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QUINCUAGÉSIMO TERCER PERÍODO DE SESIONES
Del 2 al 7 de diciembre de 2019
Lomé, Togo

Texto preliminar

Directrices para la restauración de paisajes forestales en los trópicos

Una iniciativa conjunta de CPF – OIMT, CIFOR, FAO, UICN, IUFRO, PNUMA, WeForest y WRI

Preparado para la OIMT
por Jürgen Blaser y César Sabogal

Octubre de 2019

Nota explicativa:

Este anteproyecto de **"Directrices para la restauración de paisajes forestales en los trópicos"** fue preparado para el Comité de Repoblación y Ordenación Forestal (CRF) que lo considerará en el quincuagésimo quinto período de sesiones del Consejo Internacional de las Maderas Tropicales, del 2 al 7 de diciembre de 2019 en Lomé, Togo.

La formulación del presente anteproyecto siguió el proceso siguiente:

- Decisión del quincuagésimo tercer período de sesiones del Consejo Internacional de las Maderas Tropicales, en noviembre de 2017, de revisar las "Directrices de la OIMT para la restauración, ordenación y rehabilitación de bosques tropicales degradados y secundarios" (ITTO 2002).
- Preparación de un informe de antecedentes sobre la restauración de los paisajes forestales (RPF): Análisis de los programas de RPF en curso de los miembros de la CPF y determinación de las líneas de referencia base para las nuevas directrices OIMT/CPF para la restauración de los paisajes forestales tropicales, octubre de 2018, con arreglo a la Iniciativa conjunta de la Alianza de Cooperación sobre Bosques (CPF) sobre Restauración de Paisajes Forestales.
- Presentación del informe de antecedentes y esbozo de un borrador inicial de las directrices en el quincuagésimo cuarto período de sesiones del Consejo Internacional de las Maderas Tropicales, celebrado a principios de noviembre de 2018.
- Una primera Reunión del Grupo de Expertos en RPF celebrada en Bangkok, Tailandia, a mediados de noviembre de 2018, con la participación de expertos en restauración de los países miembros, organizaciones internacionales y regionales (incluidos miembros de la Alianza de Cooperación sobre Bosques) así como organizaciones de la sociedad civil.
- Presentación de los resultados de la primera Reunión del Grupo de Expertos ante el Foro Mundial de Paisajes en Bonn, Alemania, en diciembre de 2018.
- Una segunda Reunión del Grupo de Expertos en RPF celebrada en Lüderenalp/Emmental, Suiza, en junio de 2019, para revisar el primer borrador completo y proponer un esbozo y enfoques para una revisión adicional del borrador preparada por dos consultores: el Dr. Jürgen Blaser (Suiza) y el Dr. César Sabogal (Perú).
- Presentación de los resultados de la segunda Reunión del Grupo de Expertos ante el Foro Mundial de Paisajes en Bonn, Alemania, en junio de 2019.
- Finalización del presente borrador por los consultores en octubre de 2019 con miras a su presentación y revisión en el presente período de sesiones del Consejo.

Índice

PREFACIO

- Menciona el alcance y los problemas relacionados con la restauración de los paisajes forestales
- Una introducción general del contenido sobre paisajes pasados, presentes y restaurados, incluida la noción de que los paisajes restaurados y ecológicamente funcionales del futuro serán diferentes de los paisajes actuales
- Aclara que estas directrices no son una revisión de las Directrices de la OIMT de 2002 [que mantienen su validez] sino más bien directrices más amplias basadas en seis principios convenidos sobre la restauración de los paisajes forestales
- Firma del Director de la OIMT [¿y otras organizaciones miembros de la CPF /Alianza Mundial para la Restauración del Paisaje Forestal?]

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SIGLAS Y ABREVIATURAS

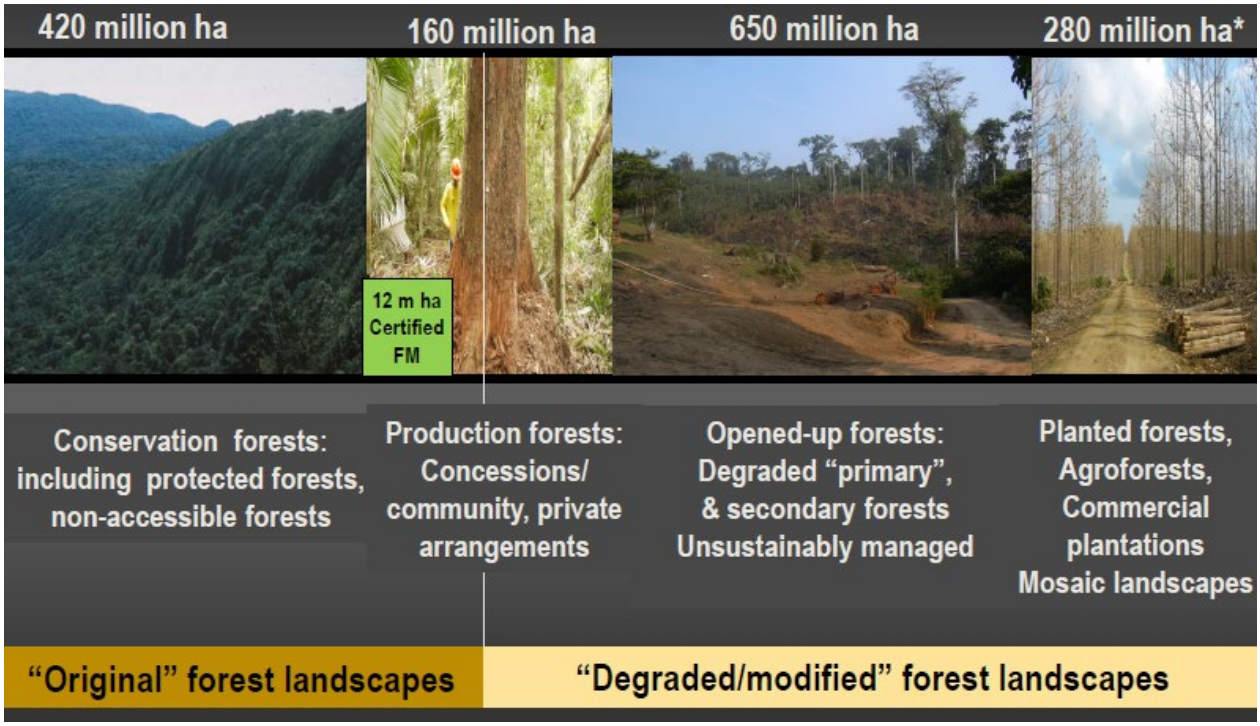
[Será preparado para la versión final]

Contexto

Los paisajes forestales tropicales del mundo se caracterizan por el cambio sin precedentes ocurrido en los últimos treinta años. Paisajes que en el pasado estaban mayormente cubiertos por bosques densos hoy muestran vastas áreas de bosques degradados y tierras sin cobertura forestal, y los bosques primarios se han visto reducidos y fragmentados. Hace una generación, se vinculó la deforestación a la intensificación de la rotación de cultivos y al desarrollo de pasturas; hoy, actores de gran poder económico están cambiando los paisajes forestales tropicales aún más para usos agroindustriales, incluidas la minería y la infraestructura. Los servicios ambientales proporcionados desde hace mucho tiempo por los paisajes forestales tropicales están en peligro, y ello tiene repercusiones importantes para la sostenibilidad, tanto a nivel local como nacional, regional, e incluso mundial.

La Figura 1 presenta una estimación de la distribución de los elementos de paisajes forestales en las zonas tropicales húmedas y semi-húmedas del mundo hasta 2019. Se estima que la superficie total alcanza cerca de 1 510 millones de hectáreas (ha), de los cuales 580 millones de hectáreas están clasificados como bosques densos de protección o producción. Otros 650 millones de hectáreas están considerados como bosques "abiertos" en varias etapas de degradación, y 280 millones de hectáreas están categorizados como paisajes “mosaico” constituidos por una mezcla de tierras de agricultura, parcelas de bosque, agrosilvicultura y sistemas silvopastoriles. Se estima por lo tanto, que la superficie de paisajes degradados o modificados de alguna otra forma en las zonas tropicales húmedas y semi-húmedas representa alrededor de 930 millones de hectáreas (la suma de los bosques abiertos y los paisajes mosaico). Estas estimaciones son similares a las de Brancalion et al. (2019), quienes estimaron que la superficie restaurable de paisajes de bosques tropicales representa 863 millones de hectáreas a nivel mundial.

Figura 1 ***Superficie estimada de paisajes forestales tropicales del mundo***



*Las estimaciones de superficie son de J. Blaser y C. Sabogal.

Publicadas en 2002, las *Directrices de la OIMT para la restauración, ordenación y rehabilitación de bosques tropicales secundarios y degradados* representaron el primer esfuerzo internacional por ofrecer orientación general sobre la restauración de los bosques tropicales. Desarrolladas en estrecha colaboración con la Unión Mundial para la Conservación de la Naturaleza (UICN), el Fondo Mundial para la Naturaleza (WWF), el Centro de Investigación Forestal Internacional (CIFOR) y la Organización de las Naciones Unidas para la Agricultura

y la Alimentación (FAO), las directrices se consideraban innovadoras cuando se publicaron ya que estaban dirigidas tanto a los responsables de políticas como a los administradores forestales para fomentar la restauración de los bosques naturales degradados y la ordenación sostenible de los bosques secundarios. Posteriormente, en 2005, la OIMT y la UICN publicaron una guía técnica complementaria sobre la restauración de los paisajes forestales, que abarcaba los enfoques a la escala de paisaje.

Desde entonces, se ha registrado un aumento enorme en el interés por el desarrollo de la restauración de los paisajes forestales (RPF) en la comunidad internacional de la silvicultura. Hoy por hoy, la RPF es uno de los tres temas internacionales de mayor prominencia en la silvicultura mundial.[1] Han surgido nuevas iniciativas y compromisos internacionales pertinentes a la RPF, como el Desafío de Bonn (2011), la Declaración de Nueva York sobre los Bosques (2014), la Asociación Mundial para la Restauración del Paisaje Forestal (AMRPF) y el Foro Mundial sobre Paisajes. La RPF está incrustada en los Objetivos de desarrollo sostenible (ODS), especialmente en el ODS 15,[2] y en las Metas Mundiales del Plan estratégico de las Naciones Unidas para los bosques. Se espera que los procesos y conceptos de la RPF constituyan componentes integrales de los programas nacionales sobre el cambio climático de la mayoría de los países tropicales como un medio para reducir las emisiones de gases de invernadero y aumentar las reservas de carbono, y de los planes nacionales para adaptar los bosques y los paisajes agrícolas a las condiciones cambiantes climáticas y ambientales.

La Asamblea General de las Naciones Unidas declaró el Decenio de las Naciones Unidas de Restauración de Ecosistemas para 2021–2030, con el objeto de aumentar la labor de restauración para abordar la grave degradación de los paisajes, incluidos los humedales y los ecosistemas acuáticos de todo el mundo. La intención es impulsar la restauración de los ecosistemas llevándolos al primer plano de los programas nacionales, aprovechando la demanda del público que clama por acción sobre el cambio climático, la pérdida de biodiversidad y el consiguiente impacto en las economías, los medios de sustento y el bienestar humano.

Además del interés político en la RPF, se han producido avances extraordinarios en los enfoques técnicos con respecto a la RPF, y en años recientes se formularon directrices y herramientas nuevas.

Esta publicación se basa en los seis principios de la RPF formulados por la AMRPF en 2018 y convenidos a nivel mundial. Para cada principio identifica una serie de elementos rectores y medidas recomendadas para emprender la RPF en escala. La publicación incluye asimismo un capítulo sobre la financiación de la RPF y las inversiones en intervenciones de RPF, y presenta recomendaciones prácticas sobre la formulación de programas y proyectos de RPF. Presenta también una serie de estudios de caso de RPF para proporcionar mayor asistencia a los profesionales en restauración de paisajes forestales tropicales.

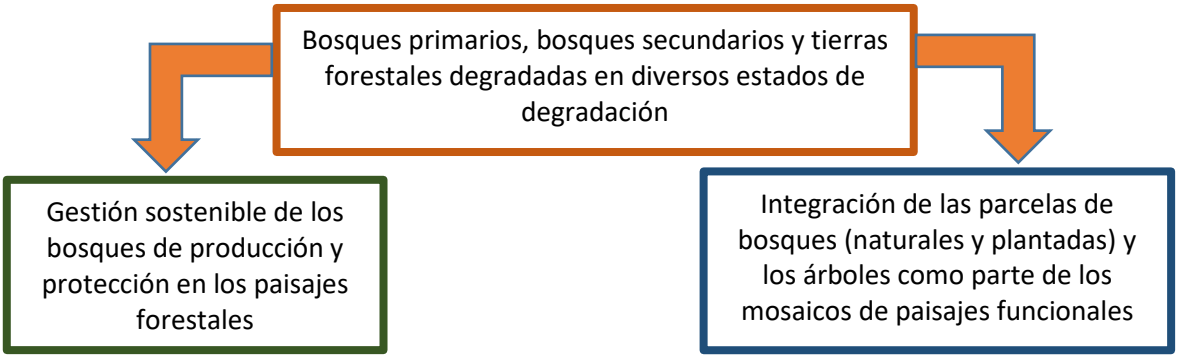
El fundamento general de la restauración de paisajes forestales (RPF) es restaurar los bosques y tierras forestales degradadas y así, con el tiempo, permitir la gestión sostenible de los paisajes. Como se describe en este documento, la RPF se concentra en la restauración de los bosques degradados y presta apoyo a una vía hacia la gestión sostenible de los paisajes restaurados. En una vista esquemática, la restauración puede estar dirigida hacia dos objetivos (Figura 2):

1) permitir la gestión sostenible de los bosques naturales como parte de la zona forestal permanente que contiene bosques de producción y protección; y
2) permitir la funcionalidad de los mosaicos de paisajes que comprenden tierras utilizadas para agricultura e infraestructura, bosques naturales, bosques plantados y árboles fuera de los bosques.

[1] Los otros dos son REDD+ y Aplicación de las leyes, gobernanza y comercio forestales (FLEGT).

[2] "Velar por la conservación, el restablecimiento y el uso sostenible de los ecosistemas terrestres, promover la gestión sostenible de los bosques, luchar contra la desertificación, detener e invertir la degradación de las tierras y detener la pérdida de la diversidad biológica."

Figura 2 ***Dos vías para la restauración de los paisajes forestales tropicales***



En general, la RPF tiene por objeto restablecer las funciones ecológicas y los bienes y servicios ambientales asociados, mejorando a la vez los resultados a nivel social (Mansourian y Vallauri 2014). Es así que la RPF no sólo aborda los procesos de degradación sino que también establece sistemas sostenibles para el suministro de bienes y servicios y productos agrícolas (p.ej. alimentos, piensos y bioenergía).

Estas directrices están dirigidas a ambas vías esquemáticas. Formuladas sobre la base de los principios mundiales convenidos en el marco de la AMRPF, ofrecen orientación sobre el desarrollo y la ejecución de los procesos de restauración de los paisajes forestales. Las directrices están vinculadas fundamentalmente con los principios que usan un marco conceptual de elementos rectores y medidas recomendadas, en consonancia con otras directrices producidas por la OIMT, especialmente las *Directrices voluntarias de la OIMT para la ordenación sostenible de los bosques tropicales naturale*s (publicadas en 2015).

1 Introducción a las directrices

Directrices y herramientas existentes para la restauración de paisajes forestales

El interés en el desarrollo de la RPF ha aumentado enormemente en la comunidad forestal internacional desde la publicación de las *Directrices de la OIMT para la restauración, ordenación y rehabilitación de bosques tropicales secundarios y degradados* en 2002 (Recuadro 1).

El lanzamiento del Desafío de Bonn en 2011 y de la Declaración de Nueva York sobre los Bosques en 2014 dio lugar a la formulación de varias series de directrices sobre la restauración de tierras y bosques degradados y su aplicación por medio de una diversidad de procesos y proyectos. El Cuadro 1 presenta un panorama general de las numerosas directrices sobre RPF formuladas desde 2012.

Recuadro 1 ***Directrices de la OIMT sobre la restauración y ordenación de bosques tropicales degradados***

Las *Directrices para la restauración, ordenación y rehabilitación de tierras forestales degradadas y bosques tropicales secundarios*, publicadas por la OIMT en 2002, fueron las primeras directrices para la restauración forestal formuladas para uso pantropical. Fueron formuladas en una época en que la restauración de los bosques tropicales estaba en las etapas iniciales de su desarrollo. Las directrices surgieron a la par de la comprensión de la amplitud de la degradación forestal en las zonas tropicales, y de un análisis inicial que estimó que 350 millones de hectáreas de tierras forestales tropicales habían sufrido daños tan graves que no volverían a crecer espontáneamente, y que otros 500 millones de hectáreas de bosques estaban degradados o habían vuelto a crecer después de la deforestación inicial. La existencia de áreas tan extensas de tierras forestales dañadas fue tanto una causa de preocupación como una oportunidad para crear un recurso de inmenso valor.

En las directrices de 2002 se destaca que antes de decidir las actividades de restauración, ordenación y rehabilitación, es preciso analizar y abordar las normativas y condiciones jurídicas y sociales existentes dentro y fuera del bosque. Son muchas las partes que tienen un interés en el bosque y los esfuerzos de restauración, ordenación o rehabilitación deben realizarse con su plena participación. Además, las directrices señalaban que es necesario resolver los problemas relacionados con la tenencia de tierras y que se deben establecer mecanismos transparentes para dirimir los conflictos relativos a los derechos de tenencia y acceso.

Asimismo, las directrices indicaban que es preciso desarrollar técnicas silvícolas que los propietarios y administradores de áreas forestales puedan comprender y aplicar. Fueron formuladas para los bosques húmedos naturales y, en vista del énfasis de la OIMT en la zona forestal permanente, excluyeron los árboles en paisajes agrícolas.

Cuadro 1 ***Panorama general de las principales directrices sobre RPF y herramientas de evaluación para la restauración de paisajes forestales***

Directrices	Año	Promotor	Alcance
Directrices de la OIMT para la restauración, ordenación y rehabilitación de bosques tropicales degradados y secundarios	2002	OIMT	Tropical, nivel forestal, nivel normativo. Primeras directrices exhaustivas sobre la RPF. Si bien contiene varias deficiencias desde la perspectiva actual, esta publicación marcó el punto inicial de las discusiones actuales amplias sobre la RPF
Rehabilitación y restauración de bosques degradados	2003	UICN	Mundial, nivel forestal y de paisaje, normativa y ejecución. Enfoques de restauración y rehabilitación de áreas vastas de bosques degradados, fragmentados y modificados
Directrices mundiales para la restauración de bosques y paisajes degradados en las tierras secas	2015	FAO	Tierras secas, nivel de paisaje, normativa, ejecución y seguimiento. Libro de referencia con instrucciones detalladas paso a paso para los diferentes niveles de RPF
Normas internacionales para la práctica de la restauración ecológica	2016	SER	Mundial, nivel de paisaje, nivel normativo. Define los pasos necesarios para planificar, ejecutar, controlar y evaluar los proyectos de restauración con miras a aumentar las probabilidades de éxito
Aumentando el efecto reverdecedor: Seis pasos para el éxito	2016	WRI	Mundial, nivel de paisaje, nivel normativo. Descripción de seis pasos importantes para la RPF correcta
Herramientas			
Restauración del paisaje forestal: Introducción al arte y ciencia de la restauración de paisajes forestales	2005	OIMT, UICN	Bosques tropicales, nivel de bosque y paisaje, nivel normativo. Presentación de complejas iniciativas de restauración en una forma simplificada que proporciona una clasificación rápida de la situación de un proyecto de RPF determinado con respecto a una diversidad de criterios
Atlas de oportunidades de restauración forestal y de paisajes	2009	WRI, UICN, Universidad de Maryland	Mundial, nivel de paisaje, nivel normativo. Herramienta de gestión de la información bajo la forma de un atlas interactivo con el objeto de ayudar en la identificación de oportunidades para la restauración
Herramienta de control de la restauración forestal (versión 1; la versión final se publicará en 2019)	2012	FAO	Mundial, nivel de bosque y parcialmente de paisaje, planificación, ejecución, seguimiento. Lista de verificación para la evaluación de las situaciones iniciales, ejecución, seguimiento y comprobación de resultados
Restauración de bosques tropicales: Guía práctica	2013	RBG, Darwin Initiative	Bioma tropical, nivel de bosque, ejecución y aplicación. Guía genérica y exhaustiva para el profesional, con conceptos y prácticas que tienen aplicación amplia en las zonas tropicales
Guía sobre la Metodología de evaluación de oportunidades de restauración (ROAM)	2014	UICN, WRI	Marco del proceso mundial, nivel nacional, nivel normativo. Marco analítico paso a paso para la identificación de técnicas de restauración apropiadas y áreas prioritarias para restauración
Diagnóstico de restauración	2015	WRI	Mundial, nivel de paisaje, seguimiento. Una herramienta para la evaluación rápida de la condición de los factores

Directrices	Año	Promotor	Alcance
			fundamentales para el éxito. Desarrollado para contribuir a la aplicación de los hallazgos de ROAM
Herramienta Spotlight	2015	IUFRO	Mundial, nivel de paisaje, nivel normativo
Herramienta para optimizar las oportunidades de restauración (ROOT)	2016	Universidad de Stanford, UICN	Mundial, marco de proceso al nivel nacional, nivel normativo. Una lista de verificación para la evaluación, el seguimiento y la comprobación de los resultados de las actividades de RPF
Selector de herramientas para la restauración de servicios ecosistémicos (RESTS)	2016	UICN	Mundial, marco de proceso al nivel nacional, nivel normativo. Marco para la toma de decisiones en la identificación de modelos para estimar los beneficios en servicios ambientales provenientes de la RPF
Ejecución de la restauración de paisajes forestales: Guía para el profesional	2017	IUFRO	Mundial, nivel de paisaje, nivel normativo y de ejecución. Módulos sobre gobernanza, diseño, aspectos técnicos, seguimiento, comunicación y mitigación y adaptación al cambio climático en la RPF
Herramienta de ayuda en la toma de decisiones para la restauración de paisajes forestales: Estado actual y futuro	2018	CIFOR	Mundial, nivel de paisaje, planificación y seguimiento. Revisión de las herramientas disponibles para orientar la toma de decisiones antes y durante la RPF. También aborda la necesidad de herramientas y enfoques analíticos adicionales
Colecciones de estudios de caso			
Casos prácticos de la AMRPF	2019	AMRPF	Mundial, nivel de paisaje, estudios de caso. Una colección integral de estudios de caso sobre la RPF que ofrece una base de prueba para los resultados de la RPF
Banco y atlas de estudios de caso sobre la restauración de paisajes forestales	2019	Forestoration Partners	Mundial, nivel de paisaje, estudios de caso. Base de datos planeada pero no ejecutada aún, sobre estudios de caso de RPF

Notas: Véase el Anexo 1 para obtener mayor información. Véanse las “siglas y abreviaturas” para los nombres completos de los promotores.

En mayor o menor medida, la mayoría de las series de directrices existentes abarca tanto las políticas como la ejecución. Procuran ser exhaustivas y, por lo tanto, en general tienen un alcance espacial relativamente amplio. Por el otro lado, varias herramientas (p.ej. ROAM, RESTS, ROOT, LDSF, Diagnóstico de restauración, Spotlight y la Herramienta de la FAO para el control de la restauración forestal —Cuadro 1) comprenden enfoques más prácticos con respecto a la ejecución de la RPF porque tratan sus procesos primarios y secundarios[3]; dichas herramientas deben ser incorporadas en toda nueva directriz en la mayor medida posible.

Las directrices y herramientas existentes sobre la RPF ofrecen las enseñanzas aprendidas siguientes:

- **Alcance geográfico y temático.** Existe un gran número de directrices y herramientas que abarcan varios tópicos; muchas de ellas tienen alcance mundial. Una serie específica de directrices se ocupa de las tierras secas (tropicales y templadas), y también hay directrices sobre los manglares y las zonas sujetas a explotación minera, así como también para regiones y ecosistemas específicos (p.ej. los bosques de

[3] Los procesos primarios están relacionados con la conceptualización y planificación de la RPF, los secundarios con el seguimiento y control y la evaluación.

montaña/andinos de Colombia, los bosques secos en algunos estados de la India y los bosques atlánticos de Brasil).

- **Normativa y ejecución.** Pocas ofrecen procesos claros y aplicables, y suelen descuidar la necesidad de conectar los procesos primarios y secundarios.
- **Informes.** En general, el éxito se notifica sobre la base de las actividades (proyectos) y no de los resultados (procesos).
- **Historias de fracasos.** Existe una tendencia a la parcialidad conformacional que favorece las historias de "éxito" motivadoras. Se mencionan menos los casos de intentos fallidos.
- **Falta de datos.** Existe una falta de datos suficientes y confiables sobre los resultados a largo plazo.

Definiciones y contexto técnico

Términos y definiciones

Al final de este documento se presenta un glosario completo de terminología. Aquí se abordan tres grupos cruciales de términos: “bosque”, “paisaje” y “restauración”, así como también el término unificador “restauración del paisaje forestal”. Como la RPF incluye un marco normativo y de ejecución, también se definen aquí “proceso”, “programa” y “proyecto”.

El término **bosque (**o forestal) se refiere aquí a un área cubierta de árboles (es decir, un área forestal) de conformidad con las definiciones nacionales de bosques. En general, dichas definiciones incluyen una cobertura mínima de copas de árbol (p.ej. 20%), y una altura mínima de árbol (p.ej. 5 M), y una superficie mínima cubierta de árboles que alcanzan como mínimo la cobertura de copas y la altura de árbol (p.ej. 0,5 ha).

En general, se pueden distinguir los tres tipos de bosque siguientes (véase el Recuadro 3 para obtener mayor información):

- **bosques naturales**, que crecen naturalmente en un sitio (generalmente a partir de semillas);
- **bosques seminaturales**, que son bosques naturales que han sido enriquecidos con especies de árboles plantados y que son manejados por medio de la regeneración natural dirigida; y
- **bosques plantados (o de plantación)**, que fueron establecidos mediante la plantación o la siembra directa. Un sistema agroforestal de uso intensivo de árboles que satisface la definición de bosque también puede clasificarse como bosque plantado.

Los bosques plantados incluyen los tipos especiales siguientes: **bosques plantados multifuncionales** y **bosques plantados similares a la naturaleza**. Los bosques plantados multifuncionales siguen enfoques silvícolas formulados para restaurar paisajes y ecosistemas degradados, contribuir a los medios de sustento de la población rural y proporcionar servicios ambientales. Los bosques plantados similares a la naturaleza se establecen generalmente con más de una especie arbórea, con especies adaptadas a la localidad y especies nativas, suelen estar estructurados verticalmente en más de una capa, y pueden contener árboles de diferentes edades (Thiel 2018).

Ordenación forestal sostenible (OFS) se define aquí como “Proceso consistente en manejar un bosque para lograr uno o más objetivos de ordenación claramente definidos con respecto a la producción de un flujo continuo de productos y servicios forestales deseados, sin reducir indebidamente sus valores inherentes ni su productividad futura y sin causar ningún efecto indeseable en el entorno físico y social” (OIMT 2016).

Sobre la base de las definiciones de la OIMT (2002), los bosques que se han alterado más allá de los efectos normales de los procesos naturales se clasifican como bosque degradado, bosque secundario o tierras forestales degradadas (Recuadro 2). Esta clasificación responde a la necesidad de ilustrar conceptos y constituye una clasificación simplificada de lo que es siempre una realidad mucho más compleja en el terreno.

En general, los bosques primarios degradados, los bosques secundarios y las tierras forestales degradadas existen en mosaicos complejos que están sujetos a cambios constantes. Suelen existir etapas intermedias o combinaciones de condiciones muy próximas, y puede resultar difícil distinguir entre ellas. Sin embargo, cada una de las tres condiciones tiene características (presentadas en el Cuadro 2) que es preciso tomar en cuenta al momento de formular estrategias de RPF.

Los **bosques secundarios**, un tipo de bosque natural, también se conocen a veces como bosques de sucesión, de regeneración o de segundo crecimiento. Los bosques secundarios se definen como vegetación boscosa que ha vuelto a crecer en tierras donde la cobertura boscosa original fue en su mayor parte desmontada por intervención humana (Marrón y Lugo 1990; Finegan 1992; OIMT). Los bosques secundarios son importantes para muchos pueblos rurales porque contribuyen a sus medios de sustento como fuentes de madera y productos no maderables para satisfacer las necesidades locales domésticas y para la venta en los mercados. Los bosques secundarios también ayudan a conservar la biodiversidad, por ejemplo al mantener la conectividad en paisajes fragmentados y proporcionar hábitat para ciertas especies; asimismo, prestan servicios ambientales como conservación de los suelos y protección de las cuencas hidrográficas.

La formación y dinámica subsiguiente de los bosques degradados y secundarios suele estar influenciada por fuerzas interrelacionadas a la escala del paisaje. Las fuerzas que llevan a la degradación del bosque existen como una continuidad de la intensificación del uso del bosque (Cuadro 2).

Recuadro 2 ***Categorías de bosques en las zonas tropicales***

BOSQUE NATURAL

Bosque primario. Bosque natural que jamás ha sido alterado por el hombre, o que se ha visto tan poco afectado por la caza, la recolección de productos y la tala de árboles que su estructura, sus funciones y su dinámica naturales no han sufrido cambios que excedan la capacidad elástica del ecosistema.[4]

Bosque natural modificado. Bosque natural manejado o explotado para la producción de madera y/o productos forestales no maderables, fauna silvestre u otros fines. Cuanto más intensivo es el uso, mayor es la alteración de la estructura y composición del bosque primario. Ecológicamente, la alteración suele representar una regresión a una etapa sucesional anterior. Se distinguen dos categorías principales:

1) **Bosque natural manejado**—bosque natural climácico en que la extracción sostenible de madera y productos no maderables (p.ej. a través de sistemas integrados de aprovechamiento y tratamientos silvícolas), el manejo de la fauna silvestre y otros usos han cambiado la estructura y la composición de especies del bosque primario original. En el bosque primario manejado se mantienen todos los productos y servicios principales. Un tipo específico de bosque natural manejado, el **bosque semi-natural**, es manejado por medio de plantación de enriquecimiento o regeneración asistida con el objeto de crear bosques dominados por las especies arbóreas deseadas (p.ej. especies locales útiles o especies de madera de gran valor).

2) **Bosques degradados y bosques secundarios**—bosques o tierras forestales que se han alterado más allá de los efectos normales de los procesos naturales mediante el uso insostenible o a través de desastres naturales tales como tormentas, incendios, deslizamientos de tierra o inundaciones. En esta subcategoría se distinguen tres condiciones diferentes:

    i) **Bosque degradado**—bosque natural climácico cuya cobertura boscosa inicial se ha visto afectada por la explotación insostenible de madera y/o productos forestales no maderables de modo tal que se han alterado su estructura, procesos, funciones y dinámica más allá de la resistencia a corto plazo del ecosistema. Dicho de otro modo, la capacidad de estos bosques para recuperarse plenamente de la explotación en el corto o mediano plazo se ha visto afectada.

[4] Esta categoría comprende los bosques utilizados por las comunidades indígenas y locales con estilos de vida tradicionales que guardan congruencia con la conservación y el aprovechamiento sostenible de la biodiversidad (de conformidad con el Convenio sobre la Diversidad Biológica).

ii) **Bosque secundario**—vegetación boscosa que ha vuelto a crecer en tierra donde la cobertura boscosa original fue en su mayor parte desmontada (con menos del 10% de la cobertura boscosa original). Los bosques secundarios por lo general se desarrollan naturalmente en tierras abandonadas después de cultivos migratorios, el asentamiento de la agricultura o pastizales, o después del fracaso de plantaciones de árboles, minería a cielo abierto, etc.

iii) **Tierras forestales degradadas**—tierras previamente boscosas que fueron profundamente dañadas por la extracción excesiva de productos forestales maderables y/o no maderables, prácticas de manejo deficientes, incendios reiterados, pastoreo u otras alteraciones o usos de la tierra que dañan el suelo y la vegetación en tal grado que se inhibe o retrasa seriamente el restablecimiento del bosque posterior al abandono (o sea el bosque secundario) u otros aprovechamientos del suelo.

BOSQUE PLANTADO

Masa forestal establecida mediante la plantación o siembra:

- **forestación**—establecimiento de plantaciones forestales en tierras no forestadas.
- **reforestación**—reposición de árboles y plantas de la cubierta inferior del bosque en un área determinada inmediatamente después de la extracción de la cobertura boscosa natural.
- **Sistemas agroforestales**—árboles forestales introducidos en paisajes de agricultura para fines específicos como árboles aislados, en hileras o en parcelas, o en otras configuraciones que no se consideren forzosamente como “bosque”. Las parcelas forestales son pequeños lotes de árboles, naturales o plantados, distribuidos en un paisaje en mosaico para formar parte de un sistema agroforestal.

Fuente: Tomado y modificado de la OIMT (2002).

La **deforestación** es la conversión de bosques en tierras utilizadas para otros fines. La deforestación suele ser permanente, pero a veces las tierras forestales pueden revertir al estado boscoso por medio de la recuperación natural (vegetación sucesional) o por reforestación. La deforestación lleva inevitablemente a la pérdida parcial de fertilidad de los suelos. Si bien la deforestación en pequeña escala para agricultura de subsistencia todavía tiene su lugar en algunos países tropicales, hoy la mayor parte de la deforestación es causada por la conversión comercial en gran escala de los bosques para agricultura o cría de vacunos, la expansión de las zonas urbanas y el desarrollo de infraestructura.

La **degradación forestal** se refiere a la reducción de la capacidad del bosque para producir bienes y servicios ambientales (FAO 2002); la “capacidad” incluye el mantenimiento de la elasticidad de la estructura y las funciones ecosistémicas (OIMT 2005). La degradación forestal también se puede definir como la interrupción antropogénica de la sucesión, lo que impone limitaciones profundas a los procesos ecológicos subyacentes. El **bosque degradado** por lo tanto produce una cantidad reducida de bienes y servicios ambientales en un sitio determinado y mantiene solo una cantidad limitada de biodiversidad. Ha perdido su estructura y función, la composición de especies y la productividad asociadas normalmente con el tipo de bosque natural que se esperaría en ese sitio.

La mayor parte de la degradación forestal viene impulsada por la extracción de madera y tala no planificada o descontrolada, la recolección de leña y producción de carbón vegetal y el pastoreo de vacunos y los incendios sin control (Hosonuma et al. 2012; Kissinger et al. 2012). La degradación forestal no es una etapa permanente sino un proceso en que, con el tiempo, interviene una diversidad de factores (Cuadro 2).

Cuadro 2 ***Diferencias entre las tres categorías principales de bosques degradados y secundarios***

Situación	**Bosque natural degradado**	**Bosque secundario**	**Tierra forestal degradada**
	→ diferentes etapas →		
Intensidad de la alteración	Intensidad leve a moderada dentro de la escala de las alteraciones naturales comunes	Intensidad severa, causada por el desmonte de la mayor parte de la cobertura boscosa original	Intensidad reiterada y drástica con la eliminación completa de la masa forestal, pérdida de la capa superficial del suelo y cambio en el microclima
Causas comunes de la alteración	▪ Sobreexplotación de madera ▪ Extracción excesiva de productos forestales no maderables ▪ Alteraciones destructivas naturales tales como incendios forestales, tormentas y sequías ▪ Pastoreo excesivo; cultivos migratorios en pequeña escala y rotación larga	▪ Tala rasa, quema y posterior abandono del área sin conversión a usos de agricultura a largo plazo ▪ Alteraciones naturales catastróficas en gran escala (p.ej. incendios, inundaciones, tormentas, deslizamientos de tierra, sequía)	▪ Usos excesivos reiterados, incendios sucesivos, pastoreo o mal manejo ecológico en suelos frágiles ▪ Erosión del suelo ▪ Minería a cielo abierto ▪ Cambios del uso del suelo
Proceso de recuperación de la vegetación	▪ Cambios relativamente menores en la dinámica de crecimiento y regeneración, excepto donde el pastoreo excesivo impide la regeneración natural ▪ Los árboles residuales suelen estar dañados, o son "perdedores" potenciales incapaces de lograr un rebrote dinámico, o son de fenotipos inferiores ▪ La recuperación se hace principalmente mediante la reposición espontánea y autógena, normalmente complementada por brotes de cepa y bancos de semillas ▪ Cambios en la composición de especies por la extracción excesiva de madera	▪ Después de la alteración se produce una secuencia de cambios sucesionales. En este proceso se pueden distinguir varias fases o etapas con características dinámicas, estructurales y florísticas específicas. La composición de especies cambia paulatinamente de las primeras a las últimas especies sucesionales ▪ Comienzo de un proceso de crecimiento sumamente dinámico, con altas tasas de asimilación de carbono y acumulación de biomasa	▪ Sólo se produce un desarrollo sucesional muy lento después del cese de la primera alteración ▪ En general, el proceso lleva directamente de la cobertura boscosa a pastizales o matorrales o, en casos extremos, a suelos yermos
Características del sitio	▪ La estructura forestal permanece relativamente intacta ▪ Normalmente, las especies heliófilas que se regeneran después de la alteración son	El bosque regenerado difiere del bosque primario en la composición de especies y en la fisonomía. Las especies son sumamente heliófilas	Falta vegetación forestal; puede haber o no arbustos o árboles pioneros individuales o en grupos pequeños

Situación	Bosque natural degradado	Bosque secundario	Tierra forestal degradada
	→ diferentes etapas →		
	similares a las que se encuentran en la masa forestal original		

Fuente: Tomado y modificado de la OIMT (2002).

La **restauración** es el "proceso de ayudar [mediante la intervención y las medidas humanas] en la recuperación de un ecosistema degradado, dañado o destruido" (SER 2004). IPBES (2018) define la restauración como "toda actividad intencional que inicia o acelera la recuperación de un ecosistema a partir de un estado degradado". Los esfuerzos de restauración deben ser planeados al nivel del paisaje como parte integral del mosaico de usos de la tierra con el objeto de restablecer la integridad ecológica y contribuir al bienestar de la población (Maginnis y Jackson 2003).

Paisaje y enfoque de paisaje. El término **paisaje** se refiere a un área de tierras que contiene un mosaico de ecosistemas, incluidos los ecosistemas alterados por el ser humano. El término paisaje cultural se refiere a los paisajes que contienen una población humana importante (Evaluación de los Ecosistemas del Milenio 2003). La OIMT (2002) definió el término paisaje como un "grupo de tipos de ecosistemas interactuantes".

El **enfoque de paisaje** se define generalmente como un marco para la integración de las normativas y la práctica en múltiples usos de la tierra en un área determinada, para asegurar el aprovechamiento justo y sostenible de las tierras, reforzando a la vez las medidas para la mitigación y adaptación al cambio climático (Reed et al. 2014). Los enfoques de paisaje tratan procesos que tienen por objeto conciliar la conservación y las compensaciones que exige el desarrollo (Sayer 2009) en un área geográfica determinada. La FAO (2012) definió el enfoque de paisaje como aquél que trata procesos en gran escala de forma integral y multidisciplinaria, combinando el manejo de los recursos naturales con las consideraciones ambientales y de sustento; se distingue del enfoque ecosistémico en que puede incluir ecosistemas múltiples.

Según Sayer et al. (2013) "los enfoques de paisaje procuran proporcionar las herramientas y los conceptos para adjudicar y manejar las tierras con el objeto de alcanzar objetivos sociales, económicos y ambientales en áreas donde la agricultura, la minería y otros usos productivos de la tierra compiten con las metas ambientales y de biodiversidad". El Foro Mundial sobre Paisajes define el enfoque de paisaje como "el intento de alcanzar, de la mejor manera posible, un equilibrio entre las exigencias de los usos de la tierra para el bienestar humano y el medio ambiente. Ello implica crear soluciones que tomen en consideración los alimentos y los medios de sustento, los aspectos financieros, los derechos, la restauración y el progreso con miras a las metas del clima y el desarrollo".

El **manejo integral del paisaje** implica una colaboración a largo plazo entre diversos grupos de administradores de tierras y partes interesadas para alcanzar objetivos múltiples, que normalmente incluyen la producción agrícola y de madera, la prestación de servicios ambientales (como regulación del caudal de las aguas, mantenimiento de la calidad del agua, polinización, secuestro de carbono, reducción de la degradación forestal y valores culturales), la conservación de la biodiversidad, belleza, identidad y valor recreativo del paisaje, y los medios de sustento locales y la salud y el bienestar de la población (Scherr et al. 2013; Mankad 2014).

El **manejo sostenible de las tierras** (MST) es "el uso de los recursos de las tierras, incluidos los suelos, el agua, los animales y plantas, para la producción de bienes que satisfacen las necesidades humanas cambiantes, velando simultáneamente por asegurar el potencial de producción de dichos recursos a largo plazo y el mantenimiento de sus funciones ambientales" (Naciones Unidas 1992). Liniger et al. (2011) definen el MST como "sistemas de uso de las tierras que propician prácticas de manejo apropiadas para permitir a los usuarios de las tierras maximizar los beneficios socioeconómicos para sus medios de sustento derivados de las tierras, manteniendo o mejorando a la vez las funciones ecológicas de los recursos de las tierras" (Djenontin et al. 2018).

El **paisaje en mosaico** es un paisaje con una ocupación humana moderada que generalmente combina bosques o tierras boscosas con agricultura y pequeños asentamientos; es típico de muchos paisajes rurales del mundo (Stanturf et al. 2019).

El **paisaje productivo** es el paisaje capaz de proporcionar no solo productos agrícolas o forestales, sino también una amplia gama de productos y servicios (ambientales) y de satisfacer las necesidades sociales, económicas y ambientales y aspiraciones de las generaciones presentes y futuras al nivel local, nacional y mundial (Zagt y Chavez-Tafur 2014).

El **paisaje forestal o boscoso** es el paisaje dominado por bosques (sean estos naturales o plantados, o ambos).

La **restauración de paisajes** implica un proceso destinado a restaurar la estructura, la dinámica o las funciones del paisaje, entendiéndose el paisaje como un mosaico de unidades de paisaje interactivas (Metzger 2001).

El término **restauración de paisajes forestales** (RPF, también conocido como restauración de bosques y paisajes[5]) no tiene una definición universal. Maginnis and Jackson (2002) lo definían como "un proceso que procura recuperar la integridad ecológica y mejorar el bienestar humano en los paisajes deforestados o forestales degradados". En general, se entiende que la RPF se concentra en la restauración de paisajes y no así de sitios individuales (Beatty et al. 2018) y procura revertir la degradación del suelo, de las zonas agrícolas, forestales y de las cuencas hidrográficas, de modo que recuperen su función ecológica, tanto en áreas discretas como a la escala de paisaje. Laestadius et al. (2011) definen la RPF como un "marco de integración que puede, y debería ser aplicado a toda una gama de usos de la tierra para asegurar el mantenimiento y fortalecimiento de las funciones ecosistémicas fundamentales y las necesidades de la sociedad". FAO/RECOFTC (2016) considera la RPF como "un enfoque innovador que integra la labor de restauración en el bosque con otras actividades a través de todo el paisaje para lograr la productividad óptima, tanto en términos comerciales como ecológicos". La AMRPF (Besseau et al. 2018) define la RPF como "un proceso activo que reúne a la población para identificar, negociar y ejecutar prácticas que restablezcan un equilibrio óptimo convenido de los beneficios ecológicos, sociales y económicos de los bosques y los árboles en un patrón más amplio de usos de la tierra".

En estas directrices, la RPF se define como un proceso constante de recuperación de la función ecológica y mejora del bienestar humano en los paisajes forestales degradados y desforestados. La RPF no es un fin en sí mismo, sino un medio para recuperar, mejorar y mantener las funciones ecológicas y sociales cruciales a largo plazo, conduciendo así al MFS y al MTP. La RPF es más que plantar árboles: tiene por objeto restaurar paisajes enteros para satisfacer necesidades presentes y futuras y ofrecer beneficios múltiples con el tiempo. Se trata de:

- **bosques**—porque implica aumentar el número y la salud de los árboles de un área;
- **paisajes**—porque implica aspectos biofísicos, como cuencas hidrográficas enteras, así como también dimensiones normativas, sectores y comunidades múltiples, posiblemente varias jurisdicciones, y una diversidad de situaciones jurídicas, sociales y culturales que pueden resultar complejas; y
- **restauración**—porque implica recuperar la productividad biológica y los valores económicos, sociales y culturales de los paisajes para producir beneficios para la población y el planeta.

Estas directrices hacen una distinción entre los procesos de RPF y las intervenciones de RPF.

El **proceso de RPF** comprende tres elementos fundamentales: participación, manejo adaptativo y un marco constante de seguimiento y aprendizaje. Se aplica mayormente por medio de intervenciones de RPF. El proceso de RPF está relacionado con decisiones normativas y estratégicas tomadas por gobiernos o

[5] Algunos expertos y organizaciones prefieren el término "restauración de bosques y paisajes", con el mismo significado (Laestadius *et al.* 2015). Este documento no distingue entre los dos términos.

plataformas de actores al nivel nacional, subnacional o local (o, en la situación ideal, una combinación de estos) e incluye una diversidad de procedimientos intersectoriales (p.ej. instituciones, normativas, prescripciones jurídicas, gobernanza y enfoques técnicos) que ayudan a fomentar la RPF. Por lo tanto, el proceso de RPF es la realización de actividades o medidas que crean resultados especiales por medio de decisiones conscientes de las personas dedicadas a dicho proceso. Lleva a una serie de estados y etapas que forman una trayectoria definida por la comunidad pero que permite la adaptación a través del tiempo.

La **intervención de RPF** incluye arreglos de ejecución con miras al desarrollo en una escala relativamente amplia (p.ej. en una jurisdicción política determinada) o en una escala pequeña (p.ej. en una cuenca hidrográfica local). La intervención de RPF se realiza en un cierto marco temporal que puede durar o no alcanzar la totalidad del proceso de RPF a largo plazo. En la intervención de RPF se puede distinguir entre un programa de RPF, un proyecto de RPF y las actividades de RPF:

- El **programa de RPF** es una intervención de RPF en una escala relativamente grande, como dentro de una jurisdicción política determinada, e incluye un plan escrito o una normativa definida con miras a alcanzar metas específicas. En general, el programa de RPF incluye un proceso para formular el programa, la participación de una serie de organizaciones e instituciones, arreglos específicos y protocolos de ejecución, y la evaluación con respecto a criterios acordados. En general, los programas de RPF son iniciados por responsables de las decisiones de las organizaciones gubernamentales o no gubernamentales y, por lo tanto, se puede considerar que tienen un enfoque descendente. Pueden estar limitados en el tiempo y el espacio y también ser indefinidos. La mayoría de los programas de RPF existentes están vinculados a marcos de financiación de gran envergadura como el Fondo del Carbono del Fondo Cooperativo para el Carbono de los Bosques y el Fondo Verde para el Clima.

- Los **proyectos de RPF** suelen ser intervenciones para un sitio específico dentro de un paisaje más amplio, y suelen estar dedicados al fomento local, que está limitado en el alcance y el tiempo y financiado por recursos de fomento nacionales o internacionales. El proyecto de RPF puede ser autónomo o bien estar integrado en un enfoque programático más amplio.

- Las **actividades de RPF** tienen por objeto alcanzar ciertas metas o cumplimentar programas especiales. Pueden ser a corto o mediano plazo, y de pequeña o gran envergadura. Pueden seguir un enfoque descendente, ascendente o combinar ambos, y abarcar actores, colaboradores e interesados múltiples; pueden incluir uno o varios sitios. Las actividades de RPF están limitadas en el tiempo y el espacio, y tienen un presupuesto y entregables claros.

El MFS y la RPF — ¿cuál es su relación?

Los bosques naturales bajo manejo sostenible pueden ser la fuente de una diversidad de productos, servicios ambientales y oportunidades económicas, sociales y culturales. Asimismo tienen muchas partes interesadas locales y no locales. El manejo de un bosque natural con miras a un solo producto o servicio puede afectar su capacidad de proporcionar otros; por ejemplo una tasa relativamente alta de extracción de madera puede afectar el valor de un bosque como hábitat para la fauna silvestre. Es mejor tomar las decisiones sobre las compensaciones en el suministro de diversos productos y servicios ambientales utilizando procesos que incluyen toda la gama de partes interesadas. Los administradores forestales que aplican el MFS deben buscar constantemente el equilibrio entre diversos objetivos de manejo que, inevitablemente, van cambiando con el tiempo a medida que cambian las necesidades y los valores de la sociedad; éste es el reto que afronta el MFS. Si bien está incrustada en la legislación de muchos países, el manejo forestal multipropósito ha resultado ser un emprendimiento complejo que afronta una diversidad de obstáculos económicos, sociales e institucionales (García-Fernández et al. 2008; Guariguata et al. 2010; Sabogal et al. 2013). No obstante, las historias de éxito en los trópicos, tanto en el manejo forestal privado como comunitario demuestran que puede funcionar en beneficio de las comunidades y los bosques (Gilmour 2016; Sabogal y Casaza 2010; FAO).

Es probable que el manejo de los bosques naturales tropicales se realice con frecuencia creciente en lo que se pueden denominar bosques “antropogénicos” y en paisajes predominantemente agrícolas (paisajes en mosaico). Es así que, cada vez más, la RPF necesitará abordar las trayectorias y la calidad de las porciones

de bosques en matrices de paisajes de espacio y tiempo dinámicos (Chazdon et al. 2016). Los procesos de RPF pueden permitir la restauración de la función ecológica y el potencial de producción de los paisajes, lo que incluye las porciones de bosques naturales y plantados, sobre la base de una evaluación de las necesidades y condiciones. Así, según dichas necesidades y condiciones, se pueden adoptar diversos enfoques técnicos que incluyen la restauración ecológica, la regeneración natural, la regeneración natural asistida, la plantación de enriquecimiento, la reforestación, la forestación y la agrosilvicultura, en todo el mosaico de usos de la tierra como parte de la RPF.

Financiación e inversión en la RPF

La RPF es un empeño mayúsculo que requiere recursos considerables para desarrollar una visión y luego conceptualizarla y ponerla en práctica antes de alcanzar la sostenibilidad. La ambición es que, con el tiempo, los paisajes forestales y en mosaico restaurados sean económica, social y ambientalmente sostenibles. Las primeras tres fases de la RPF, diseño o desarrollo de visión, conceptualización y ejecución, requieren financiación específica. Las posibles fuentes de financiación incluyen los gobiernos nacionales, los donantes bilaterales (gobiernos y sector privado) y los organismos multilaterales de financiación como el Fondo Verde para el Clima, el Fondo Mundial del Medio Ambiente y los bancos de desarrollo. A medida que un proyecto avanza hacia la fase de sostenibilidad, es probable que vayan aumentando las oportunidades para las inversiones privadas o la financiación mixta (con participación de fuentes de financiación tanto públicas como privadas).

Los bosques se pueden degradar muy rápidamente, pero la RPF implica esfuerzos continuos por períodos largos. Los bosques degradados pueden seguir dos vías principales al desarrollo:

1) hacia un paisaje de uso más intensivo, en un mosaico que incluye diversos usos de la tierra, que podría ir de la agrosilvicultura a los bosques naturales manejados a nivel industrial o a los bosques plantados; y

2) hacia un bosque natural restaurado para fines de protección o producción, incluidos los bosques secundarios, en los que el objetivo primario es el suministro de servicios ambientales múltiples (incluso la conservación de la biodiversidad), por lo menos en las primeras etapas de la restauración.

La restauración de bosques manejados a nivel industrial puede crear beneficios económicos significativos además de alcanzar importantes metas sociales y ambientales, incluidos los impactos financieros positivos netos (beneficios privados) y los impactos económicos positivos netos (beneficios públicos) con respecto al *status quo* del uso de la tierra.

Los aspectos económicos de la segunda vía de desarrollo indicada más arriba son menos interesantes para los inversionistas privados que los de la primera. La serie de servicios ambientales producidos en dichos bosques es normalmente mayor que en los bosques plantados comerciales, pero muchos de los beneficios revisten características de bien público y no se comercian en el mercado. La disponibilidad de recursos financieros para restaurar bosques naturales degradados es limitada, y existen pocas cadenas de valor para la madera y los PFNM que generen productos comerciales en las etapas iniciales del proceso de restauración. Una opción sería exigir que los inversionistas que siguen una vía comercial a la RPF, asignen una proporción determinada específicamente a un paisaje para restauración de bosque natural. Por otra parte, se podrían asignar a esto los retornos fiscales de los bosques manejados comercialmente.

Las dos vías básicas de desarrollo de la RPF, es decir la vía que favorece los resultados comerciales o la que se inclina por resultados del bien común, son legítimas, pero una no puede sustituir a la otra. En mayor escala, ambas son necesarias y deben ser consideradas complementarias, y la adjudicación relativa de espacio a las dos estrategias debe ser una cuestión decidida según las necesidades y preferencias de la sociedad.

Se recomienda que ambas realicen la planificación estratégica del paisaje. Será preciso identificar las partes interesadas y evaluar los costos y beneficios esperados, tanto monetarios como no monetarios. Esto ayudará a identificar probables compensaciones entre los intereses opuestos durante el proceso de la RPF. Además, es preciso acordar las modalidades que permitan lograr la distribución equitativa de los costos y beneficios entre las partes interesadas, para así alcanzar resultados de restauración perdurables. Este proceso de planificación implica importantes requerimientos de datos, incluso estimaciones de los resultados económicos, sociales y ambientales, sobre la base de los datos.

REDD+ constituye una posible fuente de financiación que responde a las finalidades de la RPF así como también a la mitigación del cambio climático. Ambos enfoques ofrecen muchas sinergias, pero es importante reconocer que tienen énfasis diferentes. REDD+ se concentra en reducir las emisiones de carbono y aumentar los sumideros de carbono, mientras que otros beneficios, como el aumento de la integridad ecológica y el bienestar social son secundarios. La RPF procura mejorar la integridad ecológica y el bienestar social, incluso por medio del aumento de las reservas de carbono y otros beneficios. No obstante, lograr la consonancia entre la RPF y REDD+ puede crear incentivos positivos y fomentar los programas y proyectos a nivel de jurisdicción.

La comunicación y el seguimiento para lograr el compromiso y el apoyo público

La falta de datos, conocimientos y experiencia adecuados sobre las dimensiones ecológicas, socioeconómicas, silvícolas e institucionales del paisaje afecta e influencia la comprensión de las personas y suele conducir a normativas y manejo deficientes, mayor degradación de los recursos y uso inapropiado de la tierra. Por lo tanto, la comunicación de los resultados del seguimiento y control de la RPF es esencial para aumentar la comprensión de los costos y especialmente los beneficios de la RPF, y para asegurar que todas las partes interesadas continúen creyendo en el proceso de la RPF y prestando apoyo a la toma de decisiones.

El seguimiento y comunicación efectivos son esenciales para asegurar los siguientes:

- el compromiso político amplio y la coordinación multisectorial constante;
- la movilización y el uso de los conocimientos científicos, locales y tradicionales y la experiencia técnica;
- el intercambio constante de conocimientos y la distribución de las enseñanzas aprendidas para aumentar la dimensión de los programas y proyectos de RPF a la escala del paisaje y más allá;
- el entendimiento generalizado del contexto económico, social y ambiental, y de los cambios del contexto en que se aplican estos conocimientos;
- el apoyo de las partes interesadas, la formulación de normativas y medidas propicias para la RPF, la adjudicación de presupuestos nacionales, los recursos financieros internacionales y las inversiones del sector privado en la RPF.

Presentación de las directrices

Ámbito de aplicación

Estas directrices constituyen un documento de referencia internacional para la formulación y el perfeccionamiento de las directrices nacionales y subnacionales sobre la RPF en los trópicos. Proporcionan orientación al nivel normativo y operativo para restaurar los bosques (de producción y protección) degradados y los antiguos paisajes forestales en los biomas forestales tropicales.[6] Se centran en la restauración de los ecosistemas forestales funcionales y en los sistemas de producción agrícola multipropósito basados en los árboles en los paisajes. Sus objetivos son aumentar las contribuciones positivas de los árboles y bosques a la salud ecológica, productividad y resiliencia de los paisajes y producir productos forestales (p.ej. productos maderables, energía y alimentos).

El diseño de las directrices permite proporcionar una base para las decisiones de política y una referencia técnica que puede ser utilizada o adaptada a las necesidades y capacidades de los usuarios. Las directrices presentan el fundamento para la acción e indican las funciones y responsabilidades de las partes interesadas y las medidas para la RPF.

Las directrices son voluntarias. Pueden ser adaptadas según corresponda, a las circunstancias nacionales y locales.

Considerando los objetivos generales de recuperar la función ecológica y aumentar el bienestar humano en los paisajes forestales degradados, la RPF, en el ámbito de aplicación de las presentes directrices, implica la selección de una de las cuatro opciones siguientes, o una combinación de éstas:

1) **Restauración de los bosques naturales (de producción) degradados.** Esta opción se utiliza normalmente en áreas donde las presiones socioeconómicas y ambientales han llevado a la degradación forestal (en términos de su extensión, estructura, composición y funciones). Este tipo de restauración puede incluir medidas de conservación y silvicultura para asegurar que el bosque anteriormente productivo tenga tiempo de regenerarse naturalmente, plantación de árboles de enriquecimiento y, sobre todo, protección de las tierras de los usos que previamente causaron la degradación. La restauración forestal puede tener por objeto el aumento sostenible de la producción de madera y productos forestales no maderables y la mejora de sus cadenas de suministros, el aumento del almacenamiento de carbono, la conservación de la biodiversidad por medio de la restauración del hábitat natural, el aumento de la protección de las cuencas hidrográficas y el aumento de la resiliencia del paisaje.

2) **Manejo de los bosques secundarios.** En general, los bosques secundarios forman parte integrante de los sistemas locales y regionales de aprovechamiento de las tierras y de producción en los trópicos. Según el contexto (p.ej. tenencia, calidad del sitio, potencial biológico, mercados, disponibilidad de mano de obra y capacidad administrativa), las estrategias pueden incluir el manejo del bosque secundario como un barbecho mejorado en un ciclo de cultivo-barbecho (p.ej. como parte de un sistema de agrosilvicultura) o bien como sistema de producción de bosque alto para madera, usos múltiples y conservación (OIMT 2002; Sabogal). El manejo del bosque secundario como parte de un enfoque de paisaje puede ser una opción económica que contribuye a la multifuncionalidad mediante la aceleración de la regeneración natural, la recuperación de la biodiversidad y el secuestro de carbono. Los productos y servicios ambientales derivados de los bosques secundarios pueden diversificar los ingresos mediante la transformación de valor agregado y la comercialización.

3) **Rehabilitación de las tierras forestales degradadas o de tierras previamente boscosas para mejorar las funciones de producción y protección.** La rehabilitación de tierras forestales degradadas reservadas para funciones de protección (p.ej. para conservación de la biodiversidad y protección de las cuencas hidrográficas) y de sus zonas de amortiguación, puede incluir el establecimiento de bosques plantados y árboles (estos últimos por ejemplo distribuidos en parches por el paisaje). El objetivo es

[6] Las directrices se centran en las tierras forestales, y no abordan directamente otras categorías de uso de la tierra como las tierras de cultivo, los pastizales y los asentamientos.

restablecer las funciones protectoras del paisaje, como la protección del agua, los suelos y la biodiversidad, así como también la producción de bienes y servicios ambientales para ampliar los medios de sustento y generar ingresos.

4) **Integración de los árboles en los paisajes agrícolas.** En esta opción las intervenciones pueden incluir el aumento de la densidad de árboles en el paisaje; la prevención de la degradación de las tierras mediante mejoras a las prácticas de conservación agrícola, como la agrosilvicultura; la adopción de prácticas de manejo de recursos que, por ejemplo, reducen al máximo el pastoreo excesivo, los incendios forestales incontrolados, la tala excesiva y la recolección excesiva de leña; y la protección de los árboles y arbustos que ocurren naturalmente en las granjas. La integración juiciosa de los árboles en los paisajes de agricultura puede ayudar a mantener y aumentar el rendimiento de los cultivos, mejorar los medios de sustento e ingresos de la comunidad, y contribuir a la adaptación de los paisajes y las comunidades al cambio climático. Es bien sabido que la agrosilvicultura es una práctica agrícola inteligente en términos climáticos, que puede aumentar la productividad, sostenibilidad y resiliencia de los paisajes agrícolas y pastoriles. La agrosilvicultura representa un medio valioso para restaurar tierras agrícolas excesivamente explotadas y de baja productividad.

Destinatarios

Estas directrices fueron diseñadas para la diversidad más amplia posible de partes interesadas. Muchos actores tienen intereses en el uso y manejo de los paisajes forestales tropicales. Si bien algunos usos son compatibles, otros no lo son. Por ejemplo algunos actores desean preservar los bosques naturales (si bien pueden variar las interpretaciones del término “preservar”), y otros desearían desmontar el mismo bosque para facilitar la explotación de sus suelos o minerales. Entre estos dos extremos hay una amplia gama de actores y una gran diversidad de usos para los bosques y paisajes. Por lo tanto, las directrices están dirigidas a los grupos de actores siguientes:

- **Responsables de políticas forestales y de recursos naturales al nivel nacional y subnacional**, como los organismos gubernamentales que se ocupan de la gestión y conservación forestal, agricultura, planificación del aprovechamiento de las tierras, medio ambiente, energía, agua y minería; agencias nacionales de desarrollo y extensión que se ocupan de cuestiones de desarrollo a un nivel más amplio, lo que incluye la aplicación de los ODS, las contribuciones decididas a nivel nacional con arreglo al Acuerdo de París sobre el cambio climático, los programas nacionales de acción para la adaptación y otros planes de fomento; y los legisladores, como parlamentarios y partidos políticos.
- **Profesionales de la restauración, incluidos los administradores forestales y los extensionistas agrícolas** de agencias estatales o locales y las asociaciones de productores, así como también los pequeños terratenientes que dependen de los bosques y las comunidades rurales y forestales.
- **Organizaciones del sector privado**, como las empresas forestales pequeñas, medianas y grandes y sus organizaciones centrales, y los grupos de inversión y comercio de la agricultura.
- **Organizaciones de la sociedad civil**, como las organizaciones no gubernamentales y los grupos que abogan por el medio ambiente y el desarrollo.
- **Instituciones de investigación y educación,** como las instituciones y organizaciones públicas y privadas de investigación silvícola, educación y formación.
- **Gobiernos de los miembros consumidores de la OIMT** y otras economías desarrolladas y emergentes, así como también las **agencias de financiación y desarrollo** públicas y privadas internacionales.

Estructura: principios, elementos rectores y medidas sugeridas

Las directrices comprenden cinco capítulos principales y anexos.

El **Capítulo 1** presenta los antecedentes y el contexto para el documento, define su alcance y presenta las definiciones fundamentales.

El **Capítulo 2** presenta los seis principios de la RPF convenidos mundialmente y los detalla por medio de una serie de elementos rectores. Los principios son las reglas fundamentales para la definición del proceso de RPF, y los elementos rectores son los componentes que deben estar presentes para garantizar la adhesión a dichos principios.

El **Capítulo 3** presenta las intervenciones de la RPF como una continuidad de los elementos rectores del Capítulo 2, y un listado de las herramientas y otros materiales de conocimientos para asistir en dichas intervenciones.

El **Capítulo 4** introduce la idea de casos teóricos de RPF y ofrece estudios de caso ilustrativos para la ejecución de la RPF bajo ciertos casos de restauración generalmente representativos. Los casos teóricos se definen en términos de los resultados buscados y según los objetivos definidos por las partes interesadas locales y otras, así como también por sus factores específicos y vías de degradación.

El **Capítulo 5** ofrece recomendaciones sobre el uso de las directrices.

2 Principios y elementos rectores para la restauración de los paisajes forestales tropicales

Los principios y elementos rectores presentados aquí fueron preparados para ayudar a las partes interesadas a formular y controlar las normativas nacionales destinadas a crear las condiciones propicias para la ejecución y los resultados de la RPF. La RPF no es un fin en sí mismo, sino un medio para recuperar, mejorar y mantener las funciones ecológicas y sociales cruciales (Besseau et al. 2018). Las normativas formuladas para fomentar la RPF deberán ayudar a crear paisajes tropicales sostenibles y resilientes en los que los bosques tengan un papel primordial.

Los seis principios internacionales de la RPF convenidos y aprobados en 2018 (Besseau et al. 2018) son los siguientes:

1. Enfoque centrado en los paisajes

2. Implicar a los interesados y apoyar la gobernanza participativa

3. Restaurar múltiples funciones para obtener múltiples beneficios

4. Mantener y mejorar los ecosistemas naturales dentro de los paisajes

5. Adaptación al contexto local empleando diversos enfoques

6. Gestión adaptativa para lograr la resiliencia a largo plazo.

Estos principios proporcionan la base conceptual para las presentes directrices para la RPF; en conjunto forman una continuidad que define el proceso de RPF. Los elementos rectores siguientes describen en mayor detalle cada principio y las condiciones necesarias para el éxito de la RPF.

Principio 1: Enfoque centrado en los paisajes

Fundamento

La RPF tiene lugar dentro de paisajes enteros y entre estos. Se centra en la restauración de los paisajes, no en sitios individuales (Beatty et al. 2018). La RPF debe ser planificada y organizada a la escala del paisaje, no solo en áreas boscosas. Debe tomar en cuenta la diversidad de los usos del suelo y los sistemas de tenencia y gobernanza del paisaje y, en la mayor medida posible, debe permitir la flexibilidad al ir cambiando las condiciones en el futuro.

El fundamento de este principio es lograr un compromiso con la restauración de los bosques degradados y las tierras no forestales a la escala de paisaje, sobre la base de la planificación adecuada del uso de la tierra. Para crear las condiciones propicias necesarias se necesitan políticas apropiadas y los marcos jurídicos correspondientes; dichas condiciones requieren, entre otras cosas, un marco de política y gobernanza que vaya más allá del sector forestal (e incluya, por ejemplo, los sectores de la agricultura, ganadería, minería y energía). Al nivel internacional, el enfoque más amplio en los paisajes forestales cuenta con el apoyo, por ejemplo, de los ODS (especialmente el ODS 15), el Desafío de Bonn, REDD+ y los mecanismos de financiación como el Fondo Verde para el Clima y el Fondo Mundial del Medio Ambiente.

La RPF sólo tendrá éxito cuando se comprendan y aborden las causas subyacentes de la deforestación y degradación forestal, especialmente las que están relacionadas con la tenencia de la tierra, la gobernanza, las deficiencias del mercado y la falta de coordinación al nivel normativo (Mansourian 2017), y ello tomando en consideración los intereses de todas las partes interesadas (IPBES 2018). Para la ejecución correcta de la RPF es crucial comprender, influenciar y darle forma a la gobernanza del paisaje.

Elementos rectores

ER1: Realizar una evaluación del paisaje y planificación del uso de la tierra de forma incluyente y con una perspectiva de género

Para formular procesos de RPF efectivos es crucial conocer la base de recursos, lo que incluye las condiciones biofísicas, ecológicas, económicas y sociales. Será preciso reunir datos contundentes de línea de referencia base a la escala de paisaje, y contar con procesos incluyentes de planificación del uso de la tierra que permitan el desarrollo de paisajes multifuncionales.

Como parte de la planificación del uso de la tierra, es preciso tomar decisiones claras con respecto a las zonas que se utilizarán para agricultura en el corto y largo plazo y las que se dedicarán a la conservación, el MFS y la zona forestal permanente.[7] El equilibrio correcto entre las intervenciones de RPF puede variar mucho según el contexto.

El mantenimiento de la RPF debe ir más allá de los proyectos. Se requiere un diagnóstico participativo de las condiciones económicas, sociales y biofísicas como base para la ejecución, el seguimiento y control, la evaluación y el manejo adaptativo de la RPF.

La planificación del uso de la tierra debe realizarse de forma conjunta e intersectorial, con la participación de todas las partes interesadas y con el apoyo de expertos, para asegurar que la toma de decisiones sea justa y transparente y reducir al máximo los conflictos sobre el uso de la tierra en un paisaje, y manejarlos de la mejor forma posible.

ER2: Lograr el reconocimiento de que la RPF debe trascender las políticas sectoriales

Se requieren políticas para fomentar los enfoques de RPF, que conduzcan a leyes y reglamentación propicias para la retención de los bosques naturales y que favorezcan los programas de RPF que, simultáneamente, restauran la productividad de las tierras forestales degradadas, aumentan su valor por la gama de bienes y servicios ambientales que ofrecen, y usan los métodos más apropiados para mantener la restauración. Las políticas de RPF deben estar centradas en la persona y ser aplicadas de forma intersectorial.

Los procesos de RPF sólo alcanzarán el éxito si la gobernanza del uso de la tierra al nivel más amplio es efectiva. Para garantizar el éxito a largo plazo de los procesos de RPF es preciso contar con políticas de uso de la tierra que sean adecuadas y ejecutables.

No toda la deforestación es inapropiada. Los factores económicos y sociales pueden requerir la conversión de áreas considerables de bosques degradados y tierras deforestadas a agricultura y otros usos de la tierra; sin embargo, es preciso contar con las condiciones y reglas necesarias antes de emprender el cambio del uso de la tierra, para asegurar que dicha conversión no represente un riesgo para la sostenibilidad y que se aplique la RPF en la mayor medida posible. Es así que los enfoques multisectoriales son la clave para lograr paisajes forestales sostenibles.

Los instrumentos normativos deben tener una base económica sólida. En vista de que la RPF traerá beneficios sociales que posiblemente no se tomen en cuenta en el mercado, se requieren políticas para amortiguar los efectos de las deficiencias del mercado sobre dichos planes.

[7] La zona forestal permanente es la porción del bosque total de un país o de otra jurisdicción, designada (generalmente por ley) para ser mantenida como bosque indefinidamente.

ER3: Ejecutar la RPF a una escala apropiada	ER4: Abordar plenamente la tenencia y los derechos de acceso
El paisaje no siempre cae dentro de una sola jurisdicción. El enfoque en los paisajes requiere la identificación de una escala adecuada para la RPF, que busque un equilibrio entre las necesidades económicas, sociales y ambientales. Los paisajes suelen trascender las fronteras políticas (o jurisdicciones) y lograr la RPF puede requerir la coordinación y cooperación entre ellas. Esto se logra más fácilmente si los compromisos con la RPF están en consonancia con los objetivos de política nacionales y subnacionales con respecto a uso de la tierra, clima, biodiversidad y desertificación, según corresponda.	**Para lograr la seguridad a largo plazo de las inversiones en RPF es esencial contar con enfoques equitativos y justos con respecto a los derechos de tenencia de la tierra y de acceso, y los derechos consuetudinarios y de propiedad.** Es preciso contar con derechos claros a la tenencia de la tierra y a la propiedad para poder evitar mayor degradación forestal y conversión inapropiada a otros usos de la tierra. En muchos casos existe una superposición de reivindicaciones del estado, el sector privado y las comunidades locales con respecto a la tenencia de los bosques degradados y secundarios. Como consecuencia, son comunes los conflictos por derechos de acceso, que suelen llevar al uso insostenible y a la mayor degradación del recurso. El éxito de la RPF exige que los derechos a la tenencia de la tierra, al acceso a los recursos y a su manejo sean inequívocos y respetados universalmente. Los conflictos con respecto a estos derechos deben ser resueltos por medio de procesos transparentes con el objeto de beneficiar a los grupos marginados.

Principio 2: Implicar a los interesados y apoyar la gobernanza participativa

Fundamento

La participación y colaboración de las partes interesadas es esencial para lograr resultados de RPF óptimos. La formulación de enfoques de manejo debe incluir la armonización de los diversos requisitos, valores y perspectivas de las partes interesadas y el uso de sus conocimientos y experiencia.

La RPF implica activamente a las partes interesadas, incluidos los grupos vulnerables, en la planificación y la toma de decisiones sobre el uso de la tierra, los objetivos y estrategias de restauración, los métodos de ejecución, la distribución de beneficios, y el seguimiento, evaluación y revisión.

Para el éxito de los programas y proyectos de RPF es crucial comprender la relación de las partes interesadas en un paisaje (Stanturf et al. 2017). Puede que algunos hayan estado viviendo en un paisaje por varias generaciones, algunos pueden ser relativamente recién llegados y algunos otros pueden verse indirectamente afectados por el paisaje (y afectarlo también). En mayor o menor medida, los diversos grupos de partes interesadas son responsables por la dinámica del uso de la tierra en un paisaje, lo que incluye los procesos de degradación. Por lo tanto resulta importante implicarlos en el análisis de los factores de la degradación del paisaje y formular de forma colaborativa, enfoques significativos con respecto a la RPF y determinar los costos y beneficios para cada uno de los grupos de actores. Puede que se requiera un tiempo considerable para formular una visión común de la RPF y lograr una distribución convenida y equitativa de los costos y beneficios entre las partes interesadas.

Elementos rectores

ER5: Asegurar una capacidad de gobernanza adecuada para los procesos descentralizados de RPF

El control y toma de decisiones descentralizados puede producir condiciones propicias para los procesos, programas y proyectos de RPF.

Los resultados sostenibles de la RPF requieren comprensión y colaboración entre las instituciones de todos los niveles. Las instituciones locales que supervisan la ejecución en el terreno requieren capacidad adecuada, incluso para abordar las políticas y partes interesadas sectoriales (p.ej. en silvicultura, agricultura, planificación del uso de la tierra, transporte, energía y minería) con el potencial para influenciar los procesos de RPF.

ER6: Obtener un firme compromiso de las partes interesadas

Es importante que las comunidades y las partes interesadas locales participen activamente en la toma de decisiones sobre planificación y ejecución de la RPF, y compartan la responsabilidad al respecto. El liderazgo, la confianza y la cohesión social al nivel local son ingredientes cruciales para lograr la RPF representativa y perdurable.

Las partes interesadas en la RPF pueden obrar a escalas sumamente diferentes; por ejemplo pueden incluir tanto corporaciones globales como grupos vulnerables locales. Los procesos de participación de las partes interesadas deben tratar de asegurar la participación significativa de todos los actores, reducir al máximo los desequilibrios de poder y lograr resultados equitativos.

Se necesitan alianzas y relaciones de trabajo fuertes entre las comunidades, las organizaciones gubernamentales locales y regionales, las organizaciones no gubernamentales y las organizaciones de donantes para ayudar a las comunidades a aplicar las reglas de uso y manejo forestal, proporcionar apoyo financiero y técnico para las actividades de restauración y conservación, y aumentar la capacidad de manejo sostenible y equitativo de los bosques y otros recursos naturales.

ER7: Realizar análisis conjuntos de las partes interesadas con respecto a los factores de la degradación

Es preciso eliminar las causas de la degradación de los bosques y tierras. Para ello se requiere un esfuerzo mancomunado y sostenido de todos los grupos de interesados.

La RPF requiere una buena comprensión de los procesos subyacentes que causan el cambio de un paisaje. Dicha comprensión formará la base de la formulación de casos teóricos y de una visión compartida entre las partes interesadas. La degradación del paisaje puede haber sido causada por un acontecimiento único (p.ej. deforestación planificada) o por alteraciones reiteradas de baja intensidad. Es importante asegurar que las causas de la degradación hayan cesado de influenciar el paisaje (o pueden estar controladas de forma adecuada) antes de iniciar el proceso de RPF formal.

Para que éste sea efectivo será preciso proceder a análisis de las causas de la degradación, y tomar decisiones al nivel apropiado sobre su eliminación como parte del proceso participativo.

ER8: Velar por la distribución del patrimonio y de los beneficios sociales

Todas las partes interesadas deberán compartir los costos del mercado y otros ajenos a éste, así como los beneficios de la RPF, que deberían aumentar y diversificar los medios de sustento locales.

Para que la RPF sea efectiva y sostenible, todas las partes interesadas deberán comprender y apoyar el proceso subyacente a ella. Deberán convenir en la distribución equitativa de los incentivos, costos y beneficios. La comunidad local deberá estar empoderada para obtener beneficios justos y equitativos de la RPF.

ER9: Velar por que la planificación, la toma de decisiones y el seguimiento y control de la RPF sean plenamente participativos

La participación efectiva de las partes interesadas en la planificación y el seguimiento de los procesos y proyectos de RPF es vital para el éxito.

Como se señala en el ER1, es preciso incluir toda la gama de partes interesadas en la planificación de la RPF desde el principio. También resulta crucial que todas las partes interesadas tengan la oportunidad de participar en los procesos de seguimiento y evaluación de la RPF sobre la base de procedimientos transparentes, lo que incluye proporcionar una gama de perspectivas sobre los resultados y velar por que se aprovechen cabalmente todas las enseñanzas de los éxitos y fracasos.

ER10: Aumentar la capacidad de las partes interesadas para compartir la responsabilidad por la RPF

Es necesario reforzar las capacidades de las instituciones que obran en los paisajes.

Para aprovechar el potencial de la RPF es posible que sea necesario desarrollar la capacidad de los grupos de interesados e instituciones locales para trabajar de forma efectiva juntos y con otros interesados más poderosos.

El uso cooperativo de las herramientas de apoyo a la toma de decisiones, y la formulación de casos teóricos, mapas y planes de restauración pueden ser medios útiles para interesar a los actores en los procesos de la RPF.

Para lograr el empoderamiento y la participación significativa puede ser necesario aumentar la capacidad de la comunidad para el liderazgo, la toma de decisiones participativa, la negociación y el seguimiento y control.

Las instituciones deben tener la capacidad para controlar la eficacia de sus programas, aprender de sus experiencias, manejar sus conocimientos y adaptar sus programas sobre la base del aprendizaje constante.

ER11: Obtener recursos financieros adecuados para las iniciativas de RPF

Para iniciar los procesos de RPF y ejecutar las intervenciones de RPF es preciso contar con el compromiso de recursos suficientes.

La RPF requiere recursos iniciales considerables. Sin embargo, los retornos suelen concretarse solo en el mediano a largo plazo, especialmente cuando el empeño de restauración se centra en la silvicultura. Los empeños de restauración y rehabilitación se ven imponer lo que se denomina un “impuesto por tiempo”, que es el tiempo que la sociedad debe pasar esperando que vuelva a crecer un recurso y durante el cual dicho recurso no se puede utilizar y debe ser cuidado. Esto implica costos sin retornos inmediatos sobre la inversión.

Los pequeños proyectos pueden ser agrupados para crear sinergias y aumentar la eficiencia, pero es posible que sea necesario obtener fuentes de financiación adicionales y ello destacando la importancia de la RPF para los sectores ajenos a la silvicultura.

Los proyectos exitosos de RPF deben abordar la financiación a largo plazo con estrategias múltiples adaptadas a las diversas etapas del proceso de RPF. Se puede ampliar la cartera de financiación con el objeto de incluir pagos por servicios ambientales, o recurrir al potencial de mecanismos como las compensaciones por la biodiversidad y la financiación para el clima, incluidos

ER12: Establecer un entorno propicio para las inversiones en RPF

Se necesitan inversiones para asegurar la restauración y el manejo sostenible de los bosques y paisajes degradados, y será más fácil obtenerlas con políticas e instituciones propicias.

El desafío económico para la RPF es asegurar retornos financieros positivos y, por ende, el interés de la RPF para los inversionistas financieros y su competitividad con respecto a otras opciones de inversión. A la fecha, la mayoría de los servicios ambientales del bosque no se pagan, y solo unos pocos mecanismos de pago funcionan eficazmente en el mundo. Es así que resulta crucial para la RPF la creación de las condiciones adecuadas para la inversión y movilización de recursos.

los mercados de carbono y los pagos por resultados obtenidos en la mitigación del cambio climático.	

Principio 3: Restaurar múltiples funciones para obtener múltiples beneficios

Fundamento

El objetivo de las intervenciones de RPF es restaurar múltiples funciones económicas, sociales y ambientales en un paisaje y generar diversos tipos de bienes y servicios que beneficiarán en forma equitativa a las partes interesadas. Por ejemplo, la RPF puede restaurar la fertilidad del suelo, aumentar el almacenamiento de carbono, reducir la erosión, proporcionar sombra, aumentar la calidad del hábitat para la fauna silvestre y el caudal de agua de los cauces corriente abajo, producir madera, leña y productos forestales no maderables, crear empleos y diversificar los medios de sustento, proporcionar áreas de esparcimiento y sitios culturales y espirituales así como también aumentar la resiliencia de los paisajes y las comunidades humanas al cambio climático y otras alteraciones.

Muchas funciones ambientales a la escala de paisaje están estrechamente ligadas con la presencia de los bosques naturales, los que pueden ser manejados o restaurados con el objeto de alcanzar varios objetivos complementarios, incluidos los que se indican más arriba. El manejo forestal multipropósito puede verse en los sistemas de subsistencia utilizados por los pueblos dependientes de los bosques. Si bien en la práctica el manejo multipropósito no es la estrategia predominante del sector forestal, se están lanzando iniciativas que van desde el manejo en pequeña escala, tales como los regímenes forestales comunitarios, hasta las operaciones en gran escala, como los programas nacionales para elaborar estrategias de REDD+.

Como se señala en las *Directrices voluntarias para la ordenación y el manejo sostenible de los bosques naturales tropicales* (OIMT 2015), el manejo forestal multipropósito combina tres objetivos orientados a la protección con las funciones productivas de los bosques, a saber:

1) la conservación de suelos y recursos hídricos y la permanencia de las reservas de carbono en los bosques, lo que se relaciona con el mantenimiento de la productividad, salud y estado del bosque mismo;

2) el mantenimiento (a escala de paisaje) de beneficios tales como la calidad y el caudal de agua de los cauces corriente abajo y la reducción de inundaciones y sedimentación; y

3) la conservación de la biodiversidad, que es especialmente abundante en los bosques tropicales naturales y cumple una función vital como amortiguador contra las condiciones cambiantes del medio ambiente y como reservorio de la variación genética aplicable en el mejoramiento y cultivo de árboles.

El enfoque multipropósito también se aplica a la restauración de los bosques naturales degradados. En particular, la naturaleza multipropósito de muchas especies de los bosques tropicales constituye una característica importante que se debe tomar en cuenta en las estrategias de RPF. Los conflictos sobre el uso de los recursos se pueden minimizar definiendo claramente el objetivo principal del manejo y designando en la normativa jurídica los bosques para los usos que generen los beneficios sociales y económicos más adecuados en un área determinada

Elementos rectores

ER13: Asegurar múltiples funciones y beneficios
A la escala de paisaje, un aspecto fundamental de la RPF es generar múltiples beneficios a partir de una diversidad de intervenciones. Para alcanzar resultados de restauración sostenibles, los procesos de RPF deben buscar y utilizar sinergias entre las funciones relacionadas con el ser humano en los paisajes y las metas ecológicas. Han surgido nuevos programas que valoran los bosques y paisajes y refuerzan la función multipropósito de los bosques, como los programas REDD+ enfocados en los resultados, y las contribuciones definidas a nivel nacional para la mitigación y adaptación al cambio climático. La RPF permite la integración de la mitigación y adaptación por medio de REDD+.

ER14: Conservar la biodiversidad y restaurar las funciones ecológicas
La conservación de la biodiversidad contribuirá al funcionamiento sano de los paisajes. Los procesos biológicos son el fundamento de todas las actividades de RPF. Sin aumentar la diversidad de plantas, animales, hongos y microbios, hay pocas esperanzas de poder restaurar las tierras profundamente degradadas de modo que tengan la capacidad de mantener una productividad elevada. Se ha demostrado que, con el tiempo, es más probable que los paisajes biodiversos puedan producir productos valiosos y ser resilientes al cambio ambiental, incluido el cambio climático, que los paisajes cuya biodiversidad se ha agotado. La protección y restauración de los suelos, especialmente la reposición de su materia orgánica, son cruciales para facilitar la restauración.

ER15: Mejorar los medios de sustento
La diversidad de estrategias de RPF en un paisaje ayuda a aumentar las oportunidades para mejorar los medios de sustento y la seguridad de los recursos en el largo plazo para los actores del paisaje, incluida la mujer. Las estrategias pueden incluir el desarrollo de cadenas de valor forestal y agrícola, la creación de incentivos de mercado, el aumento y diversificación de las oportunidades de empleo y la descentralización del manejo de los recursos naturales y los derechos a la tierra. Asimismo, la RPF procura aumentar la resiliencia del paisaje y de la población que vive en él, lo cual contribuirá a mantener los sistemas de subsistencia en el futuro.

ER: Aprovechar cabalmente los conocimientos locales
Los conocimientos locales e indígenas constituyen un recurso valioso que debe tener igual peso que otros sistemas de conocimientos al momento de definir los resultados de la RPF. Los actores locales y los pueblos indígenas en particular suelen poseer vastos conocimientos acerca de la biodiversidad, los suelos y los usos múltiples del paisaje. Esto debe ser tomado en cuenta al momento de definir los procesos, programas y proyectos de RPF apropiados. La RPF requiere la participación y movilización del capital social y humano que existe en los paisajes. Al abarcar enfoques más amplios de la RPF, incluida la integración de múltiples sistemas de conocimientos, la comunidad local, las agencias gubernamentales, los propietarios de tierras y otras partes interesadas podrán participar mejor en los procesos de RPF y en el manejo constante del paisaje, y dirigirlos. Será preciso dedicar esfuerzos sistemáticos desde el principio para identificar, reconocer e incorporar los conocimientos y prácticas tradicionales en la planificación y ejecución de la RPF.

Principio 4: Mantener y mejorar los ecosistemas naturales dentro de los paisajes

Los procesos de RPF deben procurar detener la degradación de los bosques naturales y otros ecosistemas, velar por la recuperación, conservación y ordenación sostenible de los bosques y otros ecosistemas naturales, fomentar la conservación de la biodiversidad y aumentar la capacidad de los paisajes para producir bienes y servicios ambientales. Los procesos de RPF no deberían causar la pérdida o conversión de bosques naturales, pastizales naturales u otros hábitats naturales.

Este principio de RPF está dirigido a la restauración y conservación de los ecosistemas y hábitats naturales en los paisajes degradados y deforestados. Se deberá adoptar un enfoque de paisaje para determinar las

compensaciones entre los usos de la tierra en los mosaicos dominados por la actividad humana; por ejemplo, en las tierras agrícolas y silvopastoriles degradadas se podría concentrar en el aumento de la producción, mientras que en las áreas con hábitats naturales existentes podría predominar la conservación de la biodiversidad, aun cuando por lo menos algunas de dichas áreas se podría usar de forma productiva.

Generalmente la degradación de los bosques naturales es una consecuencia de actividades insostenibles (que suelen ser excesivamente destructivas) como la extracción de madera y leña, la caza y el desmonte y nuevo crecimiento irregular asociados con la agricultura itinerante. La degradación causada por dichas presiones rara vez lleva, por sí sola, a la deforestación; no obstante, si la extracción supera la capacidad de recuperación de un bosque, causa la pérdida de reservas de carbono y reduce la resiliencia ecológica. Para responder a la degradación forestal de forma efectiva, es importante comprenderla no como el principio de un proceso de deforestación sino como una forma de mal manejo forestal que puede ser invertida y mejorada.

En la extracción de madera, la presión de la extracción impuesta sobre ciertas especies de gran valor puede causar una tendencia disgénica (la eliminación de los árboles de gran tamaño con cada corta, dejando árboles de genética inferior como fuentes futuras de semillas), lo que reduce aún más las opciones de manejo sostenible y viable económicamente. En general, es probable que se necesiten inversiones en tratamientos silvícolas para superar el agotamiento económico de dichos bosques y asegurar su futuro valor. Antes de decidir, al nivel de proceso, restaurar los bosques degradados, es preciso establecer medidas correctivas fundamentales para evitar mayor degradación y proporcionar una base para el uso sostenible en el futuro. Es necesario realizar una evaluación exhaustiva y amplia de los factores que crearon el estado actual del bosque en un sitio determinado.

Según el nivel de degradación, existe una amplia selección de posibilidades para recuperar la integridad ecológica y la capacidad productiva de los bosques tropicales de casi todos los tipos (véase OIMT 2002). A la escala de paisaje, los bosques secundarios pueden constituir un recurso importante para el manejo multipropósito, incluida la producción de madera y de productos forestales no maderables y la prestación de servicios ambientales (especialmente la captura de carbono) a cambio de pagos. Los requisitos previos importantes para el manejo sostenible de los bosques secundarios son la aceptación social, las normativas adecuadas y el reconocimiento de los valores económicos y ambientales del bosque.

Restaurar los ecosistemas forestales degradados y evitar la fragmentación de los bosques naturales son elementos fundamentales de los procesos de RPF. En el marco de la RPF, la restauración forestal tiene por objeto restaurar procesos forestales dinámicos relacionados con la composición de las especies, estructura, productividad, biodiversidad, polinización y diversidad genética de la fauna y la flora. Por lo tanto, los programas y proyectos de RPF pueden buscar restaurar la productividad, las funciones ecosistémicas y las reservas de carbono de los bosques tropicales degradados.

Elementos rectores

ER17: Evitar la conversión de los bosques naturales	**ER18: Restaurar los bosques degradados y rehabilitar las tierras forestales degradadas**
Los bosques naturales forman parte integrante de los paisajes funcionales en los trópicos y cumplen importantes funciones de paisaje. Para asegurar los paisajes funcionales es crucial abordar los factores que impulsan el cambio de uso de tierras forestales a otros usos. La conservación y restauración de la biodiversidad, incluidos los recursos genéticos, es una inquietud especial de la RPF. En vista de la pérdida acelerada general de bosques primarios en todo el mundo, y de su importancia para la conservación de la biodiversidad, el almacenamiento de carbono, el mantenimiento de los valores culturales y otros	**Restaurar y manejar de forma sostenible los bosques naturales degradados y las tierras forestales degradadas, según corresponda.** Los bosques naturales degradados suelen tener una biodiversidad inferior y una capacidad reducida de suministrar bienes y servicios ambientales, en comparación con los bosques naturales sanos que existirían normalmente en el mismo sitio. Según la etapa de degradación, la estructura del rodal, las funciones, composición de especies y productividad pueden estar todas afectadas.

motivos, es preciso redoblar esfuerzos para evitar la conversión de los bosques primarios a otros usos de la tierra y designarlos como parte de la zona forestal permanente. Puede resultar necesario, por motivos económicos o sociales, convertir ciertos bosques degradados y secundarios a otros usos, pero esto se debe hacer como parte de un plan general de aprovechamiento de las tierras que optimice la asignación de usos de la tierra dentro de un paisaje, incluso para fines de conservación de la biodiversidad.

Es preciso comprender y abordar los procesos y causas subyacentes del cambio de uso de las tierras como parte de una estrategia general de RPF. Como dichas causas generalmente incluyen factores socioeconómicos, necesidades locales y sistemas de valor de los actores locales, deben ser tomadas en cuenta, incluidos los derechos de tenencia y acceso a los recursos.

La evaluación de las causas de la deforestación y degradación forestal, así como las decisiones al respecto, deben estar basadas en procesos participativos. Es preciso identificar las presiones locales y externas que llevaron a la deforestación y degradación forestal, y evaluar el peligro continuo que representan.

No obstante, muchos bosques degradados pueden mantener la condición del suelo y una biodiversidad nativa considerable, y existe el potencial de restablecer las funciones plenas si se reconocen y abordan las causas de la degradación.

Cuando la cobertura boscosa ha desaparecido en su totalidad debido a alteraciones como incendios recurrentes, extracción de madera y pastoreo, y dichas presiones continúan, se interrumpe la sucesión natural, probablemente se produzca el agotamiento profundo de los nutrientes de los suelos y resulte imposible la recuperación sin intervención. Es posible que la rehabilitación de dichas tierras requiera inversiones considerables.

ER19: Evitar la fragmentación forestal

En la mayoría de los paisajes en mosaico deforestados, será preciso aplicar estrategias para aumentar la conectividad por corredores biológicos y asegurar así los flujos genéticos de fauna y flora entre bosques que de otro modo estarían aislados, y otros ecosistemas del paisaje.

La RPF incluye el establecimiento o mejoramiento de los mosaicos de diversos usos de la tierra (que también son interactivos), con objetivos económicos, sociales y ambientales que suelen ser divergentes, para darle forma a la estructura y la dinámica del paisaje. En los paisajes sujetos a intervención profunda será preciso evitar mayor fragmentación de los hábitats naturales; probablemente resulte importante crear "pasos intermedios" biológicos en muchas localidades para lograr la RPF eficaz.

ER20: Conservar los pastizales, sabanas y humedales naturales

En la RPF, los bosques plantados, especialmente la forestación, no deberán reemplazar los ecosistemas nativos tropicales de pastizales, humedales o sabanas.

Los pastizales y sabanas son ecosistemas formados por especies adaptadas a un hábitat abierto. En general, no se debe convertir los pastizales y humedales naturales a otros usos de la tierra como parte de la RPF.

Como la mayoría de los pastizales tropicales antiguos dependen de alteraciones endógenas recurrentes, los empeños de RPF deben incluir en sus planes el mantenimiento en el largo plazo de los regímenes de incendio o la herbivoría de la mega fauna, o ambos, para prevenir el avance de las plantas leñosas en dichos ecosistemas.

Principio 5: Adaptación al contexto local empleando diversos enfoques

Fundamento

Este principio se basa en el historial del paisaje, y ayuda a asegurar que la planificación y ejecución de la RPF responda a las necesidades de la población y de los ecosistemas locales. En la situación ideal, la RPF emplea varios tipos de enfoques de restauración adaptados a los valores y necesidades sociales, culturales, económicos y ecológicos locales, que toman en cuenta el historial del paisaje. La mejor manera de asegurar que un proceso de RPF esté bien adaptado al contexto local es la plena participación de los actores locales en su formulación, ejecución, control y seguimiento y evaluación.

Elementos rectores

ER21: Evaluar el contexto y las restricciones locales

En un paisaje, el contexto ecológico, sociocultural y económico determina las oportunidades para la RPF así como las restricciones que la afectan.

Es importante comprender la dinámica de los usos de la tierra pasados, presentes y futuros pronosticados, y reconocer la posible multifuncionalidad de un paisaje.

Es preciso comprender los factores reales y potenciales que impulsan el cambio ecológico de un paisaje. Es posible que sea necesario efectuar intervenciones para evitar llegar a los umbrales ecológicos más allá de los cuales el cambio podría ser irreversible.

ER22: Prever futuros cambios de las condiciones

Los enfoques de RPF deben tomar en cuenta los cambios futuros y poder adaptarse a ellos.

Los futuros cambios en las políticas económicas, los factores demográficos, las tecnologías y el clima probablemente tengan repercusiones profundas en el éxito de la RPF. Por ello es vital controlar y evaluar constantemente para facilitar los enfoques adaptativos a la RPF y al manejo sostenible del paisaje.

ER23: Ajustar los enfoques al contexto local y asegurar los beneficios locales

Los enfoques adaptados al contexto toman en consideración la forma en que la RPF podrá beneficiar a las partes interesadas locales sin arriesgar la estabilidad ecológica.

Es probable que los beneficios de la RPF vayan cambiando con el tiempo tanto en naturaleza como en amplitud, y requieran intercambios y decisiones constantes entre los actores para garantizar la distribución equitativa de dichos beneficios.

Los enfoques deberán estar basados en principios de consentimiento libre, previo e informado (CLPI). El CLPI es un derecho específico relacionado con los pueblos indígenas y está reconocido en la Declaración de las Naciones Unidas sobre los Derechos de los Pueblos Indígenas. El CLPI encapsula el derecho de los pueblos indígenas y otros pueblos tradicionales a otorgar o denegar su **consentimiento** para un proyecto que pueda afectarlos o afectar sus territorios.

ER24: Asegurar la viabilidad financiera y económica de las inversiones en RPF

La viabilidad financiera y económica es esencial para el éxito de la RPF en el terreno.

Los procesos, programas y proyectos de RPF solo podrán ser sostenibles si son viables a nivel económico y financiero. Sin embargo, si los actores locales carecen de capital suficiente, puede resultar difícil justificar y atraer inversiones si los costos financieros iniciales son elevados y los retornos inciertos y en un futuro distante. Es posible que se necesiten estrategias para crear beneficios inmediatos que fomenten la aceptación local, como por ejemplo mayor seguridad de la tenencia, cultivos agroforestales anuales, parcelas para madera de crecimiento rápido y pagos por servicios ambientales incipientes, así como también beneficios a más largo plazo asociados con la producción de madera de alta calidad y la prestación sostenible de servicios ambientales.

Además de asegurar la viabilidad financiera de la RPF, deberá realizarse el trabajo necesario para demostrar y comunicar, con datos contundentes y herramientas de uso fácil, los beneficios económicos a largo plazo de la RPF a la escala de paisaje y para varios grupos de actores como medio para obtener una aceptación vigorosa de la RPF, incluso de los gobiernos y donantes.

ER25: Identificar las oportunidades para aumentar los ingresos locales	ER26: Desarrollar cadenas de suministro sostenibles
La identificación de nuevas oportunidades de generación de ingresos constituirá un incentivo vigoroso para la participación de la comunidad local en la RPF. Una de las metas finales de la RPF es lograr que la comunidad local mejore sus medios de sustento e ingresos. La demanda del mercado (y los precios pagados) por los productos y servicios ambientales obtenidos de la RPF será un factor decisivo en la rentabilidad de las intervenciones relacionadas con la RPF y, por ende, de su aceptación por los agricultores, usuarios del bosque y comunidades rurales. La transformación local de los productos forestales añadirá valor a los productos derivados de la RPF y también podría traer precios más altos para los productores. La creación de actividades gananciales y la promoción de pequeñas y medianas empresas viables pueden contribuir al éxito de las iniciativas de RPF. Para generar interés en invertir en los empeños a la escala local será crucial reducir el perfil de riesgo de dichos empeños, por ejemplo garantizando la tenencia segura, aumentando la capacidad local en administración de empresas, y ofreciendo asesoramiento técnico constante.	**Los procesos e intervenciones de RPF deberán tratar de establecer cadenas de suministro sostenibles para los bienes producidos en los bosques y paisajes restaurados.** Las cadenas de suministro sostenibles comprenden organizaciones, actividades y procesos relacionados con todas las etapas de las empresas forestales, lo que incluye la planificación, obtención, transformación, manufactura y entrega de bienes y servicios ambientales en los bosques y paisajes. La cadena de suministro sostenible es aquella que reduce al máximo los impactos ambientales y sociales negativos, aborda problemas como el uso de agua y energía, la contaminación, el tratamiento de los trabajadores, la bioseguridad, las personas marginadas, la biodiversidad y el uso de la tierra. Las iniciativas de RPF deben fomentar el desarrollo de cadenas de suministro sostenibles para aumentar el potencial de comercialización y ayudar a asegurar la remuneración justa en cada eslabón de la cadena.

Principio 6: Gestión adaptativa para lograr la resiliencia a largo plazo

Fundamento

La RPF procura aumentar la resiliencia de los paisajes y comunidades en el mediano a largo plazo. Para ello, es posible que con el tiempo tenga que ajustar sus enfoques de modo que incorporen los cambios ocurridos en las condiciones ambientales, los conocimientos, capacidades, necesidades de las partes interesadas, tecnologías y valores y opciones de la sociedad. La información y las enseñanzas derivadas del control y seguimiento, investigación y comentarios de los actores deben ser incorporadas en los planes de manejo.

Un problema fundamental para lograr resultados positivos de la RPF a largo plazo es la cuestión del cambio de los paisajes con el tiempo. Las comunidades humanas evolucionan, y sus números, destrezas, aspiraciones y expectativas van cambiando. Los mercados cambian y fluctúan ante la dinámica intrínseca y los valores y demandas cambiantes de la población. Sin embargo, la RPF es un emprendimiento a largo plazo, y las condiciones económicas y sociales que existen, por ejemplo, cuando se planta un árbol, rara vez son las mismas cuando éste es extraído tal vez décadas más tarde, y las prioridades de las partes interesadas tampoco son inmutables. Los procesos de la RPF deben adoptar una perspectiva a largo plazo, y anticipar, en la medida de lo posible, los cambios futuros. Deben estar adaptados a las condiciones locales reinantes al principio, pero tener la capacidad de adaptación necesaria a los cambios de las circunstancias económicas y sociales.

El cambio climático probablemente tenga una amplia gama de impactos biofísicos en los bosques y paisajes, como el aumento de la incidencia y gravedad de las plagas, los incendios, las inundaciones y sequías y la reducción de la productividad y salud de las plantas. Los agricultores y administradores forestales deben ser conscientes de los riesgos impuestos por dichos impactos, y tomar medidas para reducir la vulnerabilidad de

sus sistemas de producción, aumentar la resiliencia ecológica y adaptar los sistemas de producción a las condiciones climáticas cambiantes.

El potencial de la RPF para facilitar la adaptación de los paisajes tropicales al cambio climático recibe menos atención que su papel en la mitigación. El manejo adaptativo será esencial para mantener paisajes forestales resilientes y productivos en el futuro, en el que la resiliencia tenga dimensiones tanto humanas como ecológicas, ya que las primeras requieren gobernanza y distribución de beneficios justas y equitativas.

Elementos rectores

ER27: Adoptar un enfoque de manejo adaptativo

Los enfoques de manejo adaptativo reducen al máximo los riesgos económicos, sociales y ambientales asociados con la RPF.

Los procesos de la RPF son complejos y dinámicos, y conllevan riesgos e incertidumbres. Existe una falta de información sobre la ejecución de la RPF y el cambio constante, por ejemplo, en las necesidades y aspiraciones de las partes interesadas, los factores que impulsan la degradación del paisaje, y los impactos del cambio climático. Para superar los posibles riesgos y responder a los cambios de las prioridades, la RPF debe adoptar un enfoque de manejo adaptativo. Será preciso utilizar la información recabada en el seguimiento y control de los aspectos económicos, sociales y ambientales de la RPF para evaluar el éxito y ajustar los enfoques para alcanzar los resultados deseados.

También es esencial la investigación básica, aplicada y participativa que presta apoyo a la ejecución de estrategias de RPF adaptativas y facilita el intercambio de información y la mejora de las capacidades de las partes interesadas locales.

ER28: Medir continuamente las dimensiones biofísicas del paisaje

Las condiciones ambientales iniciales, especialmente los factores de estrés y de riesgo presentes en un paisaje, deben ser evaluadas.

El seguimiento y control del cambio ante este trasfondo de línea de referencia base permitirá la adaptación efectiva de la RPF con el tiempo.

El éxito de la RPF depende de la intensidad y naturaleza de los factores de estrés ambientales presentes. Es probable que los sitios con un clima con variaciones estacionales muy marcadas, exposición, bajo nivel de fertilidad de los suelos y otros factores de estrés ambiental presenten más dificultades para la restauración que aquellos que gozan de condiciones más benignas.

La evaluación y medición del éxito o fracaso depende en parte de poder comparar la situación del sitio antes y después de iniciar los procesos de la RPF y sus programas y proyectos.

ER29: Evaluar periódicamente la vulnerabilidad ante el cambio climático

Evaluar la vulnerabilidad de los ecosistemas y sistemas sociales ante el cambio climático.

Puede resultar más difícil alcanzar las metas de la RPF debido a factores de estrés periódicos e imprevisibles (p.ej. los incendios y sequías), las anomalías climáticas episódicas y el potencial de cambio climático mundial de larga duración. La capacidad limitada de adaptación de los sistemas sociales y de gobernanza incrementa aún más la vulnerabilidad.

La RPF puede aumentar la resiliencia ante el cambio climático y también ayudar a mitigarlo. Los procesos de RPF deben tomar en

ER30: Desarrollar enfoques participativos de seguimiento y control

Asegurar el seguimiento y control participativos y de uso fácil de la RPF como base para el manejo adaptativo.

Ninguna parte interesada puede reivindicar la información como propia, y es preciso reconocer la validez de diferentes sistemas de conocimientos. Todas las partes interesadas deben poder generar, compilar e incorporar la información que requieren para comprender y controlar las actividades y el avance de la RPF.

El seguimiento y control participativos de la RPF permiten a todas las partes interesadas comprender las necesidades cambiantes de los paisajes y comunidades y las adaptaciones de manejo necesarias para optimizar los

consideración los casos teóricos de cambio climático y favorecer las opciones de uso de las tierras y selección de especies apropiadas para el clima.

resultados de la RPF ante el cambio climático y otras alteraciones.

ER31: Fomentar el acceso abierto y el intercambio de información y conocimientos

El acceso adecuado a la información y la distribución y gestión de los conocimientos maximizarán la eficacia de la RPF y su apoyo por el público.

Todas las partes interesadas deben tener acceso continuo y fácil a la información sobre todos los aspectos de la RPF.

La RPF requiere cambios en las percepciones, actitudes y conductas de la población. A menos que la población afectada por un proceso de RPF pueda apreciar las razones por las cuales ésta se realiza, y los beneficios que podría derivar de la RPF, no estará muy motivada para participar en ella.

Los servicios tradicionales de extensión agrícola, que suelen ser sumamente efectivos en llegar a los agricultores y productores locales, podrían constituir un medio poderoso para informar a la comunidad local sobre el potencial de la RPF para mejorar sus medios de sustento e ingresos.

ER32: Informar acerca de los resultados de la RPF

La medición de los resultados al nivel de paisaje y los informes sobre dichos resultados presentados a todas las partes interesadas, son fundamentales para el éxito de la RPF.

El seguimiento y control efectivos dependen en gran medida de la selección de los indicadores apropiados a la escala de sitio y paisaje y en diversos momentos del proceso de restauración.

El seguimiento debe ocurrir en escalas temporales diferentes, y es probable que se produzca bajo condiciones variables de calidad de datos y capacidad técnica. Las iniciativas de RPF deben incorporar procesos sólidos de presentación de informes para asegurar que todas las partes interesadas estén plenamente informadas del avance, los cambios y desafíos constantes, y que tanto los éxitos como los fracasos generen enseñanzas que permitan aumentar la eficacia en el futuro.

3 Procesos de ejecución y orientación operativa

Coincidencia de los procesos e intervenciones de la RPF

El Capítulo 2 presenta seis principios de la RPF y 32 elementos rectores que desglosan dichos principios. Este capítulo presenta las medidas recomendadas para poner en práctica los principios y elementos rectores por medio de intervenciones (Figura XX).

La RPF puede verse favorecida por una estrategia práctica de trabajo para definir, planear, iniciar, mantener, incrementar las dimensiones y adaptar las intervenciones para responder a los cambios en las necesidades locales y las condiciones climáticas (Gutierrez et al. 2019), según la lógica del manejo del ciclo de proyectos (Battisti 2017 en Stanturf et al. 2019). El marco de manejo de ciclo de proyectos no es un proceso sencillo o lineal; se trata más bien de un proceso repetitivo, adaptativo y jerárquico, que incluye consultas recurrentes entre las partes interesadas (Stanturf et al. 2017). En la RPF, el manejo de ciclo de proyectos contiene cuatro fases de especificidad creciente y con un calendario flexible (Recuadro 4). Los comentarios recibidos a intervalos regulares durante el ciclo ofrecen oportunidades para barajar prioridades, cambiar actividades de ejecución y realinear los recursos según las condiciones cambiantes e información nueva adquirida por medio del aprendizaje y adaptación constantes (Stanturf et al. 2019).

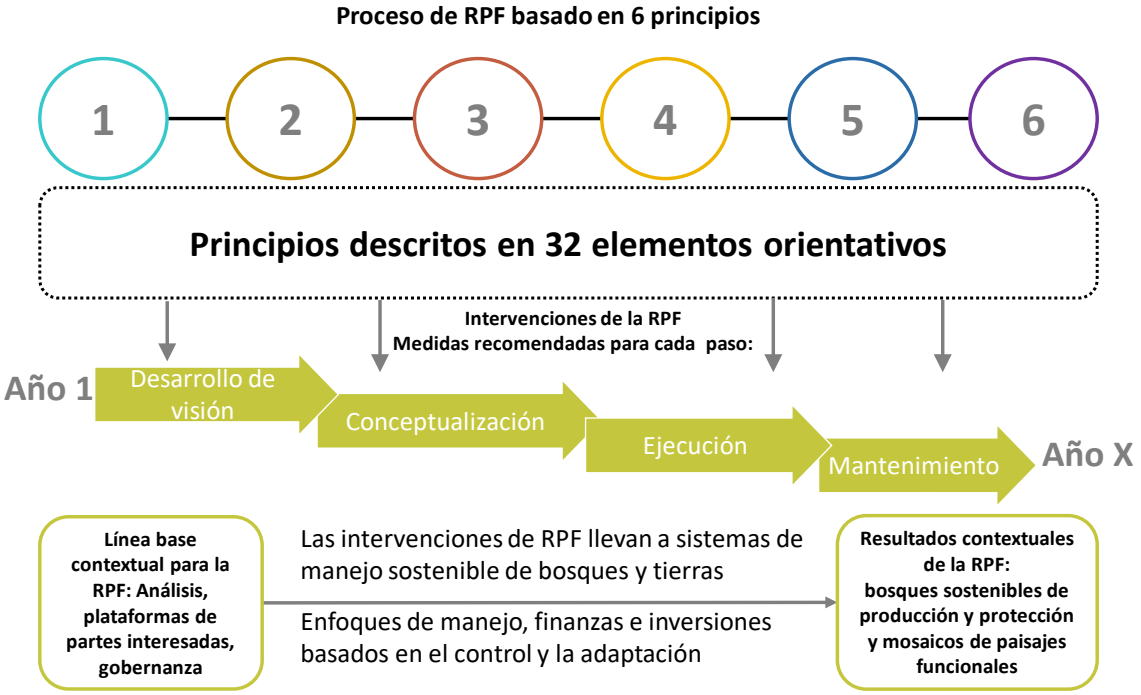
Intervenciones de la RPF

Arreglos de ejecución con miras al desarrollo a una escala mayor (p.ej. en un área de jurisdicción) o bien a una escala pequeña (p.ej. al nivel de una cuenca hidrográfica local).

Recuadro 3 ***Fases del manejo de ciclo de proyectos en la RPF***
▪ El **desarrollo de visión** define las metas a las que aspira la RPF. Esto suele ocurrir al nivel nacional o subnacional, pero también es necesario llegar a una visión y aceptación al nivel local. En general, las metas describen los resultados esperados a largo plazo, y pueden ser estrictamente mensurables o tangibles o no serlo, según el alcance y nivel de consideración. Las metas pueden reconocer compromisos internacionales, como las metas de biodiversidad. El seguimiento, la evaluación e investigación de los factores que llevan a la degradación forestal y deforestación pueden constituir la base para la fase de desarrollo de visión, pues identifican oportunidades y obstáculos
▪ La **conceptualización** convierte las metas en objetivos claros y mensurables, que sirven de base para la acción. Esta fase determina las intervenciones más factibles y efectivas para un paisaje beneficiario, que se pueden derivar de las metas nacionales, subnacionales o locales. Durante la fase de conceptualización, la selección de regiones, paisajes o unidades prioritarias dentro de un paisaje en las cuales concentrar las actividades puede ofrecer los mayores beneficios cuando los recursos son limitados
▪ La **fase de acción** convierte los objetivos en logros por medio de una lista en secuencia de lo que se hará, dónde, cuándo, por quién y a qué costo. La toma de decisiones sobre la restauración al nivel local puede incluir la selección del sitio, la selección de las actividades de RPF, el ritmo y programa de ejecución, los costos, el seguimiento y control del trabajo vinculado a los gastos, y la evaluación
▪ El **mantenimiento de la RPF** a largo plazo requiere el manejo adaptativo que combina la planificación del manejo con control y evaluación, con el objeto de ofrecer comentarios en las primeras fases con miras a posibles medidas correctivas

Fuentes: Tomado y modificado de Stanturf et al. (2017; 2019).

Figura 3 ***Las cuatro fases de la ejecución de la RPF***



Fuente: Estructura básica inspirada por Stanturf et al. (2019).

Cuadro 3 ***Naturaleza jerárquica del manejo de ciclo de proyectos, con un ejemplo de Myanmar***

Fase	**Desarrollo de visión (preparación)**	**Conceptualización (planificación)**	**Ejecución (acciones)**	**Sostenibilidad (mantenimiento de los logros)**
Realización	**Meta**	**Objetivo**	**Plan de acción**	**Comentarios**
Significado	Objeto y dirección de una intervención de RPF	Logros o metas esperadas de la acción del proyecto	Actividades para alcanzar los resultados	Manejo adaptativo para mantener los activos
Medición	Ambiciones generales: metas mensurables o no mensurables	Definición de resultados tangibles y mensurables	Lista secuencial de lo que se va a hacer, dónde, cuándo, por quién y a qué costo	Seguimiento, plan de manejo
Marco temporal	Largo plazo	Corto a mediano plazo	Corto a mediano plazo	Largo plazo
Ejemplo del Delta de Ayeyarwady en Myanmar (véase el estudio de caso x)	Bosques de manglar degradados y campos de arroz abandonados fueron sometidos a enriquecimiento y replantación con una diversidad de especies de manglar bajo manejo de silvicultura comunitaria (SC), lo que ayudó a proteger las aldeas costeras de las tormentas tropicales, tsunamis y aumento del nivel del mar	• Se restauraron por lo menos 500 ha de bosques degradados y están desempeñando sus funciones de protección • Dos tercios de los campos de arroz abandonados en zonas críticas fueron rehabilitados con manglares plantados • 12 aldeas recibieron su certificado de SC, lo que les concede derechos en el largo plazo al manejo y aprovechamiento de	• Recolección de semillas y establecimiento de cinco viveros de manglar en el Departamento de Bosques (DB) y en aldeas el año 1 • Establecimiento de grupos de usuarios de SC (seis en el primer año y dos más cada año) y solicitud de certificados de SC al DB • Cartografía de las tierras comunitarias con posibles áreas de reforestación para cada bosque comunitario • Plantación colaborativa de especies de manglar seleccionadas en bosques degradados y campos abandonados durante junio y julio	• Formulación de un plan de manejo para cada bosque comunitario y seguimiento y control anual de las plantaciones por el DB • Más hogares cada año pueden solicitar nuevas tierras a los grupos de usuarios de SC • Seguimiento y control continuos del desarrollo de la plantación por los grupos de usuarios de SC y organizaciones no gubernamentales • Replantación de manglares después del ciclón Nargis en 2008 • Cadenas de valor funcionales establecidas para productos de

	los recursos del manglar	• Apoyo a los miembros individuales de la SC en el manejo de sus parcelas de plantación	mercado de los bosques de manglar

Marco operativo para la ejecución de la RPF

El marco operativo adoptado para estas directrices incluye los cuatro pasos siguientes de intervenciones de RPF (Figura 3):

1) **desarrollo de visión** (preparación)— en el corto plazo relativo (p.ej. un año);

2) **conceptualización** (planificación)— en el corto plazo relativo (p.ej. un año);

3) **ejecución** (acciones)—a mediano plazo (p.ej. 3–10 años); y

4) **sostenibilidad** (mantener el logro)—en el largo plazo (decenios como mínimo).

El Cuadro 4 presenta las medidas recomendadas para cada uno de los 32 elementos rectores de los seis principios de la RPF.[8]

[8] Véase el Anexo 2 que contiene una vista general de los procesos de intervención de la RPF, incluidas posibles actividades en las diversas fases.

Cuadro 4 ***Medidas recomendadas para las intervenciones de RPF en consonancia con los principios y elementos rectores de la RPF, siguiendo una lógica de manejo de ciclo de proyectos***

Principios y elementos rectores	**INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS**			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
Principio 1: ENFOQUE CENTRADO EN LOS PAISAJES				
ER1: Realizar una evaluación del paisaje y planificación del uso de la tierra de forma incluyente y con una perspectiva de género	**Definir el paisaje apropiado** en un entorno biofísico, sociocultural, económico y político determinado **Identificar y captar la atención de los actores y sus intereses** por género, en el paisaje forestal, por medio de encuestas de línea de referencia base y la utilización de técnicas participativas de evaluación rural o similares	**Desarrollar una línea de referencia base técnica** por medio de la cartografía del paisaje y el inventario de recursos (incluido el carbono) iniciales, para evaluar la condición del paisaje y formular los resultados de RPF planeados **Refrendar la línea de referencia base ecológica y socioeconómica por medio de un proceso adecuado de consulta** y obtener un acuerdo al respecto **Llevar a cabo una evaluación social del paisaje** para utilizar en el trabajo de restauración con miras a asegurar la prestación de múltiples funciones	**Formular y refrendar un plan de uso de las tierras** como instrumento clave que contribuya a la gobernanza responsable de las tierras. Velar por que el plan concilie los intereses divergentes en el paisaje y así reducir al máximo los conflictos por usos de la tierra Si se decidiera que un **paisaje forestal degradado debería permanecer o ser establecido como parte de una zona forestal permanente**, formular una estrategia de manejo apropiada en colaboración con todas las partes interesadas	**Formular y aplicar criterios socioeconómicos y ecológicos** para la evaluación de los casos teóricos de RPF **Definir y aplicar jurídicamente, a la escala de paisaje, la zona forestal permanente** como elemento clave para la sostenibilidad de los bosques naturales existentes, restaurando bosques degradados y rehabilitando las tierras forestales degradadas
	Más información			
	Guía sobre la metodología de evaluación de oportunidades de restauración (ROAM): Evaluación de las oportunidades de restauración del paisaje forestal a nivel nacional o subnacional (UICN y WRI 2014)			
	Mapping Social Landscapes - A Guide to Identifying the Networks, Priorities, and Values of Restoration Actors (Buckingham et al. 2018)			
	Baseline photography and participatory drawing in East Africa (Boedhihartono and Barrow 2008)			
	The Green Negotiated Territorial Development (GreeNTD) - a people centred, process-oriented socio-ecological approach to territorial development (FAO 2016)			
	Toolkit for the application of the GreeNTD to promote a negotiated and agreed solution to a resource dispute, ranging from governments and companies to communities, dealers and non-governmental organizations (FAO 2017)			
	Understanding the landscape mosaic – Gilmour (2005a) en: Restauración de paisajes forestales. Introducción al arte y ciencia de la restauración de paisajes forestales (OIMT/UICN 2005)			

ER2: Lograr el reconocimiento de que la RPF debe trascender las políticas sectoriales	Identificar y **analizar el marco jurídico actual** pertinente a la RPF **Formular reglas y procedimientos** que permitan la planificación congruente y efectiva para los procesos de RPF	**Analizar los posibles impactos de las leyes y políticas sectoriales** sobre los procesos de RPF. Identificar y abordar las discrepancias entre las políticas sectoriales **Refrendar la línea de referencia base ecológica y socioeconómica por medio de un proceso adecuado de consulta** y obtener un acuerdo al respecto	**Diseñar plataformas intersectoriales apropiadas de colaboración** entre las instituciones gubernamentales para legitimar los procesos de RPF **Promover acciones para asegurar que las leyes que requieran la RPF sean comprendidas en general** por los actores pertinentes y aplicadas de forma visible, verosímil y justa	**Definir criterios socioeconómicos y ecológicos** para la evaluación de **casos teóricos** de RPF **Definir y utilizar, a escala de paisaje, la zona forestal permanente** como elemento clave para el mantenimiento de los bosques naturales, la restauración de los bosques degradados y la rehabilitación de las tierras forestales degradadas **Asegurar que los marcos jurídicos estén apoyados por reglamentación adecuada**, incluso restricciones al desmonte o tala de los bosques naturales remanentes; y establecimiento de vínculos claros entre la propiedad del árbol y las tierras
	Más información			
	Participatory integrated land use planning: (i) community-based landscape planning and decision-making; (ii) effective intersectoral cooperation and coordination among government agencies at the national, subnational and local levels; (iii) the strengthening of local institutions to better manage conflicts over land use and tenure; and (iv) improved policies for integrated management (e.g. agroforestry) (FAO 2012)			
	The Restoration Diagnostic. A Method for Developing Forest Landscape Restoration Strategies by Rapidly Assessing the Status of Key Success Factors (Hanson et al. 2015)			
	Forest landscape restoration in Asia-Pacific forests [Overview on FLR policies] (FAO/RECOFTC 2016)			
ER3: Ejecutar la RPF a una escala apropiada	**Identificar escalas apropiadas para la planificación del paisaje** utilizando como base, por ejemplo, el área jurisdiccional o zonas biofísicas o socioeconómicas, o a la luz de las prácticas consuetudinarias	**Incorporar las intervenciones de RPF** en intervenciones pertinentes **a escalas espaciales mayores y menores** **Incrustar la planificación integral del uso de las tierras en planes espaciales de nivel superior** para lograr un equilibrio adecuado entre las necesidades de conservación,	**Formalizar los planes integrales de uso de las tierras** al nivel de jurisdicción como base para la ejecución de los compromisos de RPF en las escalas de programa y proyecto	**Adaptar periódicamente los planes de uso de las tierras**, según sea necesario, a los contextos cambiantes

		producción y sustento sostenible **Definir categorías de degradación de recursos** como metas para la RPF **Incorporar bosques degradados y secundarios, tierras forestales degradadas y mosaicos forestales en la planificación del uso de la tierra** a escalas macro y micro		
	Más información			
	Understanding the landscape mosaic – Gilmour (2005a), en: Restauración de paisajes forestales. Introducción al arte y ciencia de la restauración de paisajes forestales (OIMT/UICN 2005)			
	Discourses across Scales on Forest Landscape Restoration (Reinecke and Blum 2018)			
ER4: Abordar plenamente la tenencia y los derechos de acceso	**Preparar mapas** de la **situación de la tenencia,** que incluyan todas las reivindicaciones, en una etapa inicial de la formulación del proceso de RPF	Si **los derechos de propiedad y acceso no son claros**, **establecer un mecanismo transparente para la resolución de conflictos**, especialmente en los paisajes forestales convertidos recientemente **Utilizar la planificación participativa del uso de la tierra para formular criterios** y tomar en consideración las preferencias de los propietarios de tierras al seleccionar las áreas para restauración	**Fijar metas específicas para abordar la igualdad de los géneros** en los derechos y el acceso a las tierras sometidas a RPF Reforzar los **derechos de los habitantes del bosque y de los pueblos indígenas** a la recolección de productos de las tierras forestales para fines de subsistencia, y proponer reglamentación sobre el uso comercial de dichos productos	**Aclarar y legitimar derechos equitativos de tenencia, acceso, uso y otros derechos consuetudinarios** en los paisajes forestales para las partes interesadas locales y nacionales y para los inversionistas extranjeros **Reformar leyes, incluso el reconocimiento de los derechos consuetudinarios y tradicionales**, para ofrecer seguridad de la tenencia como condición necesaria para el MFS y RPF
	Más información			
	IIED – FAO Improving governance of forest tenure: a practical guide (Mayer et al. 2013)			
	The Sangha Guidelines for the landscape approach (IUCN/Ecoagriculture Partners 2008)			
	Case Report Novel governance for forest landscape restoration in Fandriana-Marolambo, Madagascar (Mansourian et al. 2016)			

Principios y elementos rectores	INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
Principio 2: IMPLICAR A LOS INTERESADOS Y APOYAR LA GOBERNANZA PARTICIPATIVA				
ER5: Asegurar una capacidad de gobernanza adecuada para los procesos descentralizados de RPF	**Identificar las autoridades e instituciones apropiadas** al nivel de localidad o municipalidad para dirigir los programas y proyectos de RPF	**Informar y descentralizar la responsabilidad** a las instituciones administrativas locales (p.ej. los gobiernos provinciales, municipios y comunidades) para planificar, ejecutar y controlar los procesos de RPF	**Apoyar la celebración de reuniones interinstitucionales periódicas** para proporcionar orientación estratégica y supervisión al proceso de RPF **Formular y aplicar salvaguardas sociales y ambientales locales** para reducir al máximo toda consecuencia adversa de los programas y proyectos de RPF para los sistemas sociales y naturales	**Empoderar a las instituciones descentralizadas** de modo que puedan desarrollar la capacidad y los medios para planificar y ejecutar programas y proyectos en apoyo de los procesos de RPF
	Más información			
	Governance and forest landscape restoration: A framework to support decision-making (Mansourian 2017)			
	The Politics of Decentralization: Forests, Power and People (Colfer and Capistrano 2016)			
ER6: Obtener un firme compromiso de las partes interesadas	**Desarrollar una visión del paisaje** compartida con las partes interesadas en un área y contexto determinados	**Evaluar las estructuras de gobernanza al nivel de paisaje** y determinar si son adecuadas para la ejecución de la RPF **Crear plataformas de actores** para formular y acordar estrategias de restauración, definir claramente las funciones y responsabilidades (incluidas las estrategias para abordar las relaciones de poder	Por intermedio de **plataformas de actores organizadas al nivel de proceso**, lograr un entendimiento de las condiciones y los factores que influencian la participación de la comunidad local en la RPF	**Desarrollar y mantener una gama diversa de alianzas** para asegurar el éxito continuo de las intervenciones de RPF

		desiguales), e identificar las áreas de conflicto y formular enfoques comunes para abordarlas		
	Más información			
	Stakeholders organized into platforms and empowered to promote SLM practices in the landscape (Eneko et al. 2013)			
	The Restoration Diagnostic. A Method for Developing Forest Landscape Restoration Strategies by Rapidly Assessing the Status of Key Success Factors (Hanson et al. 2015)			
	Applying a stakeholder approach in FLR (Kusumanto 2005), en OIMT/UICN 2005			
	Fostering stakeholder commitment in Western Flores, Indonesia - Villages' organization in local conservation and development groups (CDGs) and the Mbeliling Community Forum (FPKM) (Widyanto et al. 2014)			
ER7: Realizar análisis conjuntos de las partes interesadas con respecto a los factores de la degradación	**Identificar las presiones externas y locales que causaron la degradación** y determinar si todavía están presentes. Evaluar el potencial de reducción o eliminación de dichas causas	Usando procesos participativos, **determinar las causas subyacentes** de las presiones de degradación y la posibilidad de abordarlas	**Reducir o eliminar las presiones de degradación** y observar las respuestas naturales de la vegetación **Si resultara necesario emprender plantación adicional u otras intervenciones, asegurar que el área esté protegida** de las presiones significativas de degradación, y que las intervenciones sean adecuadas para el sitio	**Adoptar estrategias y responsabilidades** para el control de las actividades ilícitas, concentrándose especialmente en las medidas de prevención
	Más información			
	Community-based forest resource conflict management. A Training Package (FAO 2012). Case study "Supporting local mechanisms for conflict resolution in the Chiang Mai Highlands, Thailand" (V. Viriyasakultorn, p. 303)			
	Directrices de la FAO para la restauración en las tierras secas (2014)			
ER8: Velar por la distribución del patrimonio y de los beneficios sociales	**Crear y comunicar las oportunidades para el empoderamiento económico** de todas las partes interesadas locales	**Formular planes de distribución de beneficios** por medio de un proceso participativo	En un paisaje y sociedad determinados, **abordar las desigualdades de género y la marginación de otros grupos** mediante la inclusión de todos los	**Seguir y controlar la distribución de costos y beneficios** del manejo forestal entre las partes interesadas

			miembros de la comunidad en los planes de distribución de beneficios **Formular mecanismos efectivos para resolver conflictos** entre las partes interesadas sobre la distribución de costos y beneficios	
	Más información			
	Forest Restoration in Shinyanga, Tanzania / Fuentes: Fisher et al. 2005, Barrow 2014, Duguma et al. 2015			
	The Sangha Guidelines for the landscape approach (IUCN/Ecoagriculture Partners 2008)			
ER9: Velar por que la planificación, toma de decisiones y seguimiento de la RPF sean plenamente participativos	**Crear consenso entre las partes interesadas con respecto a los criterios e indicadores** para el control y evaluación de la RPF **Fortalecer los elementos que permiten el seguimiento y control comunitarios** de los procesos, programas y proyectos de RPF		**Poner en práctica el sistema de control y evaluación** (compilación de datos, análisis, informes y comunicación) para permitir el manejo adaptativo en el proceso participativo	**Revisar periódicamente las estrategias de manejo** y adaptar los procedimientos de manejo según sea necesario
	Más información			
	A diagnostic for collaborative monitoring in forest landscape restoration (Evans and Guariguata 2019)			
	The Sangha Guidelines for the landscape approach (IUCN/Ecoagriculture Partners 2008)			
	Iniciativa LUD de The Forest Dialogue https://theforestsdialogue.org/initiative/land-use-dialogue-lud			
	Restauración del paisaje en Hojancha, Costa Rica (Salazar et al. 2005, 2007)			

ER10: Aumentar la capacidad de las partes interesadas para compartir la responsabilidad por la RPF	**Evaluar los conocimientos acerca de los recursos físicos, biológicos y humanos** del paisaje y asegurar la participación de todos los actores en la compilación de datos desagregados por género		**Proporcionar formación** y aumento de las capacidades a todas las partes interesadas en las destrezas básicas necesarias para restablecer y manejar los bosques de forma sostenible con miras a producir bienes y servicios ambientales **Desarrollar capacidades de las instituciones** para el seguimiento y control de la eficacia de sus programas, gestionar sus conocimientos y adaptar sus programas a la luz de las pruebas **Incorporar la mejora de las capacidades y la formación para el liderazgo** al nivel local en un modelo de instrucción de instructores	**Evaluar las actividades de mejora de las capacidades** e incorporar los resultados en el ciclo de manejo
	Más información			
	Implementing Forest Landscape Restoration. A Practitioners' Guide – IUFRO (Stanturf et al 2017)			
	The Sangha Guidelines for the landscape approach (IUCN/Ecoagriculture Partners 2008)			
	The Landscape Academy (https://academy.globallandscapesforum.org/) organiza cursos periódicos sobre Liderazgo en materia de paisajes, Gobernanza de paisajes, Financiación de paisajes			
	The Environmental Leadership Training Initiative (ELTI) of Yale School of Forestry & Environmental Studies: the "Tropical forest landscapes: conservation, restoration & sustainable use" course (https://elti.yale.edu/)			
	Programas de formación en restauración en http://www.bonnchallenge.org/content/training-program-2			
ER11: Obtener recursos financieros adecuados para las iniciativas de RPF	**Formular una estrategia de financiación de la RPF** para cada una de las cuatro fases de la RPF	**Formular intervenciones de RPF** de conformidad con los **procedimientos de las agencias que proporcionan**	**Analizar el potencial para planes que permitan pagos de servicios ambientales y formular dichos**	Considerar la posibilidad de financiación del sector privado nacional e internacional **o financiación mixta público-privada** para

		incentivos financieros para la RPF	**planes** a la escala de paisaje, como aquellos relacionados con el carbono, los recursos hídricos, la biodiversidad y el turismo	mantener la intervención de RPF
	Más información			
	Sustainable financing for forest and landscape restoration (FAO-UNCCD 2015)			
	Towards effective national forest funds (FAO 2015a)			
	Guía genérica y serie de módulos de formación para ayudar a los países a formular estrategias nacionales de financiación forestal			
	Integrating diverse social and ecological motivations to achieve landscape restoration (Jellinek et al. 2018)			
	La economía de los ecosistemas y la biodiversidad (TEEB 2009)			
	Pagos por servicios ambientales en América Latina como herramienta de restauración y desarrollo rural (Montagnini y Finney 2011)			
ER12: Establecer un entorno propicio para las inversiones en RPF	**Preparar una lista de posibles inversionistas en RPF** en un paisaje determinado, sobre la base de los conocimientos existentes al nivel nacional	**Proporcionar las condiciones propicias** (p.ej. jurídicas, políticas, institucionales, fiscales y de tenencia) **para atraer inversiones** en la RPF (incluso asegurar la facilidad del acceso a la información)	**Evaluar las necesidades e inquietudes de posibles inversionistas** con respecto al entorno para inversiones **Promover las tecnologías simples y económicas** que responden directamente a las necesidades de los inversionistas	**Formular mecanismos de resolución de conflictos** para manejar las compensaciones nacidas de los intereses opuestos en materia de aprovechamiento de las tierras, especialmente a la luz de nuevas propuestas de usos de la tierra (p.ej. minería en áreas forestales restauradas)
	Más información			
	Sustainable financing for forest and landscape restoration: Opportunities, challenges and the way forward. FAO/UNCCD. 2015b			
	Directrices mundiales para la restauración de bosques y paisajes degradados en las tierras secas: mejora de la resiliencia y beneficios para los medios de sustento (FAO 2014))			
	Coalition for Private Investment in Conservation' Blueprints: http://cpicfinance.com/blueprints/			

Principios y elementos rectores	**INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS**			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
Principio 3: RESTAURAR MÚLTIPLES FUNCIONES PARA OBTENER MÚLTIPLES BENEFICIOS				
ER13: Asegurar múltiples funciones y beneficios	**Preparar una lista de los productos forestales conocidos y fácilmente**	**Evaluar los servicios ambientales y las compensaciones para diferentes**	**Desarrollar conocimientos exhaustivos sobre los recursos forestales y**	**Proporcionar incentivos a los agricultores para que diversifiquen sus sistemas de**

	disponibles, sobre la base de los conocimientos locales	**usos de la tierra** en el paisaje **Evaluar las perspectivas de usos múltiples de los productos forestales** y, posiblemente**, de pagos por servicios ambientales**, como estrategia para crear múltiples beneficios	**arbóreos** con miras a potenciar el valor de los bienes y servicios ambientales del bosque, y defender los derechos de usufructo	**producción agrícola** y una diversidad de especies arbóreas multipropósito, y examinar el potencial de mercado para los productos de valor agregado
	Más información			
	Accelerating biodiversity commitments through forest landscape restoration (Beatty et al. 2018)			
	A Cost-Benefit Framework for Analysing Forest Landscape Restoration Decisions (Verdone 2015)			
	Synergies between Climate Mitigation and Adaptation in Forest Landscape Restoration (Rizvi et al. 2015)			
ER14: Conservar la biodiversidad y restaurar las funciones ecológicas	Cada vez que ello sea posible, e independientemente de los costos de oportunidad, **priorizar la restauración de las áreas de bosques naturales degradados por encima de su reemplazo** por otro tipo de uso de la tierra	**Priorizar la restauración de las funciones ecológicas** como la protección de las cuencas hidrográficas, la conservación de los suelos y los servicios de polinización en el diseño de las intervenciones de RPF	**Aprovechar los conocimientos ecológicos pertinentes sobre las especies** en la formulación de las iniciativas de RPF	En las tierras agrícolas, **proporcionar incentivos para las prácticas de uso diversificado de las tierras y prácticas de manejo** como los diversos tipos de agrosilvicultura para permitir la multiplicidad de funciones y proteger los suelos y recursos hídricos
	Más información			
	Directrices de OIMT/UICN para la conservación y utilización sostenible de la biodiversidad en los bosques tropicales productores de madera (OIMT/UICN 2009)			
	Biodiversity in forest landscape restoration assessment planning (en Beatty et al 2018)			
	Forest and water on a changing planet: Vulnerability, adaptation and governance opportunities. A global assessment report - IUFRO (Creed and Nordwijk 2018)			
ER15: Mejorar los medios de sustento	Utilizando procesos participativos, **determinar y priorizar las opciones para mejorar los medios de sustento** por medio de la RPF	**Planificar la evaluación y el seguimiento participativos** de la situación socioeconómica de los hogares y comunidades antes, durante y después de las intervenciones de RPF para evaluar la	**Considerar mecanismos de incentivo, mejora de las capacidades y desarrollo institucional** (incluidas las asociaciones de productores) **para fomentar el desarrollo de**	**Definir reglas para permitir el uso continuo de productos forestales y arbóreos tradicionales**, incluida la reglamentación para asegurar la extracción sostenible

		eficacia de las estrategias de aumento de los medios de sustento y los resultados para la población local En dicha planificación de la intervención de RPF, **asegurar que los bosques y árboles restaurados generen un suministro adecuado de madera y leña para satisfacer las necesidades de la comunidad** en el paisaje	**productos comerciales de valor agregado** sobre la base de los resultados de la RPF **Formular planes comerciales viables** para las actividades gananciales relacionadas con la RPF	Aplicar el **seguimiento y control participativos** de la situación socioeconómica de los hogares y comunidades
	Más información			
	Directrices mundiales para la restauración de bosques y paisajes degradados en las tierras secas: mejora de la resiliencia y beneficios para los medios de sustento (FAO 2014)			
	Direct and indirect methods for improving forest ecosystem function and livelihood, well-being, and resilience through FLR / Source: Forest landscape restoration for livelihoods and well-being (Erbaugh and Oldekop 2018)			
	Enhancing food security through forest landscape restoration: Lessons from Burkina Faso, Brazil, Guatemala, Viet Nam, Ghana, Ethiopia and Philippines (Kumar et al. 2015).			
	Improving ecosystem functionality and livelihoods: Experiences in forest landscape restoration and management (Barrow et al. 2012)			
ER16: Aprovechar plenamente los conocimientos locales	**Formular procesos de RPF que incluyan los conocimientos locales** sobre el uso de productos forestales no maderables y carne de caza	Formular enfoques para la ejecución de la RPF que **combinen los conocimientos de los actores locales**, incluidas las comunidades indígenas y los agricultores, **y los avances tecnológicos** en el uso de las tierras y los bosques	**Documentar prácticas tradicionales de aprovechamiento de las tierras** que permitan a la comunidad local derivar múltiples beneficios del paisaje forestal	Prever de forma adecuada en los procesos de RPF **las disposiciones necesarias para asegurar el mantenimiento y refuerzo de los valores culturales locales asociados con los recursos naturales**
	Más información			
	Community-led restoration of forest resources improves community cohesion and livelihoods (Ghosh et al. 2016)			
	Management and restoration practices in degraded landscapes of Eastern Africa and Southern Africa (Chirwa et al. 2015a,b)			

Principios y elementos rectores	INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
PRINCIPIO 4: MANTENER Y MEJORAR LOS ECOSISTEMAS NATURALES DENTRO DE LOS PAISAJES				
ER17: Evitar la conversión de los bosques naturales	Utilizando análisis técnicos y evaluaciones de los actores a nivel transectorial, **determinar las causas directas e indirectas de la deforestación y degradación forestal**		**En un proceso participativo**, definir **la zona forestal permanente** (para funciones de protección y producción) en un área jurisdiccional y delimitarla **Crear incentivos para el uso de la tierra para fines de estabilización por los actores locales en las fronteras agrícolas** en las inmediaciones de la ZFP designada (p.ej. en zonas de amortiguación)	Definir y **acordar los criterios para la conversión de bosques degradados y secundarios** a otros usos de la tierra. Priorizar la gestión forestal sostenible por encima de otros usos no forestales de la tierra
	Más información			
	Directrices técnicas para la restauración, ordenación y rehabilitación de bosques tropicales secundarios y degradados (OIMT (2002)			
	Directrices para la conservación y utilización sostenible de la biodiversidad en los bosques tropicales productores de madera (OIMT/UICN 2009)			
	Directrices voluntarias para la ordenación y el manejo sostenible de los bosques tropicales naturales (OIMT 2015)			
	Ejemplos de medidas que se pueden tomar para abordar los factores de la deforestación, véase el módulo de la Caja de herramientas FAO-OFS "Reducción de la deforestación" en: http://www.fao.org/sustainable-forest-management/toolbox/modules/reducing-deforestation/basic-knowledge/es/			
	Ejemplos de estrategias y medidas para prevenir y detener la degradación forestal, véase el módulo "Reducción de la degradación forestal" en http://www.fao.org/sustainable-forest-management/toolbox/modules/reducing-forest-degradation/basic-knowledge/es/			
ER18: Restaurar los bosques degradados y rehabilitar las tierras forestales degradadas	**Decidir los procesos para la identificación y priorización de áreas para intervenciones de RPF**. Al hacerlo, **evaluar los usos actuales y tomar en cuenta los aspectos**	**Utilizar un proceso participativo** para definir los **objetivos** de la intervención de RPF **Definir los enfoques y técnicas de RPF** idóneos para alcanzar los objetivos convenidos	**Formular un plan de RPF mediante un proceso participativo** **Abordar las presiones anteriores y actuales o los factores involucrados en la**	Si fuera jurídicamente factible, **fomentar las actividades económicas** como intercalación de cultivos, para aumentar la viabilidad económica de las intervenciones de RPF, especialmente al principio del

	socioeconómicos, ecológicos, jurídicos, técnicos y financieros, como requisitos jurídicos, servicios ambientales fundamentales, riesgos futuros asociados con el cambio climático, necesidades de subsistencia y oportunidades de mercado	**Investigar y seleccionar las especies arbóreas más apropiadas**, sobre la base de criterios ecológicos, socioeconómicos y de mercado Si fuera apropiado, **realizar análisis de costo–beneficio** de las intervenciones de RPF más prometedoras, definidas con la participación de las partes interesadas	**degradación de los bosques y tierras** y sus consecuencias e impactos, incluso, cuando corresponda, por medio de acuerdos de concesión gubernamentales y acuerdos con la población local sobre el uso del bosque	proceso de restauración
	Más información			
	Directrices técnicas para la restauración, ordenación y rehabilitación de bosques tropicales secundarios y degradados (OIMT 2002)			
	Restauración de paisajes forestales. Introducción al arte y ciencia de la restauración de paisajes forestales (OIMT/UICN 2005)			
	Restoring Tropical Forests. A Practical Guide (Elliott et al. 2013)			
	Directrices mundiales para la restauración de bosques y paisajes degradados en las tierras secas: Mejora de la capacidad de adaptación y beneficios para los medios de sustento – FAO (2014)			
	Guía sobre la metodología de evaluación de oportunidades de restauración (ROAM): Evaluación de las oportunidades de restauración del paisaje forestal a nivel nacional o subnacional (UICN y WRI 2014)			
	International standards for the practice of ecological restoration – including principles and key concepts (McDonald et al. 2016)			
	Implementing Forest Landscape Restoration. A Practitioners' Guide – IUFRO (Stanturf et al 2017)			
	Case: Rainforest Restoration: A Guide to Principles and Practice (Mudappa and Raman 2010)			

ER19: Evitar la fragmentación forestal	**Evaluar el grado de fragmentación forestal** y formular estrategias para aumentar la conectividad con miras a facilitar los flujos genéticos de la fauna y flora nativas entre paisajes y dentro de los mismos		Cuando ello sea posible, **crear corredores** entre rodales forestales fragmentados para la fauna silvestre y la dispersión de semillas de árbol Si fuera apropiado, **establecer bosques plantados para múltiples propósitos económicos, sociales y ambientales,** incluido el mejoramiento de las condiciones del sitio y la conservación de la biodiversidad en las áreas con escasa presencia de bosques	**Hacer el seguimiento y control de las inversiones** efectuadas
	Más información			
	Directrices para la conservación y utilización sostenible de la biodiversidad en los bosques tropicales productores de madera (OIMT/UICN 2009)			
	Restoring Tropical Forests. A Practical Guide – Forest Fragmentation, pp. 93-98 (Elliott et al. 2014)			
	Targeted habitat restoration can reduce extinction rates in fragmented forests (Newark et al 2017)			
ER20: Conservar los pastizales, sabanas y humedales naturales	Aplicando un proceso participativo, **identificar las áreas naturales que no se deben convertir** a bosques plantados u otros usos de la tierra y que, por el contrario, se deberían mantener en un estado natural	**Evaluar los posibles factores de riesgo de la conversión** de áreas naturales y formular estrategias para reducir al máximo dichos riesgos	Emprender, mediante **colaboración transectorial**, medidas de conservación y gestión de sabanas y humedales	**Hacer el seguimiento y control del desarrollo** de los pastizales y humedales naturales
	Más información			
	Resilience and restoration of tropical and subtropical grasslands, savannas, and grassy woodland (Buisson et al. 2018)			
	Wetlands International: https://www.wetlands.org/?s=restoration			

Principios y elementos rectores	INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
PRINCIPIO 5: ADAPTACIÓN AL CONTEXTO LOCAL EMPLEANDO DIVERSOS ENFOQUES				
ER21: Evaluar el contexto y las restricciones locales	**Evaluar las condiciones locales** ecológicas, socioculturales, económicas y de gobernanza que impulsan el cambio del paisaje		**Analizar posibles oportunidades y restricciones** para la ejecución de la RPF, en vista del contexto local Utilizando un proceso participativo, **determinar los tipos y objetivos de las intervenciones de RPF** de sitios específicos	**Adaptar al nivel local,** según sea necesario, al contexto cambiante, incluso en lo relativo al cambio climático
	Más información			
	Understanding the landscape mosaic (Gilmour 2005b)			
	Restoring Tropical Forests. A Practical Guide (Elliott et al. 2013)			
	Guía sobre la metodología de evaluación de oportunidades de restauración (ROAM): Evaluación de las oportunidades de restauración del paisaje forestal a nivel nacional o subnacional (UICN WRI 2014)			
	Implementing Forest Landscape Restoration. A Practitioners' Guide (Stanturf et al. 2017)			
ER22: Prever futuros cambios de las condiciones	**Realizar una evaluación general del riesgo climático nacional** del país en lo que respecta al aprovechamiento de la tierra, los cambios del uso de las tierras y la silvicultura	**Analizar las condiciones actuales y las tendencias proyectadas socioculturales, políticas y relacionadas con el clima** y evaluar las oportunidades y los riesgos asociados **Revisar la adaptabilidad de los enfoques de RPF seleccionados a las futuras tendencias a la escala de paisaje**	**Hacer el seguimiento y control de las tendencias y evaluar los riesgos asociados y las posibles oportunidades** **Introducir y aplicar tecnologías emergentes** como la teledetección de acceso libre, los sistemas y modelos de información geográfica, los modelos digitales del terreno y software que facilita la detección de patrones a la escala de paisaje	**Diversificar los usos de la tierra, biota y medios de sustento** para reducir el riesgo y aumentar la resiliencia del paisaje **Proporcionar incentivos para tecnologías limpias** en las prácticas de restauración y plantación y para usos de la tierra adaptados al cambio climático proyectado
	Más información			
	Directrices sobre el cambio climático para los gestores forestales (FAO 2013)			

ER23: Ajustar los enfoques al contexto local y asegurar los beneficios locales	**Definir una serie de intervenciones de RPF adecuadas para el contexto local y desarrollar una visión de paisaje** aceptable para todas las partes interesadas	**Revisar los enfoques seleccionados sobre la base de su adaptabilidad a las tendencias futuras** en el contexto local **Evaluar los servicios ambientales importantes al nivel local**, incluidos los servicios culturales y de regulación, y asegurar su prestación continua mediante la RPF en un paisaje	**Mejorar las oportunidades de ingresos locales** y **preparar los mercados para productos desarrollados al nivel local** provenientes de los paisajes forestales restaurados **Prestar atención a la producción de valor agregado al nivel local** proveniente de los bosques restaurados y de los paisajes en mosaico	**Asegurar la plena participación de los actores locales** en la formulación, ejecución y evaluación de la RPF, y tomar en cuenta el historial del paisaje y las expectativas de la población
	Más información			
	Decision support tools for forest landscape restoration (Chazdon and Guariguata, 2018)			
	A tool for planning community-based tree and forest product enterprises: Market Analysis & Dev. - MA&D (FAO 2011)			
	A Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions (Verdone 2015)			
	Marco para la toma de decisiones en la identificación de modelos para estimar los beneficios en servicios ambientales provenientes de la RPF (Christin et al. 2016)			
	Identificando opciones a nivel del sitio – Lamb (2005), en: Restaurando el paisaje forestal (OIMT/UICN 2005			
ER24: Asegurar la viabilidad financiera y económica de las inversiones en RPF	**Preparar análisis de costo–beneficio** de los programas y proyectos de RPF planeados, incluidos los beneficios no monetarios y sus valores	**Formular casos comerciales para las inversiones en RPF** y comunicarlos a posibles inversionistas del sector privado	**Explorar las oportunidades para incentivos de mercado** como los pagos por carbono según los resultados y los mecanismos de pagos de transferencia por servicios ambientales Al nivel de programa y proyecto, realizar **análisis económicos de las iniciativas de RPF al nivel piloto** para orientar la formulación de normativas en el uso de incentivos	**Determinar cómo generar valor agregado para los productos y servicios ambientales derivados de las intervenciones de RPF,** como por medio del ecoturismo, la reducción de desperdicio y la mejora de la calidad de los productos

	Más información			
	Proyecto FAO – CDB: Análisis de costo/beneficio para las inversiones en RPF			
	A Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions (Verdone 2015)			
	Value for Money: Guatemala's Forest Landscape Restoration (Colomer et al. 2018)			
	Enhancing food security through forest landscape restoration: Lessons from Burkina Faso, Brazil, Guatemala, Viet Nam, Ghana, Ethiopia and Philippines (Kumar et al. 2015)			
ER25: Identificar las oportunidades para aumentar los ingresos locales	**Reforzar las organizaciones de productores forestales y las pequeñas y medianas empresas locales** y prestar apoyo a su acceso al mercado **Considerar las oportunidades locales para fuentes de ingresos alternativas para la población rural empobrecida** no basadas en la titularidad de la tierra ni en la explotación de los recursos naturales		**Promover la producción y transformación locales y de valor agregado** de los productos agrícolas, madera y productos forestales no maderables **Promover las oportunidades de ingresos derivados de los bosques y el acceso al mercado para la mujer** como factores decisivos importantes para la aceptabilidad local de la ejecución de la RPF	**Desarrollar oportunidades para alianzas con comunidades, instituciones y proyectos** (públicos y privados) que cuenten con experiencia en transformación y comercialización con miras a reforzar los esfuerzos desplegados para lograr el acceso a los mercados **Explorar los planes de manejo forestal comunitario** basados en bienes y servicios ambientales del bosque, y formular estrategias para la inversión
	Más información			
	Community forestry and FLR: Attracting sustainable investments for restoring degraded land in SE Asia (Gritten et al. 2018			
	Forest landscape restoration for livelihoods and well-being (Erbaugh and Oldekop 2018)			
ER26: Desarrollar cadenas de suministro sostenibles	**Identificar el potencial para desarrollar cadenas de suministro verdes** para los productos provenientes de los paisajes forestales restaurados	**Aprovechar las iniciativas existentes de cadenas de suministro sostenibles**, como las que están asociadas con la certificación y la legalidad de la madera, con miras a aumentar la facilidad de acceso de procesos similares	**Desarrollar instrumentos para apoyar los retornos financieros para las opciones sostenibles de aprovechamiento de las tierras forestales**, incluidos los mecanismos que proporcionan pagos pos los servicios ambientales en los paisajes restaurados	**Determinar la magnitud de las oportunidades posibles de comercialización y las cadenas de valor** para las especies arbóreas que abundan en el paisaje pero que son relativamente desconocidas en los mercados

		para las comunidades locales e indígenas y los pequeños agricultores **Forjar alianzas público–privadas** para compartir los costos incrementales y asegurar la viabilidad de las iniciativas para crear cadenas de suministro sostenibles en los paisajes forestales restaurados **Ayudar a las comunidades locales e indígenas y a los pequeños agricultores** a desarrollar cadenas de suministro sostenibles para los bienes que producen en las tierras forestales restauradas	**Crear las condiciones propicias**, incluidos los incentivos, el acceso a recursos financieros e impuestos justos, y reglamentación simplificada, con el objeto de desarrollar cadenas de suministro sostenibles para productos prometedores de los bosques restaurados y la agrosilvicultura	
	Más información			
	Cadenas de suministro verdes: un tema candente – AFT (2018)			
	Is community forestry open for business (Greijmans and Gritten, 2015) Congreso Mundial de Silvicultura, Durban			

Principios y elementos rectores	**INTERVENCIONES DE RPF EN EL CICLO DE MANEJO DE PROYECTOS**			
	Desarrollo de visión	***Conceptualización***	***Acciones***	***Mantenimiento***
PRINCIPIO 6: GESTIÓN ADAPTATIVA PARA LOGRAR LA RESILIENCIA A LARGO PLAZO				
ER27: Adoptar un enfoque de manejo adaptativo	Desde las etapas iniciales del proceso de RPF, **velar por que todas las partes interesadas comprendan la importancia del manejo adaptativo** para mejorar las intervenciones de planificación de la RPF **Incorporar en el sistema de seguimiento y control de la RPF** un componente que permita aprender las enseñanzas de los		**Evaluar, revisar y documentar periódicamente los comentarios relativos a las intervenciones de RPF**, con la participación de las	**Revisar anualmente** la intervención de la RPF y adaptarla a la luz de las enseñanzas aprendidas del seguimiento y evaluación

	éxitos y fracasos y la mejora de las intervenciones de RPF futuras	partes interesadas pertinentes **Fomentar la investigación aplicada y participativa** sobre los factores decisivos para la adopción de las intervenciones de RPF por los actores locales y ampliar y comunicar los conocimientos y experiencias resultantes	
	Más información		
	Multi-sectoral platforms for planning and implementation - How they might better serve forest and farm producers (FAO 2014)		
	Directrices técnicas para la restauración, ordenación y rehabilitación de bosques tropicales secundarios y degradados (OIMT 2002)		
	International standards for the practice of ecological restoration – including principles and key concepts (McDonald et al. 2016)		
	Implementing Forest Landscape Restoration. A Practitioners' Guide – IUFRO (Stanturf et al 2017)		
	Co-creating Conceptual and Working Forest and Landscape Restoration Frameworks Based on Core Principles (Gutierrez et al. 2018)		
ER28: Medir continuamente las dimensiones biofísicas del paisaje	**Determinar el riesgo físico y ambiental específico y los factores de estrés** que podrían afectar las intervenciones de RPF	**Documentar la situación de línea de referencia base** con fotografías al nivel del suelo y de drones, y teledetección En la medida de lo posible, documentar el historial del sitio que llevó a la necesidad de RPF	Analizar los resultados y **determinar** si **los efectos de los factores de estrés** permitirán un enfoque viable a nivel social y económico con respecto a la RPF en el paisaje y a lo largo del tiempo
	Más información		
	Directrices sobre el cambio climático para los gestores forestales (FAO 2013)		
	Synergies between Climate Mitigation and Adaptation in Forest Landscape Restoration (Rizvi et al. 2015)		
ER29: Evaluar periódicamente la vulnerabilidad ante el cambio climático	Evaluar los enfoques de RPF según su capacidad para **aumentar la capacidad de adaptación de las partes interesadas a largo plazo** **Alentar la investigación para aumentar y aplicar los conocimientos ecológicos** con miras a mantener los procesos ecológicos	**Evaluar la vulnerabilidad ecológica y social** y los factores que la impulsan **Evaluar los impactos del**	En el caso de los factores de estrés causados por el cambio climático, **explorar la factibilidad de emprender la RPF con arreglo a**

	como la polinización, la dispersión de semillas y los ciclos de nutrientes	**cambio climático y de la variabilidad del clima** sobre las características físicas del paisaje y su productividad, dinámica ecológica y funciones ecosistémicas	**mecanismos de adaptación y mitigación** de la Convención Marco de las Naciones Unidas sobre el Cambio Climático, especialmente como parte de la adaptación al cambio climático
	Más información		
	Directrices sobre el cambio climático para los gestores forestales (FAO 2013)		
	Accelerating biodiversity commitments through forest landscape restoration - Evidence from assessments in 26 countries using the Restoration Opportunities Assessment Methodology (ROAM) (Beatty et al. 2018)		
ER30: Desarrollar enfoques participativos de seguimiento y control		**Desarrollar e implementar una serie completa de indicadores de proceso y de protocolos de seguimiento y control** que abarquen los siguientes: ▪ los medios de sustento de las comunidades, desagregados por grupo social; ▪ los valores de biodiversidad y las funciones ecológicas; y ▪ la productividad de los sistemas de agricultura y recursos naturales	**Hacer un seguimiento de los arreglos institucionales** para la gobernanza del paisaje, incluidas las leyes y costumbres, reglamentación y normas de conducta Utilizar enfoques de RPF que aumenten la resiliencia ecosistémica y la capacidad adaptativa de las partes interesadas locales
	Más información		
	Applying an adaptive management approach in FLR – Gilmour (2005b), en OIMT/UICN (2005)		
	Measuring the effectiveness of landscape approaches to conservation and development (Sayer et al. 2016)		
	Monitoring Forest Landscape Restoration Projects (Stanturf et al. 2017)		
	Success from the ground up: Participatory monitoring and forest restoration (Evans and Guariguata 2016)		
	A Guide to identifying priorities and indicators for restoration monitoring -WRI/FAO (Buckingham et al. 2019)		

ER31: Fomentar el acceso abierto y el intercambio de información y conocimientos	**Recopilar los datos e información existentes a nivel nacional** sobre las prácticas en materia de RPF, y utilizar estos conocimientos para formular las intervenciones de RPF **Aumentar la concientización** con respecto a las características e importancia de la RPF al nivel local e internacional	**Desarrollar y divulgar información destinada a los servicios de extensión agrícola para uso en el terreno** con miras a aumentar el entendimiento de la RPF y de sus beneficios, costos y técnicas **Formular estrategias de comunicación** sobre la RPF con miras a los grupos principales de partes interesadas	**Fomentar los grupos de trabajo nacionales y locales** que incluyan a todas las partes interesadas, y alentar otras formas de redes para intercambio de experiencias y formulación de ideas y medidas para la RPF **Diseñar o adaptar herramientas de comunicación** ajustadas al mensaje, al medio utilizado y al grupo destinatario
	Más información		
	IUFRO practitioner' s guide – implementing forest landscape restoration (Stanturf et al, 2017, p 94-109)		
	Measuring the effectiveness of landscape approaches to conservation and development (Sayer et al. 2016)		
	Mansourian and Vallauri (2014): Restoring forest landscapes: important lessons learnt (véase la lista de ref.)		
	IUCN ArborVitaeSpecial (2008): Learning from Landscapes: https://www.iucn.org/downloads/a_avspecial_learning_from_landscapes_1.pdf		
	FAO's Forest and Landscape Restoration Mechanism (FLRM) – Knowledge Base: http://www.fao.org/in-action/forest-landscape-restoration-mechanism/knowledge-base/en/		
ER32: Informar acerca de los resultados de la RPF	**Formular un plan de seguimiento y evaluación sociales** en las etapas iniciales del proceso de RPF, incluidos indicadores para medir el avance	**Realizar el seguimiento de los hogares y comunidades antes, durante y después de la ejecución** de una intervención de RPF para generar datos sobre los cambios en los medios de sustento, bienestar y resiliencia debidos a la RPF	**Asegurar la continuación del seguimiento con el tiempo, sobre aspectos como** reservas de carbono, biodiversidad, servicios ambientales y medios de sustento de las partes interesadas locales **Comunicar los hallazgos del seguimiento** a redes nacionales e internacionales de RPF, incluido el Barómetro de RPF
	Más información		
	IUFRO practitioner' s guide – Implementing forest landscape restoration (Stanturf et al, 2017, p. 64-74)		

	Marco general de seguimiento de la UICN
	Criterios y comunicación en el Barómetro del Desafío de Bonn de la UICN miden los esfuerzos de restauración https://infoflr.org/bonn-challenge/bonn-challenge-barometer
	Página web de The Forest and Landscape Restoration Mechanism (FLRM)
	Monitoring and evaluating site-level impacts – Gasana, J (2005), in (OIMT/UICN 2005)
	Participatory planning, monitoring and evaluation of multi-stakeholder platforms in integrated landscape initiatives (Salvemini and Remple 2014)
	Indicators for improved forest ecosystem function, livelihood and resilience – Erbaugh/Oldekop 2018)

4 Case studies on tropical forest landscape restoration

The need for FLR emerges as forests and wider landscapes become degraded as a result of one or more direct drivers. From this baseline, the design and implementation of FLR is context-specific and influenced by biophysical factors, socioeconomic conditions and governance at the landscape scale. The role of stakeholders is decisive in setting objectives for the FLR process and the sustainable use of the landscape into the future.

Context matters

"Different biophysical and social contexts affect the choice of technical approach necessary to meet restoration goals and objectives. Each situation will be unique and may require a particular mix of approaches, but some general principles apply" (Stanturf et al. 2017)

This chapter presents 17 case studies of FLR processes that have been implemented in the past or are under implementation now. The experiences gained in these efforts inform the guidelines and help illustrate the range of FLR approaches given local biophysical, socioeconomic and governance contexts, stakeholder objectives and available resources.

Case studies were sought to highlight one of the following six common options (conforming with the four options described on page XX) for restoring degraded tropical forest landscapes:

1) restoration of degraded forests for production;
2) restoration of degraded forests for protection (e.g. of soil, water, biodiversity);
3) rehabilitation of degraded forest land through planted forests;
4) rehabilitation of degraded forest land through agroforestry or silvopastoral systems;
5) restoration and management of secondary forests; and
6) restoration or rehabilitation of mangroves

The cases studies were described using a standard template covering a number of relevant characteristics (Box 4).

BOX 4 ***Template for describing case study of tropical FLR***		
1. Proponent	7. Target main objective	13. Innovative aspects
2. Country of implementation	8. Target group or users	14. Outcomes
3. Location	9. Partners and collaborators	15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context
4. Implementation period	10. Context (initial situation) and challenge (problem) being addressed	16. Main challenges faced 17. Key messages and lessons learned
5. Restoration option	11. Process and methodological approach, techniques and tools used	18. Sources describing the case 19. Contributors
6. Focus of the case	12. Field-level practices implemented	20. Photos

Of the 17 selected case studies, three are from tropical Africa (Ethiopia, Ghana and Madagascar), six are from tropical Asia (Cambodia, Indonesia, Myanmar, the Philippines and Thailand) and eight are from Latin America (Brazil, Colombia, Ecuador, Guatemala and Peru).

Table 5 ***Selected case studies of FLR in the tropics***

CASE STUDY	COUNTRY	RESTORATION OPTIONS					
		Restoration of degraded forests for production	Restoration of degraded forests for protection	Rehabilitation of degraded forest land through plantation	Rehabilitation of degraded forest land through agroforestry or silvopastoral systems	Restoration and management of secondary forests	Restoration or rehabilitation of mangroves
		I	II	III	IV	V	VI
1. Restoration of overlogged forests with intensive silviculture	Indonesia	✔					
2. Rehabilitation of degraded forests by local communities	Ghana	✔					
3. Facilitation of biodiversity by shelter effects of *Pinus patula* and *Alnus acuminata* in montane ecosystems of South Ecuador	Ecuador	✔	✔	✔			
4. Assisted natural regeneration for watershed restoration	Philippines		✔				
5. Early example of FLR in northern Thailand	Thailand		✔				
6. Restoration of degraded tropical forests: A performance-based payment approach	Ethiopia	✔	✔	✔			
7. Achieving Prey Lang landscape restoration through community forestry approaches	Cambodia		✔			✔	
8. Restoring cloud forest on private and communal land in the Ecuadorian Andes	Ecuador		✔			✔	
9. *Matas Legais* project	Brazil		✔	✔		✔	
10. Land Use Dialogue planning sustainable landscapes in the Atlantic rain forest	Brazil	✔	✔	✔	✔	✔	
11. Private restoration of degraded forest land with native tree species in the Peruvian Amazon	Peru			✔		✔	
12. From *Eucalyptus* monocultures to high diversity mixed forests: bringing together	Brazil			✔			

CASE STUDY	COUNTRY	RESTORATION OPTIONS					
		Restoration of degraded forests for production	Restoration of degraded forests for protection	Rehabilitation of degraded forest land through plantation	Rehabilitation of degraded forest land through agroforestry or silvopastoral systems	Restoration and management of secondary forests	Restoration or rehabilitation of mangroves
		I	II	III	IV	V	VI
wood production and tropical forest restoration							
13. Strengthening cocoa value chain for upscaling FLR through agroforestry	Guatemala				✓		
14. Productive rehabilitation of tropical cattle ranching lands – the Colombian Sustainable Cattle Ranching Project	Colombia				✓		
15. Restoration of mangrove ecosystems through community forestry	Myanmar						✓
16. Empowering local communities for restoration of a coastal landscape in Ayeyarwaddy	Myanmar						✓
17. Restoration and community management of mangroves in the western coast of Madagascar	Madagascar						✓

Note: Dark green indicates the main restoration option.

Table 6 ***Case studies of tropical FLR illustrating the practice of FLR principles (P) and guidelines (G)***

(Marks in dark green means the case study has a strong contribution to the guiding element)

PRINCIPLE	GUIDING ELEMENTS	CASE STUDIES																
		Indonesia	Ghana	Ecuador-1	Philippines	Thailand	Ethiopia	Cambodia	Ecuador-2	Brazil-1	Brazil-2	Peru	Brazil-3	Guatemala	Colombia	Myanmar-1	Myanmar-2	Madagascar
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Focus on landscapes	1: Undertake inclusive, gender-responsive landscape-level assessment and land-use planning							X		X	**X**				X		**X**	X
	2: Gain recognition that FLR must transcend sector policies										**X**			X	**X**	**X**	X	X
	3: Conduct FLR at an appropriate scale	X										X			**X**			
	4: Fully address tenure and access rights						X	X								**X**	**X**	
2 Engage stakeholders and support participatory governance	5: Ensure adequate governance capacity for decentralized FLR processes							X			**X**				**X**		**X**	
	6: Obtain strong stakeholder engagement	**X**	X	X	**X**	X	**X**	**X**	**X**	**X**	**X**				X	**X**	**X**	**X**
	7: Conduct joint stakeholder analysis of the drivers of degradation		X				**X**			**X**	**X**						**X**	
	8: Ensure social equity and benefit sharing							**X**			**X**							
	9: Ensure that FLR planning, decision-making and monitoring are fully participatory		**X**				X	**X**	X	X	**X**					**X**	**X**	**X**
	10: Build stakeholder capacity for sharing responsibility for FLR	**X**	**X**	X	X	**X**	**X**	**X**	X	X	**X**			**X**	X	**X**	**X**	**X**
	11: Secure adequate financing for FLR initiatives	X			**X**		X	X	X	**X**	**X**	**X**	**X**	**X**	X			
	12: Establish a favourable investment environment for FLR	X						X		**X**	**X**	**X**		**X**				

3 Restore multiple functions for multiple benefits	13: Ensure multiple functions and benefits			X	X		X	X		X		X				X	X	
	14: Conserve biodiversity and restore ecological functions			X	X	X	X	X	X	X		X	X		X	X		X
	15: Improve livelihoods		X		X		X	X	X					X	X	X	X	X
	16: Make full use of locally based knowledge		X					X	X		X	X						
4 Maintain and enhance natural forest ecosystems within landscapes	17: Avoid the conversion of natural forests	X							X	X				X				
	18: Restore degraded forest and rehabilitate degraded forest land	X	X	X	X	X	X	X	X	X		X	X	X				X
	19: Avoid forest fragmentation					X				X		X			X			
	20: Conserve natural grasslands, savanna and wetlands														X	X		X
5 Tailor to the local context using a variety of approaches	21: Assess local context and restrictions				X	X	X	X	X		X	X			X	X	X	X
	22: Allow for future changes in conditions					X			X		X	X	X					
	23: Tailor approaches to the local context and ensure local benefits		X		X		X	X		X	X	X				X	X	X
	24: Ensure the financial and economic viability of FLR investments	X	X									X	X	X	X			
	25: Identify opportunities to increase local incomes	X	X		X		X	X	X			X		X		X	X	X
	26: Develop sustainable supply chains	X						X		X		X		X				
6 Manage adaptively for long-term resilience	27: Take an adaptive management approach										X		X			X		
	28: Continually measure the biophysical dimensions of the landscape	X		X	X	X				X		X	X			X		X
	29: Periodically assess vulnerability to climate change																X	
	30: Develop participatory monitoring approaches				X		X	X							X			X
	31: Encourage open access to, and the sharing of, information and knowledge			X		X		X			X	X	X	X	X		X	X
	32: Report on FLR outcomes	X	X	X	X	X	X					X	X					

Case studies

Sustaining timber yields in dipterocarp forests through Indonesia selective logging and strip planting (TPTI/SILIN) technique	
1. Proponent	Sari Bumi Kusuma logging concession Ministry of Environment and Forestry of Republic of Indonesia
2. Country of implementation	Indonesia
3. Location	Sari Bumi Kusuma logging concession, Central Kalimantan Province, Indonesia (lowland dipterocarp forest)
4. Implementation period	1999 – present
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ✓ Intervention level ✓
7. Target/Main objective	Sustainably manage production forests in Indonesia to supply timber to forest industries and provide conservation benefits such as biodiversity conservation as well as social and economic benefits to local people.
8. Target group or users	Forest managers, government's decision-makers, impact investors and local people.
9. Partners & collaborators	Faculty of Forestry, Tanjungpura University, West Kalimantan
10. Context (initial situation) and challenge (problem) addressed	Under the currently allowable logging intensities and cutting cycle of 30 years, timber yields are not sustained in selectively logged dipterocarp forests in Indonesia. Timber harvest volumes decrease from more than 60 m^3/ha when primary forests are harvested to only 32-40 m^3/ha from second harvests, with only 19 m^3/ha expected from the third harvest. Yields of <30 m^3/ha are not financially remunerative, and forests without valuable timber are prone to conversion to more lucrative land uses. To sustain timber yields, Indonesia strip planting technique (TPTJ/SILIN) was piloted in two logging concessions in 1999. This case study is from one of these logging concessions. TPTJ is strip planting with native fast-growing commercial timber species such as *Shorea leprosula* and *Shorea parvifolia*. Nursery-grown seedlings or wildlings are planted in twice-logged forest at 5 m intervals along cleared strips with spacing of 20 m. Based on this case study (Ruslandi et al. 2017a), timber volumes from planted trees and naturally regenerated future crop trees in the inter-strip areas are expected to recover primary forest volumes (96 m^3/ha) after 40 years. Carbon stocks recover to primary forests levels in just 35 years.
11. Process, methodological	– Application of best management practices for enrichment planting with fast-growing dipterocarps (e.g., tending of seedlings) while maintaining natural forest cover at

approach, techniques and tools used	operational scales in logging concessions. Refined nursery practices, tree improvement, and species selection were integral to the success of this intervention. – Intensive tending of the seedlings for the first years after planting. – Planting on fairly level terrain where access for planting and tending crews is easy.
12. Field-level practices implemented	– Implementation of reduced-impact logging – Large scale nursery establishment – Adequate site preparation (i.e., strip clearing) – Careful planting of native fast-growing commercial species (e.g., large planting holes) – Tending (weeding and liberation of planted trees) – Tree improvement and species selection – Forest growth monitoring Local people as a contractor are responsible for site preparation, planting and tending, while the rest of activities are the responsibility of the concession's employees.
13. Innovative aspects	– Planting native commercial fast-growing species at industrial scales (i.e., 4,000 ha/year) – Maintaining natural forest cover between planted strips – Applied only on level terrain with easy access from maintained logging roads so the planting and monitoring costs could be minimized. – Employing local people as workers or planting contractors
14. Outcomes	– Line planted area of 49,000 ha in the Sari Bumi Kusuma logging concession – More than 2,000 employment of workers from local communities for planting of 4,000 ha per year – Commercial timber growth of 5 m^3/ha/year in TPTJ area compared to only 1 m^3/ha/year in selective logging only (TPTI) area. – Scientific publications and training for local researchers and forest workers (the concession has SOPs for each of the TPTJ activities, as the concession has been FSF certified)
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– The TPTI/SILIN technique should be implemented only on reasonably level terrain in areas that will remain accessible for at least 5-10 years – Skilled and dedicated staff members who take pride in their work – Company owner commitment, including financial support. The upfront cost of applying TPTJ was about US $ 429/ha and net present value was US $ 628/ha for the timber only revenue and US $ 1056/ha for the timber and carbon payment revenues, at the cutting cycle of 25 years as specified by government and a discount rate of 6%/year – Government support, including incentives such as reducing timber royalty
16. Main challenges faced	– Financial viability, in terms of low financial returns and high upfront costs – Ownership of planted trees and long-term land security. There should be a clear regulation that the planted trees will be owned by the concession and there is a guarantee from the government that the concession license will be extended allowing for the concession to harvest the planted trees. – No harvesting method has been defined to minimize the impacts of future harvests of large volumes
17. Key messages and lessons learned	– Silvicultural knowledge about the planted species is critical – Dedicated and well-trained concession staff is paramount to make sure all procedures are implemented properly and innovatively – Strong commitment from concession owners, including financial support, is required – Government support, including incentives, are needed for its wider adoption – Local community members should be employed

18. Source(s) describing the case	Ruslandi, W.P. Cropper, F.E. Putz. 2017a. Effects of silvicultural intensification on timber yields, carbon dynamics, and tree species composition in a dipterocarp forest in Kalimantan, Indonesia: An individual-tree-based model simulation. For. Ecol. Manage. 390. doi:10.1016/j.foreco.2017.01.019 Ruslandi, C. Romero, F.E. Putz. 2017b. Financial viability and carbon payment potential of large-scale silvicultural intensification in logged dipterocarp forests in Indonesia. For. Policy Econ. 85. doi:10.1016/j.forpol.2017.09.005
19. Contributors	Ruslandi (Yayasan Konservasi Alam Nusantara , an affiliate of The Nature Conservancy, Jakarta Indonesia) and Francis E Putz (Department of Biology, University of Florida)
20. Photos	

Figure 2. Site preparation for strip planting at SBK concession with annual targets of 3,000 – 4,000 ha. @Ruslandi

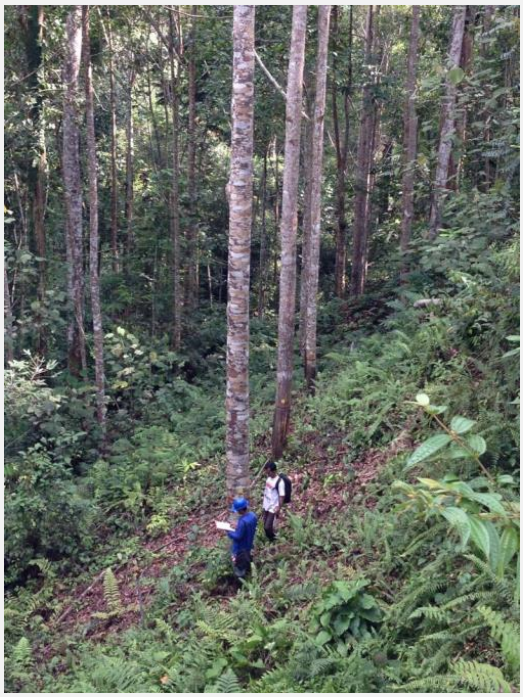


Figure 4. A 16 year-old plantation in SILIN/TPTI area of SBK concession @ SBK concession

Rehabilitation of degraded forests by local communities in Ghana	
1. Proponent	ITTO (International Tropical Timber Organization) CSIR-FORIG (Forestry Research Institute of Ghana)
2. Country of implementation	Ghana
3. Location	Pamu-Berekum Forest Reserve (dry semi-deciduous forest ecological zone) Afrensu-Brohoma Forest Reserve (dry semi-deciduous fire zone) Southern Scarp Forest Reserve (moist semi-deciduous southeast)
4. Implementation period	2012 – 2017
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ✓ Intervention level ☐
7. Target/Main objective	Forests established by local communities through the rehabilitation of degraded reserved forest areas are collaboratively and sustainably managed together with the communities and serve as a major source of livelihood.
8. Target group or users	Local communities living in and around the reserved forest areas in three districts
9. Partners & collaborators	Local communities, FSD (Forest Service Division of the Forestry Commission), traditional authorities and district assemblies
10. Context (initial situation) and challenge (problem) addressed	The over-exploitation of forest resources, agricultural expansion into forest areas, wildfires and mining activities have significantly reduced the forest cover and degraded most of the reserved forest areas in Ghana. This negatively affects biodiversity, soils and finally agricultural productivity. After an initial focus on the rehabilitation of degraded reserved forest areas through community plantation and agroforestry establishment, it became clear that long-term success depends on the elaboration of a sustainable management and monitoring system including capacity building and governance aspects.
11. Process and methodological approach, techniques and tools used	The project was guided by a participatory process. Local communities were the main actors in plantation establishment. They were also included in land use surveys, focus group discussions and capacity building together with the Forest Service Division. Furthermore, capacity building on plantation management techniques, timber and carbon valuation, monitoring and governance were central aspects of the approach.
12. Field-level practices implemented	– Seed propagation and nursery establishment – Establishment of tree plantations with various indigenous (*Albizia adianthifolia, Altsonia boonei, Ceiba pentandra, Ficus exasperate, Milicia excelsa, Sterculia tragacantha, Terminalia* spp., …) and one exotic tree species (*Cedrela odorata*) – Enrichment planting of five NTFPs in the plantations – Methodology for communities to calculate timber financial values – Estimation of carbon stocks and CO^2-reduction through restoration

	– Plantation registration and development of management plans
13. Innovative aspects	– Planting distance: The project used wider planting distances than suggested by the Forestry Commission for the Taungya system, as farmers preferred 8m x 3m or 6m x 6m to have more light for growing crops. – Registration: Project supported farmers to register established plantations to get a share of benefits at the time of harvest. – NTFPs: The inclusion of NTFPs in the Taungya system has not been done before in Ghana.
14. Outcomes	– 225 ha of plantation with 48 tree species established in 4 years → the increased forest cover contributes to water supply and carbon sequestration – Over 180 farmers have registered their plantation plots with the government – 5 species of NTFPs integrated in established plantations in one project site – Several technical reports and publications which support researchers and practitioners in community-based degraded forest restoration
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Local institutional arrangements need to be in place to govern and manage established plantations in the long term – Use of local knowledge – Collaboration and clear distribution of roles between government-affiliated stakeholders and local communities – Green fire breaks around established plantations to prevent wildfires
16. Main challenges faced	– Restricted tree tenure and complicated plantation registration procedure – Continued wildfires, unsustainable farming practices and illegal logging – Conflicts with nomadic livestock herders
17. Key messages and lessons learned	– Strong commitment from forest resources managers (communities) needed – Opportunity costs for not converting degraded forest areas into agricultural lands need to be accounted for, e.g. through PES, carbon credits, or alternative livelihoods
18. Source(s) describing the case	ITTO - FORIG, 2017. Management of forests established through rehabilitation of degraded forests by local communities in Ghana. Completion report (PD 530/08 Rev.3 (F)). Kumasi, Ghana
19. Contributors:	Mélanie Feurer (Bern University of Applied Sciences, Switzerland) and Lawrence Damnyag (CSIR-Forestry Research Institute, Ghana)
20. Photos	

Figure 1 Section of ITTO Rehabilitation project community plantation with Khaya senegalensis, Terminalia superba and Terminalia ivorensis in Olantan community, Begoro Forest district site. © Alex Aglebe

Figure 2 Collecting biodata from farmers for benefit sharing document of the plantation in Nsugunsua community, Offinso district. © Emmanuel Antwi Bawuah

Facilitation of biodiversity by shelter effects of *Pinus patula* and *Alnus acuminata* in montane ecosystems of South Ecuador	
1. Proponent	Universidad de Cuenca - Centro de Agroforestería y Manejo de Paisaje, Facultad de Ciencias Agropecuarias; Technical University of Munich (TUM) - School of Life Sciences Weihenstephan, Chair of Silviculture; and Thünen Institute of International Forestry and Forest Economics
2. Country of implementation	Ecuador
3. Location	Loja canton, Loja province, Southern Ecuador. Six study sites within the provinces of Loja and Zamora-Chinchipe (*Estación Científica San Francisco* site), including five plantations *of Pinus patula* and three naturally regenerated forests of *Alnus acuminata,* and representing large parts of the humid Andean ecosystem in the altitudinal range between 1935 m and 2450 m a.s.l.
4. Implementation period	2011 – 2016
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ✓ Intervention level ✓
7. Target/Main objective	Reforestation of degraded areas is a promising strategy for sustainable land-use and the conservation of biodiversity, especially for the tropical mountain forest ecosystem of Ecuador. However, native tree species have been predominantly neglected so far and introduced species have been favoured, resulting in monocultures of *Pinus* spp. and *Eucalyptus* spp. with well-known ecologic disadvantages. Nevertheless, these plantations are able to produce timber on former forest land (which has been converted to pasture and subsequently degraded to bracken fern fields) and they are suitable for the provision of shelter for native tree species that can be introduced by enrichment plantings. This is of particular importance since experimental trials showed that many native species require shelter for their successful establishment. Fostering the establishment of mixed forests, this concept can be used for restoration of degraded areas and for the conversion of existing monocultures and has been tested within the scope of the "***Nuevos Bosques para Ecuador, a DFG-Technology Transfer Project***". The objectives of this project have been focused on topics of (i) *scientific research* and (ii) *technology transfer* with a participatory approach: the central work package was responsible for the installation of experimental plots and the realization of thinning treatments and enrichment plantings, in order to enable for the evaluation of *A. acuminata* and *P. patula* stands as shelter tree species and the ecological and economic effects of these silvicultural treatments. Technology transfer included both, a broad implementation of the silvicultural concept and the communication of suitable techniques and instruments for further continuation of the pilot project.
8. Target group or users	Private landowners, National Environmental Agency, local government agencies and NGOs

9. Partners & collaborators	Technical University of Munich (TUM), Universidad Técnica Particular de Loja (UTPL), Naturaleza y Cultura Internacional (NCI), Westfälische Wilhelms-Universität Münster, Thünen Institute of International Forestry and Forest Economics, Georg-August-Universität Göttingen, Freie Universität Berlin, Universidad Nacional de Loja (UNL), Ecuadorian Ministry of Environment (MAE), Provincial Government of Loja, Municipality of Loja, Municipality of Zamora and local landowners.
10. Context (initial situation) and challenge (problem) addressed	Reforestation with native species and mixed forests with higher ecological and economic stability are not yet considered in restoration practices in Ecuador, besides positive experiences in Central America and other regions of the world. The aim of this pilot project is to foster the establishment of mixed forests with native species and tested enrichment plantings with native tree species in naturally regenerated stands of *Alnus acuminata* and plantations of *Pinus patula*.
11. Process and methodological approach, techniques and tools used	In total, 50 experimental plots have been installed: 33 in plantations of *P. patula* and 17 in *A. acuminata* stands. Each experimental plot has been divided into 16 sub-plots where nine native tree species were randomly distributed. The study areas were visited by local staff from different institutions to learn *in situ* of the different activities of enrichment planting as strategy of restoration. Moreover, planting stock propagation techniques have been shared with different local institutions. Additionally, several training courses in tree climbing and seed collection techniques have been carried out in order to facilitate propagation of autochthonous material.
12. Field-level practices implemented	Enrichment planting has been carried out in the experimental plots and surrounding demonstration areas during the rainy season in March and April 2015, immediately after performing different levels of thinning operations. 3267 seedlings have been planted in pine plantations and 1683 seedlings in alder stands. The project aims included the comparison of both shelter tree species and the evaluation of environmental factors facilitating or impeding the establishment of native species. Thinning operations with different thinning intensities have been implemented in both, pine plantations and alder stands. In addition, the impact of thinning operations on natural regeneration and their ecological and economic consequences were assessed. Training courses (tree climbing, silvicultural techniques) were carried out in the field under realistic and practice-oriented conditions.
13. Innovative aspects	Institutional objectives and technology transfer aspects have focused on training of local staff in environmental sciences and technical issues (incl. tree climbing courses, seed management practices, nursery techniques, silvicultural treatments, monitoring systems of nutrient cycling and biodiversity), and the improvement of inter-institutional cooperation concerning environmental issues and upscaling of technical experiences. Another innovative aspect is combining productive and protective functions into restoration concepts.
14. Outcomes	Forest plantations with exotic species in southern Ecuador have mostly been characterized as having negative externalities in both ecological and economic aspects. After 10 years of research in mountain forests in southern Ecuador on aspects of restoration and reforestation few native tree species with good growth response (e.g. *Handroanthus chrysanthus*, *Cedrela montana*, *Juglans neotropica*) in comparison to exotic species have been identified under open field conditions. Some more species were able to adapt under the shelter of *Pinus* and *Alnus*, e.g. *Podocarpus oleifolius* and *P. sprucei*.
15. Conditions (institutional, economic, social, cultural, environmental) for	A participatory approach through active and well-balanced joint cooperation of national, provincial and municipal agencies with non-governmental organisations (NGOs) and research organizations (Ecuadorian and German universities) conducted according to the objectives of local landowners and implementing factual corporate social responsibility.

successful replication in a similar context	
16. Main challenges faced	– Creating a platform for effective and harmonic interaction of the various stakeholders – Clear leadership and administration – Creating options for mid-term run-time and funding periods with a minimum of up to ten years
17. Key messages and lessons	– Applied science with a long-term perspective contributes to better decisions – The major obstacle to use native species for large-scale restoration is the lack of adequate knowledge about their biological characteristics and silvicultural traits. Information about appropriate seed storage, propagation methods and silvicultural treatment options has to be adequately retrieved, compiled, applied and knowledge communicated – Both shelter tree species demonstrated potential for enrichment planting with native species. Thinning operations resulted in clearer effects for enrichment plantings in pine plantations and the seedlings of all species showed consistently higher growth rates with increased thinning intensity – Forest site classification can essentially support forest management planning, e.g. in stands of the site class with the highest productivity, investments are more effective and in stands with lower productivity forest conversion into mixed stands might be more applicable. The developed classification system should be expanded to other native tree species – Since many soils in tropical areas are heavily degraded investigations should be carried out on how soil biodiversity in tropical ecosystems can be facilitated by the conversion of monocultures (e.g., on bracken sites) into mixed forests. In this case, oribatid mites acted as indicators and model organisms for soil fauna – Arbuscular mycorrhizal fungi (AMF) represent the dominant mycorrhizal form in tropical (native) trees, improving nutrient uptake, water balance and pathogen tolerance of their host plants. However, the forestry sites used in this project for afforestation of native tree species potentially provide a poor AMF inoculum: *Pinus patula* only forms associations with ectomycorrhizae, whereas roots of *Alnus acuminata* are associated with ectomycorrhizae, AMF and the nitrogen-fixing actinomycete *Frankia*
18. Source(s) describing the case	Data are published in the database of the *Platform for Biodiversity and Ecosystem Monitoring and Research in South Ecuador* (http://tropicalmountainforest.org/) or available from the project partners on request.
19. Contributors	Dr. *Ximena Palomeque* (Universidad de Cuenca, Centro de Agroforestería y Manejo de Paisaje, Facultad de Ciencias Agropecuarias), Dr. *Bernd Stimm* (Technical University of Munich, TUM School of Life Sciences Weihenstephan, Chair of Silviculture), Dr. *Sven Günter* (Thünen Institute of International Forestry and Forest Economics)
20. Photos	

Figure 1 Dense *Pinus patula* plantation in Southern Ecuador. © Baltazar Calvas

Figure 2 Regeneration after thinning in a pine plantation. © Bernd Stimm

Assisted natural regeneration (ANR) for watershed restoration	
1. Proponent	Bagong Pagasa Foundation and the Food and Agriculture Organization of the United Nations (FAO)
2. Country of implementation	Philippines
3. Location	Danao Municipality, Bohol
4. Implementation period	2002 - 2010
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ☐ Assessment / Monitoring ✓ Intervention level ✓
7. Target/Main objective	To promote ANR as a cost-effective restoration method for recovering biodiversity, enhancing resilience and supplying multiple forest products and ecosystem services.
8. Target group or users	National government planners and extension agents, local government officers, non-government organizations, and local communities.
9. Partners & collaborators	Non-government organizations, local communities, and government extension agents. Additional funds were provided by the Japan Fund for Global Environment (JFGE).
10. Context (initial situation) and challenge (problem) addressed	The once-forested watersheds had been deforested and severely degraded through unsustainable land-use practices. Fire-prone grasses had become dominant, which prevented natural forest recovery. Tree planting was believed to be the only available approach to restoration, although there were few incentives and inadequate funds to implement and sustain such planting efforts. Previous reforestation efforts involving conventional tree planting were largely unsuccessful due to the lack of support from local people. ANR was introduced as a low-cost approach toward restoration, with attractive benefits for local people and clear advantages in enhancing biodiversity and watershed protection.
11. Process and methodological approach, techniques and tools used	ANR was used as the restoration approach with the engagement of local stakeholders including communities, government officials and extension agents as a key strategy. The process started with the demonstration and explanation of ANR so that all concerned would understand the approach. Initial field work involved locating and staking wildlings (naturally regenerating seedlings and saplings) and nurturing their growth by reducing competition from weeds and grasses and protecting against fire. Local farmers were encouraged to plant food crops on firebreaks to provide economic benefits for local people. The approach prioritized fire prevention, establishment of firebreaks, “lodging” of fire-prone grasses (e.g., *Imperata cylindrica*), and control of unplanned grazing and fuelwood gathering. As the local community began to appreciate the potential of ANR for restoring degraded forest lands, the municipality organized civic groups (associations of teachers, police, etc.) who “adopted” additional areas of nearby land for protection and expansion of the restoration efforts.

12. Field-level practices implemented	Firebreak establishment and planting of food crops on the fire breaks, preventing recurrence of fire through community patrols, pressing (or "lodging") of grasses and other weedy vegetation, regular patrols, community meetings and discussions.
13. Innovative aspects	Active nurturing of natural regeneration (i.e., "assisted") is itself a rather innovative approach in most areas where planting of trees is the conventional approach to reforestation. The project's ability to convince interested sectors that natural regeneration can play a major role in forest restoration was a significant success. Multi-sectoral collaboration was key. Provision of meaningful incentives to local people served to gain their commitment and support.
14. Outcomes	– The case clearly demonstrated the potential of ANR as a cost-effective approach for restoring an ecologically diverse forest, capable of providing multiple benefits. Based on the results, the local government passed a resolution declaring itself as the first "ANR municipality" in the Philippines – Monitoring data collected during the project confirmed the cost of ANR-based restoration to be approximately half that of conventional reforestation, resulting in a highly diverse natural forest comprising native species well adapted to the site – The Danao site became a "showcase" for demonstrating the potential and feasibility of ANR to a multitude of forestry officials and other visitors in subsequent year – Several international workshops financed by international NGOs have been conducted at the site, in addition to workshops and trainings conducted by FAO – Largely attributable to the pioneering work at Danao, ANR has increasingly been recognized recommended for ecologically sound forest restoration by Philippine government agencies, NGOs and international donors (e.g., Asian Development Bank, USAID)
15. Conditions (institutional, economic, social, cultural, environmental) for the successful replication in a similar context	– Patient and steady community organizing – Targeted and consistent information campaign that generates interest in ANR based on cost savings, development of biologically diverse forest cover and the need to understand that forest restoration cannot be achieved solely by planting – Enlisting cooperation of local NGOs and educational institutions – There appears to be a range of population density that favors ANR: where population pressure on the land is not so intense that all available land is cultivated and not so sparse that labor is unavailable to implement ANR field practices – Recognition by local people of the direct and indirect benefits of forest restoration is essential to secure commitment and support of the efforts
16. Main challenges faced	The widely held misperception that forest restoration can be achieved only via extensive tree planning.
17. Key messages and lessons learned	– ANR is an effective, low-cost approach to restoration that can achieve impressive results by working with nature – Engagement of local stakeholders and provision of incentives to local communities were the key factors in convincing the concerned parties that ANR can be used to restore forests for the protection of watershed as a shared objective – Careful monitoring and documenting of results can verify the cost-effective aspects of ANR and help to convince observers of its feasibility
18. Source(s) describing the case	*Restoring forest landscapes through assisted natural regeneration (ANR)* (http://www.fao.org/3/ca4191en/CA4191EN.pdf) *Forests beneath the grass* (http://www.fao.org/3/a-i1734ee.pdf)

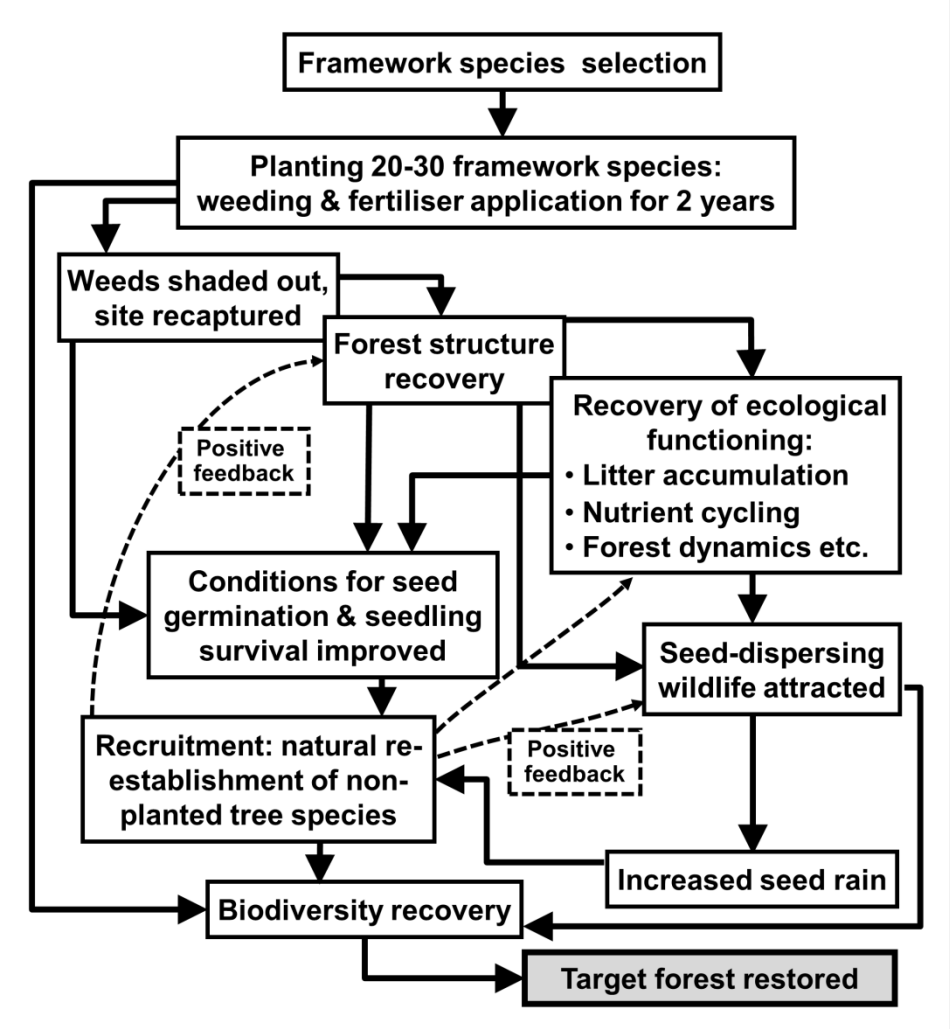
19. Contributors	Patrick Dugan (Bangong Pagasa Foundation), Kenichi Shono (Forestry Officer, Forest Management, Food and Agriculture Organization of the United Nations), and Patrick Durst (Forestry and Natural Resources Consultant; former Senior Forestry Officer, FAO)

20. Photos

Figure 1. Forest restored through ANR (©Patrick Durst)

Figure 2. Forest restored through ANR (©Patrick Durst)

Early example of FLR in northern Thailand	
1. Proponent	Forest Restoration Research Unit, Biology Department, Science Faculty, Chiang Mai University (FORRU-CMU)
2. Country of implementation	Thailand
3. Location	Upper Mae Sa Valley, Chiang Mai Province, northern Thailand
4. Implementation period	1996 till present
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ☐ Assessment / Monitoring ☐ Intervention level ☐
7. Target/Main objective	To develop effective techniques to restore upland evergreen tropical forest. To stabilize watershed services and to restore biodiversity to degraded forest sites in a national park.
8. Target group or users	Villagers living within a national park, National Park officers, students and practitioners of forest restoration, NGO's etc.
9. Partners & collaborators	FORRU-CMU, the communities of Ban Mae Sa Mai and Ban Mae Sa Noi, Doi Suthep Pui National Park Authority
10. Context (initial situation) and challenge (problem) addressed	The community of Ban Mae Sa Mai was founded in 1922 at an altitude of about 1,400 m but the village was moved down to its present location (1,081 m altitude) in the early 1960's, after deforestation had caused the water supply to run dry. In 1981, the village was included within the Doi Suthep-Pui National Park. This meant that the villagers faced possible eviction, since they had no land titles. Consequently, a few villagers formed the "The Ban Mae Sa Mai Natural Resources Conservation Group" in the early 1990s, to demonstrate that they were responsible custodians of the forest. Furthermore, in 1996, the villagers decided to contribute to a national reforestation project to celebrate His Majesty King Bhumibol Adulyadej's Golden Jubilee, agreeing to reforest 50 ha of agricultural land in the upper watershed and reforest the area, whilst intensifying agriculture on the more fertile land in the lower valley by installing an irrigation system. When FORRU-CMU approached the villagers in 1996 to discuss planting framework species trial plots, they readily agreed, recognizing an opportunity to improve their reforestation efforts.
11. Process and methodological approach, techniques and tools used	Field trials of the framework species method of forest restoration were conducted, combining tree planting with assisted natural regeneration and protection of remnant trees. Framework tree species are selected from the indigenous tree flora characteristic of the target forest ecosystem for their ability to (1) survive and grow well in deforested sites; (2) shade out weeds (with dense spreading crowns); and (3) produce resources, such as fleshy fruit or nectar-rich flowers, early in life, to attract seed-dispersing animals and consequently promote biodiversity recovery. FORRU-CMU guided the experimental design whilst villagers worked voluntarily to plant the trees

	and received payments for monitoring and maintenance, including fertilizer application, weeding and fire prevention. 
12. Field-level practices implemented	– Planting stock raised from locally collected seeds – Planting 20-30 framework tree species to increasing stocking density to 3,100/ha – Site clearance with glyphosate – Weeding and fertilizer application 3 times in the first rainy season and 3 times in the 2nd – Fire prevention in the dry season – Monitoring 2 weeks after planting and at the end of the 1st and 2nd rainy seasons – Comparison among species and silvicultural treatments using performance indices derived from survival and growth rates
13. Innovative aspects	First time testing of the framework species method of forest restoration outside of Australia where it originated (https://www.dropbox.com/s/x87seamzady6fe0/2003%20Selecting%20framework%20spp%20forecol.pdf?dl=0)
14. Outcomes	– A reliable set of science-based forest restoration techniques – tried and tested – 33 ha of forest added to a highly overcrowded landscape with rapid biodiversity recovery and carbon accumulation – Reduced conflict between villagers and the national park authority – Perceived improvement in watershed services

	– A forest restoration model widely used for workshops, conferences and publications to foster best practices for FLR
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Communities that recognize the benefits of forest restoration in terms of both environmental services and political clout – Co-operative park authority – University with access to fundraising mechanisms – Students to undertake scientific aspects of the work for their projects
16. Main challenges faced	– Need for continuous fundraising – National park regulations prohibit sale of products/services from the restored areas, so the project could never become financially self-supporting – Constantly shifting socio-politico-economic conditions – Annual fires in the dry season
17. Key messages and lessons learned	No matter how much technical and financial support is provided, and no matter how many village meetings are run, the sustainability of FLR can never be guaranteed, if the benefits of restoration are not immediately evident and whilst rural populations continue to grow and aspirations rise.
18. Source(s) describing the case	https://www.mdpi.com/1999-4907/10/9/732/htm
19. Contributors	Stephen Elliott (FORRU, Biology Department, Chiang Mai University, Thailand)
20. Photos	

Figure 1. Forest restoration using the framework-species method has transformed the landscape of the upper Mae Sa Valley. (**A**) May 1998 before restoration; (**B**) same site, left of the track, restored forest, 15 years old, planted 2001; right, 9-year-old restored forest, planted 2007 (photo September 2016). (**C**) Inside nearby restored forest, 18½ years old, a dense understory develops that comprises seedlings and saplings of >70 recruit tree species. (Credit: FORRU-CMU).

Original: https://www.dropbox.com/s/7llm5vmhd45j3rg/FIG%204%20RESTORATION%20EXAMPLE.tif?dl=0

Restoration of Degraded Tropical Forests: A performance Based Payment Approach	
1. Proponent	Thuenen Institute of International Forestry and Forest Economics. Case implemented by Gesellschaft für Internationale Zusammenarbeit- Biodiversity and Forestry Program (GIZ-BFP) Ethiopia.
2. Country of implementation	Ethiopia
3. Location	Geiza tropical mountainous high forest located in Zazie Kebele (village), Geresse woreda (district), Arba-Minch, Gamo Gofa zone in Southern Nations Nationalities and Peoples Region (SNNPR).
4. Implementation period	Since 2017
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ✓ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ✓ Intervention level ✓
7. Target/Main objective	– Restoration of tropical degraded forest sites from the landscape perspective – Creation of forests beyond tree planting e.g. a combination of natural forests plantation with mixed age and diverse tree species in buffer zones – Improved sustainable forest management and conservation of biodiversity – Increased forest protection and productivity within area enclosures – Supply of ecosystem services such as provisioning services e.g. timber, firewood, charcoal; regulating services e.g. erosion control, carbon sequestration; supporting services e.g. biodiversity conservation and cultural services like recreation – Enhanced livelihood opportunities and long-term resource security
8. Target group or users	Local communities around highly degraded forest landscapes and protected sites.
9. Partners & collaborators	Universities, private partners, state and regional administration, community-based organisations, farmers and farmer groups.
10. Context (initial situation) and challenge (problem) addressed	– Geiza forest was degraded and highly depleted due to over exploitation of forest resources (timber, NFTP especially wood-fuel) and encroachment for farming by the surrounding communities – Some parts of the forest areas were enclosed by excluding local people from access and use (grazing and farming). This aimed to allow for natural regeneration and recovery of pasture and trees. Unfortunately, due to inadequate management, more than 5 years after the establishment of the enclosures, productivity was still low and consequently the supply of forest products. This called for alternative interventions in particular enrichment planting and establishment of mixed species woodlots – Lack of sufficient supply of good quality seedlings – Lack of capacity (knowledge and financial) in tree nursery and plantation management by the local communities
11. Process and methodological	– Engagement of various stakeholders, especially local communities at all stages of tree establishment and monitoring through participation, negotiation and signed agreements of restoration goals

approach, techniques and tools used	– Tree planters have to fulfil the terms and conditions for the signed agreement referred to as Tree Planting Modality Agreement. The agreement clarifies duties for the different stakeholders specifically GIZ-BFP and farmers and farmer groups. Key duties of the farmers and farmer groups are to acquire and legalize land for forest establishment (certificates of land use rights), provide boundary maps, baseline information and concept notes that describe planned forest activities, provide guarantees for silvicultural activities, including weeding, beating up and guarding of the plantations, establishment of mixed forest stands with diverse species and uneven age distribution. GIZ-BFP on the other hand is responsible for providing partial finances for purchasing seedlings and providing technical advice, support and tools. The programme also provides a onetime payment for healthy trees (15 to 18 months after tree planting). Prior to payments, both the GIZ-BFP, partner organisations and farmers jointly conduct tree monitoring and survival assessments. This is done to allow transparency, trust and acceptance of the results obtained from the assessments. In situations where forest sites are owned by a group, payments are not given to individual members but directly given to the whole group – Performance based payments/incentives for tree nurseries and forest establishment activities depending on agreed indicators, e.g. survival of at least 1600 trees per ha at the time of monitoring (15 to 18 months after tree planting) – Monitoring and follow-up of newly established afforestation sites – Capacity building for local individual farmers, farmer groups and communities in all forestry related silvicultural activities such as nursery and stand establishment, maintenance, tending and harvesting
12. Field-level practices implemented	– Assessment and documentation of baseline information (biophysical and economic) – Enrichment planting using at least 25% indigenous tree species with not less than 10 years rotation and 75% of short rotation tree species (e.g. *Eucalyptus* spp.) so to ensure restoration of multiple functions, benefits and long-term resilience – Field participatory monitoring through survival rate assessments – Advice and technical support for tree nursery, plantation establishment and maintenance, capacity building and training on silvicultural practices and development of a management plan including sustainable harvesting and utilization of tree resources
13. Innovative aspects	Performance-based payments/incentives through contractual agreements between the individuals, groups, small enterprises, and biodiversity and forestry program of GIZ-Ethiopia.
14. Outcomes	– Increased tenure and access rights to forest land for the local communities – Increased establishment of good quality tree nurseries as a sustainable business model for forest user groups – Increased survival rates of established tree plantations – Establishment of mixed species plantations embedded within a community/individual based land use plan within the buffer zone of a protected forest reserve. This creates a forest landscape mosaic within and around the protected forest reserve – Increased benefits for the communities through direct cash payments for forestry activities, increased forest protection, and increased productivity and potential for the supply of forest products and services
15. Conditions (institutional, economic, social, cultural, and environmental) for the successful replication in a similar context	– Land tenure regulations and assurance of land use and tree harvesting rights (provision of land certificates for at least 30 years and above) – Availability of voluntary agreements between main stakeholders and tree growers – Benefit sharing mechanisms (bylaws) – State's willingness and support towards tree planting. – People's understanding of the value of trees – Market assurance for different tree products encouraged by stakeholders

	– Availability of human labour – Enabling conditions need more research.
16. Main challenges faced	– Unclear land and tree tenure rights – Assurance of its sustainability to other stakeholders since such models take time to provide convincing results
17. Key messages and lessons learned	– Stakeholder engagement, especially from the local communities, plays a big role in the success of forest restoration projects – Signing flexible contracts/agreements and directly involving communities is very important – Allowing local communities in forest activities and use of forest products from planted areas helps them believe and develop a sense of ownership towards the surrounding forests. This not only enhances forest production but also forest conservation of enclosure areas – Forest landscape restoration should be implemented in a form of sustainable economic/livelihood provision model and tree planting should be supplemented with proper monitoring and management, e.g. by applying appropriate silvicultural techniques
18. Source(s) describing the case	Key informants: Julian Schmid (GIZ-Development Advisor for Forestry), and Alemayehu Asefa and Shibire Bekele (GIZ).
19. Contributors	Vianny Ahimbisibwe, Jobst Michael Schröder and Sven Günter (Thünen Institute of International Forestry and Forest Economics). Acknowledgement goes to Karin Christina Allgoewer (GIZ-BFP program manager) for the logistic support.

20. Photos

Figure 3: Site preparation and pitting for the next tree planting activities carried out by a group of farmers in a formerly degraded enclosure. (Credit: Vianny Ahimbisibwe)

Figure 2. Re-forested site with different tree species (Cypress spp., Grevillea spp., Eucalyptus spp. and others) through the Performance based incentive approach. (Credit: Vianny Ahimbisibwe)

Achieving Prey Lang landscape restoration through community forestry approaches	
1. Proponent	The Center for People and Forests (RECOFTC)
2. Country of implementation	Cambodia
3. Location	Prey Lang Landscape includes Prey Lang Forest, a nature reserve in Kampong Thom, Preah Vihear, Kratie and Stung Treng Provinces.
4. Implementation period	Since 2006
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ✓ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ☐ Assessment / Monitoring ☐ Intervention level ☐
7. Target/Main objective	1. Formalizing local communities' rights to manage forests 2. Fostering multi-stakeholder participation in establishing zones and guidelines for sustainable management of forests 3. Supporting the development of inclusive forest-based business opportunities The aim of the landscape programme is to strengthen the capacity of community forestry (CF) stakeholders in Prey Lang landscape. This includes local communities, the Forest Administration (FA), NGO partners and local government officials to sustainably manage the network of community forests.
8. Target group or users	Communities living and using forest resources in the Prey Lang landscape, in particular ethnic Kuy people making up 30% of its population.
9. Partners & collaborators	– The Cambodian Forest Administration (FA) at national, cantonment, division and triage level – Local NGO partners: Action For Development, Cambodian Community Development, Save Cambodian Wildlife, Buddhism For Development Kampong Thom, and Environment Protection and Development Organisation, Ponlork Khmer, World Conservation Society, World Wildlife Fund – Provincial CF Programme Coordination Committees, formal platforms/networks for CF development partners
10. Context (initial situation) and challenge (problem) addressed	Prey Lang is a biodiversity hotspot, covering 900,000 hectares of lowland evergreen forests, deciduous forests, flooded forests, grasslands, marshes and freshwater mangroves. This landscape hosts endangered species and indigenous communities threatened by deforestation, illegal logging and forest degradation. Since the early 2000s, CF schemes have played a key role in reducing forest loss and poverty in the area. Cambodia's National Forest Programme (NFP, 2010-2029) aims to create 1,000 sites over an area of two million hectares as a platform for investment and forest restoration. The NFP also views CF as a means to combat climate change and strengthen ecosystems.
11. Process and methodological	RECOFTC places local people at the center of forest landscape restoration and envisions a future where people in the Asia-Pacific live equitably and sustainably with thriving forests

approach, techniques and tools used	and landscapes. RECOFTC's approach is closely linked to the NFP, the CF Sub-Decree and the CF *Prakas*, which define the fundamental guidelines for establishing CF sites and agreements between forest communities and FA. There are 12 steps: Step 0: Identification of potential CF areas Step 1: CF Establishment Step 2: Information gathering Step 3: Establishment of CF Management Committee (CFMC) structure Step 4: Preparation of internal by-laws of CFMC Step 5: Demarcation of CF boundaries and mapping Step 6: Preparation of CF regulations Step 7: Preparation and approval of the CF Agreement Step 8: Preparation of the Community Forest Management Plan Step 9: Enterprise development Step 10: Implementation of the Community Forest Management Plan Step 11: Monitoring and evaluation Following these steps, RECOFTC Cambodia developed a CF capacity development programme for CF stakeholders. This was followed by capacity development trainings with forest dependent villages, FA, NGO partners and local authorities to explore collaborative forms of forest stewardship. Initiatives in Prey Lang focus on: 1) researching and training on Community forest management planning and strengthening institutions; 2) piloting CF partnerships that implement forest management; 3) supporting multiple stakeholder processes to link national and grassroot initiatives developing CF, and; 4) developing initiatives increasing equitable benefits from sustainable forest management.
12. Field-level practices implemented	Highlighted are the main practices as part of the implementation of the CF Steps. Field trainings and coaching. Capacity development involved CF stakeholders tailoring specific CF training modules to provide communities, local government officials, FA and NGO participants with practical management skills to assess, zone, plan and manage forest resources. Forest management planning. CF land is surveyed, mapped, and divided into zones for restoration, conservation, firewood and pole extraction, each requiring a plan of action. CF management is participatory and integrates community initiatives with scientific forestry management techniques. The facilitator must ensure that the interests and concerns of local community members are reflected in the management plans. Community members carry out forest patrolling and restoration activities in degraded forest areas by artificial regeneration (interplanting) of trees. CF nurseries maintained with FA support produce seedlings each year including *Afzelia xylocarpa*, *Sindora cochinchinensis*, *Hopea odorata*, *Acacia* hybrids, *Dipterocarpus alatus*, *Anisoptera costata* and bamboo species. Fencing and fire breaks protect tree plantings while CFMC and CF members carry out weeding and pruning. CF establishment. Early in the CF application process, the villagers must learn how to self-organise and agree on CF objectives. CF interest and membership varies depending on the level of consensus reached and the quality of the CF areas. This variation has implications for participation, decision-making, benefit sharing and organizing CF work. Communities must learn about and consider the implications of CF investments before they can make informed decisions. Once this occurs, the development of CF procedures and documentation of CF membership application can start. Once CFMCs are established, CFs demarcate and map the community forestry boundaries, which allows them to develop CF regulations for resource use within the area. After these steps are complete, CF communities sign formal agreements with the FA to formalize their rights to manage the community forest. Multi-stakeholder processes. Throughout the CF application process, coordination among CF stakeholders is crucial. RECOFTC works with the FA at the district level to ensure that CF

	initiatives support the government's 5-year work plans. Multi-stakeholder consultations and participatory operational planning at the local level help to identify priorities. Activities are then planned according to available resources and service providers. By using existing CF platforms and planning systems, it is possible to promote activities with direct government support alongside other contributions. Local CF networks can also identify and resolve issues encountered through regular meetings. CF development funds. To financially support CFMCs, communities must establish CF development funds (CFDF). CFDFs can be allocated to implement activities during the stages of CF formalization and development and may help strengthen institutions. CFMCs get a "hands-on" opportunity to apply knowledge and skills gained from the CFMC financial management training, including recordkeeping, financial management and coaching.
13. Innovative aspects	Running a CF credit scheme in areas that are resource deficient is important because they can help kick-start businesses. These CFs struggle to generate revenues to support sustainable forest management and are unable to initiate forest-based businesses due to the degradation of their landscapes. *How does it work?* A core budget of USD 1,000, which comes from a project or the CFDF, is made available for CFs and placed under the control of the CFMC. A certain amount is allocated for CF members to invest in small businesses (often agriculture based), which is then paid back within three to six months at low-interest rates, allowing the fund to grow. In a 2015 assessment, 11 established CFs managed funds between USD 1,000 and USD 5,000. USD 10 to USD 40 per month was used to support basic CF management activities, regular patrolling, constructing fire breaks, restoring degraded forest areas or meeting with members to resolve conflicts. After achieving a certain level of financial stability, CFs use the credit fund as a means to reduce their dependence on outside funders, like businessmen who charge high interest rates. The scheme has resulted in a notable increase in participation from CF members, especially women, in both business development and CF management. Women are motivated by the CF credit schemes and now hold 24% of the committee positions.
14. Outcomes	In Prey Lang Landscape 4,594 people were trained on various topics. This resulted in 164 operational CFs with a 15-year agreement. CFs now cover over 200,000 hectares and involve 29,654 households in operational forest management plans.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	Legal recognition of CF. The government has committed to increasing CF to 1,000 sites over an area of two million hectares, and to formalising CF tenure and management rights for a period of 15 years after the CF steps are completed. Sufficient quality forest resources to establish CF is essential. However, 20-70% of the granted CFs so far are degraded, which is likely to prevent communities from gaining short-term benefits and reduce management efforts. Community incentives/interest. The implementation of CF should help to secure tenure rights for villages, so that local communities can legally prevent destructive forest conversion. Communities are also incentivized to develop commercial benefits from their investments and practice their cultural and spiritual beliefs. Strong CF institutions/leadership. When leadership complies with the CF *Prakas,* CF agreement and CF management plan, and develops its capacity, the CFMC can effectively: 1) govern its members, 2) put in place transparency metrics for financial management and decision making processes, and 3) partner with local authorities, FA, and NGOs to combat illegal logging activities and land encroachment. An example is documented on the RECOFTC website. Institutional capacity development for CF. Capacity development for all CF stakeholders ensures the long-term sustainability of CF and institutional management.Extension services and curricula require strong institutionalisation within the FA, while CF Networks and platforms for learning and information sharing require local level FA support.

16. Main challenges faced	Quality CF processes. There is a tendency to implement the CF establishment and formalization process too quickly without ensuring that expected outcomes in each of the CF steps are adequately met. For instance, CFMCs are sometimes formed but not fully functioning (step 2) or CFMC by-laws (step 4) and CF regulations (step 5) are prepared and approved but not yet well understood and implemented. Moving quickly to reach step 6 (signing of CF agreements) without following up with important activities in earlier CF steps might endanger local understanding and ownership. Commercial CF incentives. Step 9 of the CF process, enterprise development, is not yet fully achieved and few community enterprises are operational. While there are initiatives to achieve economic models of CF that enable villagers to benefit commercially, few concrete and viable examples exist. Some CFs have a business plan but without the resources, capacities and support to implement these, they are not operationalised. Through collaboration among CFs they might be able to accumulate sufficient volumes of forest products to attract business partners. Developing effective partnerships between CF organisations and private sector, for example trading cashew or acacia, may pose another challenge for FA officials who often have no expertise of skills to facilitate partnerships. Planning ahead: CF as legal source of timber? CF management plans that incorporate timber harvesting will potentially be one of the few sources for legal timber in Cambodia, but this link is not yet developed. However, with the increase in CF sites across the country and CFs maturing to harvest timber, attention is needed to improve forest governance and strengthen forest law enforcement where communities and smallholders are involved. See also this site.
17. Key messages and lessons learned	Tenure rights: *CF is an important land tenure mechanism through which local communities can gain formal rights to access, manage and restore forests that they can use to build their livelihoods*. Participation and endorsement of local authorities helps to avoid land-use conflicts and adds legitimacy to ownership claims. Multi-stakeholder approaches: *Stakeholder engagements assist the process of establishing CFs and helps with laying the groundwork of effective partnerships with government, among CF groups and networks, and the private sector*. Involving staff from different sectors and organisations builds relationships, which can ensure a shared understanding of what CF development requires and an appreciation of strengths and constraints of each other's institutional arrangements. Training for action: *Participatory approaches have proven to be effective in capacity building where training is linked to implementation of CF activities*. The logical sequencing of training courses is linked to the different steps of CF establishment and formalization, thereby ensuring government buy-in. Realistic prospects: *Clear guidance in CF processes is important for communities and stakeholders to keep the momentum of resource management activities in newly established CFs*. CF requires maintained motivation to continue efforts in management especially where multiple objectives are pursued, such as protection of biodiversity and natural resources, restoring forest functions, and production of forest products.. Examples to stimulate this is by the provision of modest financial support to CFMCs through the establishment of CFDFs, but also in maintaining close relations, providing institutional support and communication between the FA and CFMCs. The role of FA in attracting private sector partnerships in this context is highly recommended as to develop a realistic outlook to restore forests and develop market access.
18. Source(s) describing the case	Bampton, J.F.R., Heng, D., & Long, R. 2009. Partnerships for Community Forestry Development in Cambodia. Paper presented at Community Forestry International Workshop, 15-18 September 2009, Pokhara, Nepal. Center for People and Forests - RECOFTC. 2017. Prey Kbal Bey CF Development and Forest Restoration. Internal report.

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19. Contributors

Lok Mani Sapkota and Martin Greijmans (RECOFTC)

20. Photos

Figure 1. Community members of Phnom Dek Chambok Hos patrol their community forest near Prey Lang Sanctuary. (Photo credit: RECOFTC)

Figure 2. RECOFTC facilitates a group discussion with CF members of Borie Ousvay Community Forest

(Photo credit: RECOFTC)

Restoring cloud forest on private and communal land in the Ecuadorian Andes	
1. Proponent	*Defensa y Conservación Ecológica de Intag* (DECOIN)
2. Country of implementation	Ecuador
3. Location	Intag Valley, Imbabura Province
4. Implementation period	2001-2012 (incl. site maintenance)
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ✓ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ✓ Assessment / Monitoring ☐ Intervention level ☐
7. Target/Main objective	The main goals of the work were to (1) restore water to local communities undertaking restoration (local objective); (2) conserve biodiversity in a highly deforested, megabiodiverse region (international (funders)), and (3) provide local communities with land sovereignty in the face of mining interests in the region.
8. Target group or users	Implementers, donors, local and regional NGOs and government agencies. Target group of 'users' of the restoration include local communities to restore much-needed water to their communities; downstream communities for water benefits< and international community for biodiversity conservation.
9. Partners & collaborators	*Defensa y Conservación Ecológica de Intag* (DECOIN), a local NGO and implementer; local communities; international private donors (United States); and Rainforest Concern, Ecuador (International NGO with national chapter).
10. Context (initial situation) and challenge (problem) addressed	The Intag Valley is a rural Andean farming region in Imbabura, Ecuador. Mountainous, steep, and remote, the region ranges from 650 to nearly 4000 masl in elevation, with annual rainfall from 1500 to 3300 mm. Intag is in the centre of the Tropical Andes biodiversity hotspot, and its cloud forests are exceptionally diverse with 80 to 120+ tree species in 1/10 of a hectare. Clearing patterns here are typical of many places in the Andes - following centuries of sparse habitation and dense forests, after the Ecuadorian land reform laws in the 1960s and 70s deforestation rates increased precipitously throughout the 1970s, 80s and 90s, mainly for cattle ranching and small-scale farming. Today, cloud forests have been extensively cleared (upwards of 60%). Intag's population (~1600 people) is primarily rural and mestizo, with minority populations of *Otavaleños* (indigenous people from the Central Valley) and Afro-Ecuadorians, and dispersed across 76 communities. Farming is largely non-mechanized as most occurs on 10–35° slopes. This case is based on work with residents in four small communities (23–45 households, average farm size 13 ha) in northeast Intag that participated in forest restoration projects supported by the local NGO DECOIN. Cloud forests play a vital role in the hydrological cycle, capturing clouds and mist as precipitation. Following deforestation in watershed catchments, in the late 1990s and

	early 2000s communities in Intag reported increasing problems with droughts and erratic water supply during the dry season. Summer drought conditions were so severe that, combined with declining soil fertility and underperformance of 'green revolution' farming technologies, these traditionally agrarian communities were uncertain if they would be able to continue farming. The community was in crisis.
11. Process and methodological approach, techniques and tools used	In response to these water shortages, DECOIN helped more than 40 communities establish small-scale, community-based reforestation projects in watersheds. Founded in 1995, DECOIN worked through local schools to increase environmental awareness about the value of forests and promote forest stewardship. Rather than reaching smallholders through existing farmers organizations focused on private farms, DECOIN's focus was exclusively on creating and managing communal reserves. Funded through private donations and partnerships with international environmental NGOs, the goals of the watershed reforestation projects were to: (1) improve the quality of water resources in communities (in particular, maintain summer stream-flow); (2) restore and conserve forest biodiversity in the region; and (3) provide local sovereignty over land development in strategic locations throughout the region. DECOIN purchased land in watersheds from local farmers and signed the title over to communities for the purpose of conservation and restoration, with use restrictions in the title: no burning, cattle, cultivation, or harvesting for sale. DECOIN intervention: – Worked at the communal level to purchase land and create community watershed reserves – Sought international funds for projects (for biodiversity conservation) – Worked through elementary schools to provide environmental education – Trained local people to collect seeds and seedlings from native forests, grow them, and plant and maintain them – Engaged trusted local leaders/managers in each community – Ensured that trees were properly maintained
12. Field-level practices implemented	– Training and materials for establishing tree nurseries – Creating restoration associations/cooperatives within communities – Training for collecting and propagating native species, training to plant trees and maintain restored areas – Education on unsustainable land use practices (i.e., burning, cattle on marginal lands, etc.) – Maintaining planted areas 3-4 per year for 2-3 years after initial planting Planting involved using commercial seed for a quick growing, nitrogen-fixing exotic (*Alnus nepalensis*) which local people favoured. Technicians also provided training for residents to collect and propagate seeds from native trees in nearby forests, and to plant and maintain these seedlings in combination with a limited number of *A. nepalensis*. Seedlings were planted 2.5 m apart, and people planted a total of 50 species with between 12 and 26 in each reserve. All reserves were managed similarly. Community members cleared pasture grass around seedlings by hand every 3–4 months, and prohibited grazing animals, harvesting wood for sale, clearing, and burning within reserves. In each reserve, there are planted areas and areas that, because of limited funds, were not planted but left to regenerate naturally.
13. Innovative aspects	– Introducing communal land into an area where private land was the norm created a new, safe space for people to become familiar with, experiment with, and participate first-hand in restoration. This was a creative way to engage many stakeholders at the local level – even those who did not have land. It also allowed landholders to

	collectively achieve benefits that would have been challenging for individual farmers-restoring large tracts in strategic watershed regions – Working with schools to provide environmental education on the importance of trees for water and farming, encouraging a way of thinking as environmental stewards – Hiring local leaders as implementers – another key step towards engaging stakeholders in a meaningful way – Allowing local people to plant the species they wanted but within a given framework (i.e., allowing some exotics and a choice of natives) really helped make the project locally relevant and accepted
14. Outcomes	Restoring forests on communal land produced a number of social and environmental benefits, and, according to interviews with both landholders and local NGOs, was widely considered a success. **High participation**: In total, ~ 60% of households (69 people) restored over 70 hectares of land in four microwatersheds, planting over 75,000 trees. Most people reported planting trees to restore water resources, and four to seven years after the inception of the projects, more than half reported an increase in water quality, quantity, or both. **Landscape-level impacts**: Strikingly, after inception even more households began planting on private land – an activity that was not directly supported by DECOIN but tended to arise organically when people saw the benefits of planting trees. They also started to allow natural regeneration around waterways, fences and roadways. **Jump-starting succession:** areas were restored with 'useful' species with which people were familiar. Although different in composition from primary forests in the region, these sites were recruiting native species at much faster rates (both in terms of species richness and numbers) than unrestored, abandoned pastures nearby. **Communal governance around shared benefits: c**ompared to private lands, restoring on land owned and governed by the community was a relatively low risk investment. Smallholders could restore forests without giving up farmland, making the opportunity costs of restoring on communal land lower than on private land, where restoration may compete with agricultural production. Restoring forests to watershed areas may not have been possible (or attractive) if the burden had been placed on the few households who owned land in watersheds (2–6 in each community), but were both attractive and accessible when the resources of the community (labour, knowledge, motivation) were pooled. This allowed a broader range of community members, from the land rich to the land poor or landless, to participate and benefit from restoration.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	Communities were experiencing the effects of forest degradation, and the NGO helped them make the link between a resource that they needed and forest restoration. A desire to remain on the land and identification with a land-based livelihood, as well as communities with some degree of cohesion, were also key enabling conditions. People chose to restore forests in Intag because they faced a dire situation: their future as farmers was uncertain in the face of environmental change. By framing forest restoration as a way to alleviate urgent environmental problems, the NGO DECOIN initiated restoration projects with exceptionally high participation rates. Households planted trees in communal reserves and on farms to obtain different ecosystem services, but the ultimate goal was the same – to restore and provide products and services to maintain and sustain farming livelihoods, which were threatened by a perceived decline in environmental conditions. This 'crisis restoration' – in which people reforest to combat changing environmental conditions that threaten their livelihoods and communities – required that people look backward to move forward. Recalling a past when forests provided vital ecosystem services, people in Intag worked to build a future in which they could sustain farming practices and rural livelihoods. After clearing forests for decades, trees and forests were re-envisioned as a means to help farming. Ultimately, this restoration was an endogenous shift from exploiting forest to protecting them.

16. Main challenges faced	– Lack of resources for maintenance and monitoring (donors do not want to support these activities) – Threats from mining and administrations that support mining over forest conservation activities – Lax enforcement of communal land rules (like allowing animals in reserves); however, because people generally believe in the ability of forests to restore water, these are minimal and have minimal impacts on forest regeneration
17. Key messages and lessons learned	**Restoring communal lands allowed for more inclusive participation, larger restored areas, and facilitated knowledge sharing and acquisition**. It was thus well suited to achieve the goals of both ecological forest restoration (focus on restoring intact ecosystems), and forest landscape restoration (focus on the spatial allocation of restored/reforested sites to benefit a range of stakeholders). This case suggests a few **key lessons for maximizing the benefits of such projects**: – Communal restoration should focus restoration around shared, communal services or goods with widespread appeal in the community – Restoration can be used strategically to achieve goals that may be out of reach to individuals, but that may be possible as a group Restoring forests thus fits a typology of extensive land uses, such as pastures and wild woodlands, that have been traditionally man- aged communally even in places where agricultural plots are managed privately. – Within communal arrangements, it can be beneficial to allow people the space and flexibility to learn from each other, share knowledge, and experiment with different species and methods – Projects should engage locally trusted, respected, and visionary leaders The case also suggests that the **perceptions of environmental crisis due to forest loss can strongly influence people's motivation to plant trees,** on farms or off. In Intag, people engaged restoration because they identified strongly as farmers, experienced land degradation that threatened their ability to farm, and came to see forests and tree planting as an integral part of creating viable farming systems in these new conditions. **Reframing tree planting and reforestation as a forward-looking solution to current and tangible environmental problems can make projects relevant, useful, and desired by local communities.** The Intag case shows that communities experiencing environmental crisis may be willing to plant trees if they believe it will improve conditions, and that local agencies and NGOs can play a powerful role in making this link. Focusing tree planting efforts on those communities and households who stand to benefit most from restoration has the potential to produce high participation rates, high levels of community and on-farm engagement with the projects and can foster new and innovate ways of using trees in rural farming systems. **From a landscape perspective, communal management meant that large areas of land could be restored in strategic locations to restore a given ecosystem service.** Rather than restoring small patches on private landholdings distributed across the landscape, communities planted trees in contiguous patches of land around streams. Restoring the same crucial area of forest on private lands would have been challenging, as all landholders would have had to (1) agree to participate; (2) agree to restore that particular area of land; and (3) monitor and maintain sites individually. Communal restoration also meant that those who were most interested and invested in restoring forests were able to participate, even if they did not own land in target areas. A significant benefit of communal restoration was that **restoring on communal land seemed to provoke people to increase forests on private land**. After restoring forests on communal land, nearly 80% of the participants planted trees on private farms, and an additional number of households that had not participated in the projects also began planting on-farm trees at that time (prior to the communal projects, only 9% households

	had planted on private land). In addition, secondary forest cover in the region increased dramatically as people intentionally allowed forests to regenerate naturally on private land along roads and waterways.
18. Source(s) describing the case	Wilson, S.J., O.T. Coomes, and C. Dalaire. Local forest transitions in the Ecuadorian Andes: Forest recovery amidst deforestation, 2001-2010. *Regional Environmental Change. In press.* Wilson, S.J. and O.T. Coomes. 2019. Crisis restoration in post-frontier tropical environments: Replanting cloud forests in the Ecuadorian Andes. *Journal of Rural Studies.* 67: 152-165. Wilson, S.J. and J. Rhemtulla. 2018. Small montane cloud forest fragments are important for conserving tree diversity in the Ecuadorian Andes. *Biotropica,* 50: 586-597. Wilson, S.J. 2016. Communal management as a strategy for restoring cloud forest landscapes in Andean Ecuador. *World Development Perspectives.* 3: 47-49. Wilson, S.J. and J. Rhemtulla. 2016. Community-based tree planting accelerates forest recovery but creates novel forests in Andean Ecuador. *Ecological Applications*. 26: 203-218.
19. Contributors	Sarah Jane Wilson (Department of Geography, McGill University, Canada)

20. Photos

Figure 1. The Intag Valley, Imbabura Province, NW Andean Ecuador. @ Sarah Wilson

Figure 2. Restoring pastures in watersheds – clearing grass from around recently planted trees. @Sarah Wilson

Matas Legais Project	
1. Proponent	Apremavi - *Associação de Preservação do Meio Ambiente e da Vida* (Environmental and Life Preservation Association) and Klabin company
2. Country of implementation	Brazil
3. Location	States of Paraná and Santa Catarina
4. Implementation period	Since 2005
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ✓ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ✓ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ✓ Assessment / Monitoring ✓ Intervention level ☐ Environmental suitability of rural properties and Atlantic Rain Forest restoration
7. Target/Main objective	Develop actions in conservation, environmental education and forest promotion that help preserve and restore the remnants of native forests, improve quality of live and forestry development based on planning at the landscape and rural properties level
8. Target group or users	Rural owners, outgrowers of Klabin.
9. Partners & collaborators	The *Matas Legais* project is a partnership between the association Apremavi and the company Klabin (the biggest producer and exporter of papers for packaging in brazil and leader in the production of paper packaging).
10. Context (initial situation) and challenge (problem) addressed	The project emerged from the need for the properties of Klabin's outgrowers to be environmental suitable according to the government regulations.
11. Process and methodological approach, techniques and tools used	Landowners, particularly those supplying raw materials to Klabin, are approached by project staff through environmental education activities in schools, direct visits and seminars. In agreement with the landowner, it is decided on the areas where commercial forests can be planted, areas that need to be conserved, areas that must be restored (such as water springs and riparian forest) and areas of secondary forests to be enriched. Planning activities take place at the properties. These are mapped out and the data is inserted into Apremavi's Environmental Portal, a platform of geographic data that helps monitor the activities. With this virtual platform it is possible to access data such as: areas

	and restoration methodology, information over seedlings used, data, maps and sketches of the properties, and photos of the different stages of execution.
12. Field-level practices implemented	The activities start with field visits to the owners to analyse the property's situation. Conversations take place about the environmental adequations that need to be carried out. After agreeing on the needed actions, reforestation and restoration areas are demarcated. The project offers seedlings and materials for the construction of fences, when needed, and the owner plants the trees and does the maintenance of these trees. After trees are planted, monitoring visits are scheduled.
13. Innovative aspects	The partnership between a NGO and a private company. For the embodiment of the partnership several meetings between both parties were scheduled, aiming to design a project that was interesting for both institutions and also important for the society. The success of this type of partnership can be measured by the number of years that it has been in development: 15 years in 2020. The Environmental Portal. This virtual platform guarantees transparency to the project, which is fundamental for credibility to the society and also promotes a sense of belonging for everybody that participates in the project.
14. Outcomes	Until July of 2019 the project worked in 1019 areas reaching 391 hectares of restoration with native trees planting and 2566 hectares of natural regeneration and conservation. Over 1.4 million seedlings were donated and planted in the states of Paraná and Santa Catarina.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	This model of partnership between a cellulose and paper company and an environmental NGO can be replicated to other partnerships between companies and civil society organizations. It is a partnership built on dialogue using the assets of each partner organization in a complementary way, seeking a common and important goal for each of the organizations, but that also to benefit society as a whole. There are countless opportunities to build this kind of partnership between companies and civil society organizations, which requires a dialogue to be established and certain conditions such as trust, commitment, non-exclusion, integration, respect for diversity, proactivity and transparency. Partnerships built this way are meant to last.
16. Main challenges faced	The process of learning and coexisting between the different sectors, in this particular case involving a company and an environmental NGO working with rural owners and communities. It is a continuous learning experience that requires constant evaluations and adaptations, without diverging from the main purpose.
17. Key messages and lessons learned	The main message is the importance that dialogue processes have in building long-term partnerships.
18. Source(s) describing the case	Apremavi. 2008. Matas Legais - Planning properties and landscapes. Edited by Miriam Prochnow. Rio do Sul (SC). The Brazilian Forestas Dialogue. 2013. Writings of the Dialogue - Silvicuture and communities. Sergio Adeodato. P. 26. Atalanta (SC). Apremavi's environmental database platform: http://apremavi.cargeo.com.br/publico/mapa/ Klabin website: https://www.klabin.com.br/en/

19. Contributors	Miriam Prochnow (Steering Committee Member, The Forest Dialogue / Association for the Preservation of the Environment and Life Brazil), and Leandro da Rosa Casanova and Maurício Batista Reis (Technical Coordinators of the *Matas Legais* Project).

20. Photos

Figure 1. Area with newly planted Eucalyptus seedlings and demarcated restoration area on Valmor Catafesta property. Year 2007. (Photo by Leandro Casanova)

Figure 3. Aspect of Valmor Catafesta's area in 2019. (Photo by Leandro Casanova)

Propriedade: VALMOR E JOZONÉIA CATAFESTA

Proprietários
Nome: VALMOR CATAFESTA
Nome: JOZONÉIA VANDERLINDE

Data do Cadastro: 04/07/2019 13:28

Município: Rio do Oeste - SC

Nome do Projeto:
Programa Matas Legais - SC, Projeto Restaura Alto Vale

Selecionar	Nome do Projeto	Áreas de Intervenção	Qualificação / Metodologia	Área Calculada (HA)	Data entrega mudas/plantio	Total de Mudas	Galeria
		Nenhuma					
	Programa Matas Legais - SC	APP restaurada	Restauração / Plantio de espécies nativas	1,15	---	990	Ver fotos...
	Projeto Restaura Alto Vale	Área 01- Rio	Restauração / Plantio de espécies nativas	0,34	---	440	Ver fotos...

Figure 4. Image of Apremavi's environmental database platform with infomation of Valmor Catafesta property.

Land Use Dialogue (LUD) - Planning Sustainable Landscapes in the Atlantic Rain Forest	
1. Proponent	Apremavi - *Associação de Preservação do Meio Ambiente e da Vida* (Environmental and Life Preservation Association)
2. Country of implementation	Brazil
3. Location	Alto Vale do Itajaí Region, State of Santa Catarina
4. Implementation period	Since 2016
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ✓ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ✓ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ✓ Management of secondary forests ✓ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ✓ Assessment / Monitoring ☐ Intervention level ☐ Focus on planning sustainable landscapes, engagement of stakeholders and supporting participatory governance
7. Target/Main objective	The goal of the LUD initiative is to support a stakeholder driven landscape platform for learning around collaborative, adaptive land management in selected landscapes around the world. The multi-stakeholder landscape platform builds shared understanding between local stakeholders and global partners engaging in LUD processes. Together landscape stakeholders foster a common landscape vision of how various priorities and challenges across sectors and land uses connect. The LUD model is designed to identify locally prioritized actions across multiple pathways for change. These often include: – generating recommendations for policy guidelines or implementation; – resolving conflicts and confusion around land rights and boundaries; – developing partnerships between community and private sector; – testing sustainable land use practices; and – establishing information sharing and learning networks locally and internationally.
8. Target group or users	NGOs, communities, private companies, academia and governments.

9. Partners & collaborators	The Forests Dialogue (TFD), The Brazilian Forests Dialogue, Apremavi and IUCN
10. Context (initial situation) and challenge (problem) addressed	In Brazil the LUD initiative was launched in April 2016 in Atalanta, Santa Catarina, focused on planning and implementing sustainable landscapes in the Alto Vale do Itajaí (Upper Itajaí Valley). The Alto Vale do Itajaí was chosen as pilot because the region's land use already fulfils a great deal of the characteristics of sustainable landscapes. It is an opportunity to exchange ideas and experiences that can contribute to improve land use in the region and also advertise the project to other regions. The Valley was colonized in the beginning of the 20th century, and in less than 100 years of "economic growth" 80% of the forests in the region were destroyed. The floods, a secular phenomenon of the region, started to occur more frequently, and today the Alto Vale is highly affected by the climate crisis. With less forests to explore, particularly after 1970, companies and small rural owners started to plant exotic tree species to supply the market. In the 1980s, with the native forest restoration projects starting, and the environmental laws specific to rain forest protection being regulated (since 1990), deforestation started to slowly drop, and the restoration of the biome started.
11. Process and methodological approach, techniques and tools used	The process began with a seminar to gather available information and integrate the regional actors that have great influence in the landscape. Two days of field visits and debates were held among specialists about the importance of a new participatory perspective on land use, aiming at the basin of the Itajaí river involving 31 municipalities in Santa Catarina State. In this first historic meeting, where objectives to continuing the dialogue with practical actions were defined, 49 NGOs, agricultural, public and private companies, government, universities, cooperatives and rural producers' associations participated. A working group to articulate the next steps was formed. The second step of the process was the II seminar of Land Use Dialogue in the Rain Forest - Planning sustainable Landscapes in the Alto Vale do Itajaí, held in March 2017. Consisting of 90 participants, the initiative was supported by databases and geoprocessing images - the knowledge of local actors - to elaborate the first map of priority areas envisioning sustainable landscapes in the Alto Vale do Itajaí.
12. Field-level practices implemented	During the I seminar several field visits were made to better understand the reality of the region. After this first encounter, a SIG database was organized, producing a pilot map of the social/environmental situation of the region. This data base was used to support the debates of scenarios for 2030 and 2050, discussed in the second seminar. A research on perceptions was also made, asking "What is your opinion over the scenarios for 2030/2050 in the Alto Vale do Itajaí?" The research covered eight main topics: Forests and Biodiversity, Water Resources, Protected areas, Farming, Silviculture/Reforestation, Rural roads, Landslide and Flood risk areas, and rural area x urban area.
13. Innovative aspects	For the first time, in the Valley region, different sectors sat at the same table to look beyond the backyard, proposing priorities and actions aiming to follow the

	law and also transcend it with additional measures, focusing on improving the quality of life as a whole. The involvement in the mapping process motivated, for example, not only the adequacy of the environmental legislation, but also production practices not regulated by law capable of bringing together production and environmental conservancy in a more effective way in the long run. Some organisations that participated in the process incorporated the results in their strategic planning.
14. Outcomes	The first Map of Priority Areas for Sustainable Landscapes in the Alto Vale do Itajaí; recommendations for prevention and mitigation of environmental risks; and a list of priority actions to guide public policy, investment in conservation, and private sector initiatives. Around 150 areas were demarcated according to the eight themes: – Areas that have the potential or that already have sustainable production activities, such as agroecological production and agroforestry systems, etc – Priority areas for water resources and biodiversity conservation, such as water springs and basins, besides places of endangered fauna and flora – Forestry restoration areas, such as permanent preservation areas and Legal Reserves – Areas with environmental impacts that need to be resolved – Areas with potential of ecological enrichment with native trees – Priority areas for the formation of biodiversity corridors and integrative landscape management – Areas with a higher risk of landslides and floods Part of the recommendations in the restoration theme is being implemented by the *Restaura Alto Vale* project that started in 2018 and, so far, already engaged with 368 rural owners in 27 municipalities. Some 64 000 native tree seedlings have already been distributed covering 91 hectares of restoration.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	Stakeholder mapping. A key priority in LUD platforms has been to gather the existing knowledge on the landscape and identify key actors in the landscape that influence land use decision making. Communication pathways. It is important the there is an information sharing mechanism, so that participants know who is doing what in the landscape. Clear dialogue structure and objectives. A central tenet to a landscape approach is that the end goal is not pre-defined but determined by the stakeholders involved through a process of visioning and balancing trade-offs. Leadership**.** It is clear that the success of a multi-stakeholder platform is enabled by a key group of actors in the landscape to champion the identified priority actions and continued flow of information beyond platform meetings.
156 Main challenges faced	The question of inclusivity. To achieve the goal of inclusive decision making, the platform must be viewed as a legitimate mechanism to influence change by all actors, including those not traditionally involved. Overcoming power imbalances for participatory decision making. Participants of the LUD platforms include both, those that would be considered current decision makers and those impacted by landscape decisions. Policy as an entry point. While focusing on land use policy allows for dialogue to be focused and action oriented, it also has its challenges. Focusing on policy can

	lead discussions to center on the overlap or lack of synergy between policy from different sectors.
17. Key messages and lessons learned	Attending to scales. Landscape approaches are designed to function at multiple scales, from influencing sustainable land use decisions by individuals to reforming federal and regional land use planning policy and guidelines. Dialogue capacity building. In order for the dialogue platform to be truly inclusive, it must not only make space for different stakeholders to participate in the dialogue but enable actors to present and negotiate their priorities.
18. Source(s) describing the case	The Brazilian Forest Dialogue/Apremavi. 2019. Writings of the Dialogue - Volume 9: Land Use Dialogue - Planning Sustainable Landscapes. Edited by: Miriam Prochnow e Fernanda Rodrigues. Atalanta (SC).
19. Contributors	Miriam Prochnow (Steering Committee Member, The Forest Dialogue / Association for the Preservation of the Environment and Life Brazil) and Wigold Bertoldo Schaffer (Technical coordinator of the LUD project for the Alto Vale do Itajaí Region).

20. Photos

Figure 1. Alto Vale do Itajaí region. (Photo by Wigold Schaffer)

Figure 2. Field visit during the I LUD seminar in April 2016. (Photo by Wigold Schaffer)

Private restoration of degraded forest land with native tree species in the Peruvian Amazon	
1. Proponent	*Bosques Amazónicos SAC* (BAM) company through its *Campo Verde* project[9]
2. Country of implementation	Peru
3. Location	Campo Verde, Ucayali Region (Peruvian Amazon)
4. Implementation period	Ongoing since 2008
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ✓ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ✓ Assessment / Monitoring ✓ Intervention level ✓
7. Target/Main objective	Reforestation of degraded pasture lands, rehabilitation of degraded forest areas and supporting biodiversity by connecting forest fragments and recreating habitats for wildlife. The *Campo Verde* project reforests with native tree species on degraded lands for timber and carbon purposes.
8. Target group or users	Reforestation companies, rural communities and extensionists
9. Partners & collaborators	AIDER (Asociación para la Investigación y Desarrollo Integral), INIA (National Institute for Agrarian Innovation), GOREU (Regional Government of Ucayali)
10. Context (initial situation) and challenge (problem) addressed	The company's property in the central Peruvian Amazon of around 18 000 hectares comprises degraded pastureland, wetlands, grasslands and primary and secondary forests, reveals a pattern of unsustainable logging and farming since the 1960s. Since the 1980's, it was cleared in successive stages for cattle ranching and by the mid-1990's, active production on the land ceased. Continuous fires from neighbouring smallholding plots and soil degradation resulting from overgrazing and soil fragility precluded the natural regeneration of the original forest cover. In 2007 an area of 2,040 hectares of degraded pastures were targeted for restoration under the *Campo Verde* project.
11. Process and methodological approach, techniques and tools used	The design and planning of the *Campo Verde* Project considered a sequence of assessments/studies and activities: – Biophysical assessment for the characterization of the herbaceous, shrub and arboreal vegetation, soils and fauna (with emphasis on entomological fauna) – Socioeconomic assessment of the zone of influence to gain knowledge and enhance the understanding of the core characteristics and aspirations of the village people and settlements located in the proximity to the project area – Design of the technical proposal, including the preparation of the main components of the proposal (species selection, soil preparation, quality of plants to use according to the dominant vegetation and planting design, spacing, management regimes etc.)

[9] BAM is a Peruvian private company founded in 2004 specializing in the conservation, protection, restoration and sustainable management of tropical forests. Its Campo Verde project operates since 2008 (http://www.bosques-amazonicos.com/en)

	based upon the infield biophysical surveys and analyses, literature review and experts' opinion. – Establishment of a central nursery with a production capacity of one million plants per year in polyethylene bags from seed propagation – Establishment of the forest plantation using four native timber species combining fast (*Simarouba amara* Aubl., local name marupa), medium (*Dypterix ferrea* Ducke, shihuahuaco) and slow (*Tabebuia serratifolia* (Vahl) Nichols, tahuarí, and *Swietenia macrophylla* King, caoba or mahogany) growing species. In addition, the planting of the nitrogen-fixing species *Inga edulis* Mart. (guaba) with the purpose of ameliorating the soil, suppressing weed growth and providing shade and protection for the timber species. The timber species were planted in various combinations or stand models – Maintenance and silvicultural practices, designed to reduce the mortality level, maximise growth and yield and mitigate the risk of pests and diseases – Research, carried out directly by BAM company or through partnerships with acknowledged research organisations – Monitoring, both for carbon marketing purposes (carbon stocks, leakages, emissions) and for the company's management needs in order to timely assess fundamental indicators such as survival, growth rates and unit costs. The monitoring also included environmental and social impacts of the project based on a set of key indicators – Social issues, including the promotion of productive projects with neighbouring communities such as the replication of the plantation model in parcels of rural families, and other crops.
12. Field-level practices implemented	Biophysical diagnosis to assess the drivers and level of degradation and to assist in the design of the intervention (species selection, soil preparation, quality of plants to use according to the dominant vegetation and planting design, among other aspects). Site preparation and establishment, including: – area stratification and delimitation of management units to facilitate management and monitoring – land classification and evaluation – weed management (carried out using tractor-mounted sprayers and glyphosate for control) – soil cultivation (using an offset disc plough to form contours or "fish spine" furrows) – plant nutrition (application of 1 kg of chicken manure and 100 g of dolomite lime per tree) – planting (in various regimes for the reforestation of the pasture areas and the enrichment planting of the secondary forests) – maintenance: pruning, phytosanitary control in the nursery and the plantation area, forest protection (following environmental strategies for the prevention and control of pests and diseases, compliance with legal and technical regulations on industrial safety and hygiene, and involvement of the neighboring population) and fire protection (20 to 30 m wide firebreaks, construction of water points for fire tenders, etc.) Community development program with neighboring villagers to prevent encroachment and contribute to local livelihoods
13. Innovative aspects	– The project management and business model considers a strategic planning process with baseline diagnostic studies and silvicultural operations to deliver the final products, community development activities, and strategic alliances to improve or develop production protocols (such as the phytosanitary control), for basic studies of plant production (cloning, etc.), monitoring and research as well as product processing and commercialization. For instance, the management regime for site

	preparation and the establishment of the pasture areas includes the stratification and delimitation of management units to facilitate management and monitoring, land classification (according to various soil types, slope classes, terrain features and levels of weed competition) and evaluation (based upon the classification, sites were evaluated to optimize silvicultural regimes in terms of soil preparation, weed management, soil nutrition and species choice) – Plant protection is done using an integrated pest management approach. Native viruses are multiplied in the laboratory for larvae control. Entomopathogenic fungi and bacteria are used as agents for biological control of insects attacking the planted timber species – Implementation of eco-business with carbon credits from greenhouse gas emission reductions through reforestation of native tree species on land degraded due to cattle ranching, as well as through natural regeneration. In 2008 the Campo Verde project became a Verified Carbon Standard (VCS) Afforestation/Reforestation (ARR) Project under the CCBA – Climate, Community and Biodiversity Alliance
14. Outcomes	The project restoration interventions have: – contributed to the valorisation of 2,040 ha of degraded land through forest plantations and assisted natural regeneration. By 2018 around 870 hectares have been reforested with almost two million valuable native trees (an average plantation rate of 270 ha/year). Additionally, 124 ha are being restored through protection measures and assisted natural regeneration – achieved greenhouse gas emission reductions generating 169,000 carbon credits in the carbon market by 2016 (the price for the first sale of carbon was USD 8/metric ton) – fundamentally contributed to reverse a typical pattern of habitat loss, soil degradation and biodiversity impacts with a management regime that recovers soil physical, chemical and biological characteristics; and regenerates forest habitats and enhances biological corridors, thus improving the overall biodiversity conditions of the region. Furthermore, the project intends to establish mahogany which is under serious risk of extinction (included in CITES list) because of its over exploitation for many years. An additional benefit is the improvement of water quality and quantity in the Agua Blanca river and other tributaries of the local water system. The project is generating interest for ecotourism as evidenced by the many visitors to the area (over 2,000 people annually), including professionals, producers (small- and medium landholders), interns and students from national and foreign universities The project is currently considered a reference for other companies and landholders interested in the business of planting native tree species in deforested/degraded forest lands in the country's Amazon region. BAM company has received a number of awards for its Campo Verde project, e.g.: the Gold level certification by the Climate, Community and Biodiversity Alliance (CCBA) in recognition of its effectiveness in mitigating climate change and promoting biodiversity and sustainable development; and the 2010 National Renewable Natural Resources Eco-Efficiency Business Award by Peru's Ministry for the Environment and *Universidad Científica del Sur*.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Private investors decision to finance a high-risk project – Careful planning considering specialization by activities to facilitate their correct understanding and the adoption of a working schedule geared to improve the technology, reduce costs and adapt to changing situations during project implementation

	– Continuous improvement of the technology for soil preparation, plant production and plantation management based on strategic alliances – Use of local knowledge about soils, species interactions and the appropriateness of species selection as well as the institutional alliances to the improve the silvicultural technology – On-site training by specialists and permanent updating according to activities carried out during project implementation – Maintaining constructive relations with local communities – Establishing an effective monitoring and evaluation system
16. Main challenges faced	– Financial constraints. The initial objective of the *Campo Verde* Project to produce wood and commercialize carbon was later changed to just focus on the production of wood with native species of fast and slow growth. The sale of carbon was discontinued due to the heavy burden of prerequisites demanded that was not compensated by the income received. – High operational costs. The reforestation of degraded pastures in the local conditions is an expensive business, amounting to around USD 7,000 per hectare (including all direct and indirect costs). The challenge is to scale up operations and integrate with the management of the residual logged-over and secondary forests in the area – Weak government support. The regional and national governments have not shown real interest in the initiative and its potential model for adapting to smallholders' settlements. – Gaps of information. The use of native tree species at scale brings a number of challenges, particularly with regards to the gaps of information on taxonomy, silviculture and technological properties of several tree species.
17. Key messages and lessons learned	– The choice of species should be made on the base of a biophysical diagnosis – The use of *Inga edulis* to recover degraded areas has proved to be a success in the plantation model – Soil cover with legumes has proved to be an efficient way of biological control of weeds, notably with *Desmodium ovalifolium* (low-cost establishment, persistent, non-aggressive, supports shade of plantations, lignified stem and high contribution of biomass) to be introduced in the system at the third year – The accompaniment to the planted timber species through the regrowth or natural regeneration left on site is critical. The cutting of lianas or other creeping plants is essential – To ensure quality final products from the forest plantation the origin of the planting material and its traceability is of utmost importance – The best method of pest control in a mixed native species forest plantation is biological control with the use of entomopathogens – The establishment of biological corridors that provide alternate hosts and shelters to parasitoids is a good option to maintain the balance of harmful insect populations – Local participation should be promoted at two levels: internally, to maintain well trained and motivated human resources, and externally as part of a community development program to approach and raise awareness with neighbouring villagers and communities
18. Source(s) describing the case	Chavez R., J. and C. Sabogal. 2019. Restoring degraded forest land with native tree species: the experience of "Bosques Amazónicos" in Ucayali, Peru. *Forests 2019, 10(10), 851; https://doi.org/10.3390/f10100851* BAM - Bosques Amazónicos: http://www.bosques-amazonicos.com/en/our-projects/reforestation-of-native-species-in-campo-verde-ucayali

19. Contributors	Jorge Chávez Rodríguez (Bosques Amazonicos SAC) and Cesar Sabogal (independent consultant)

20. Photos

Figure 1. Degraded pasture with remaining high forest before start of the Campo Verde project showing the delimitation of the restoration area in management units (Photo by BAM)

Figure 2. Planting Inga edulis and timber species (Photo by BAM)

Figure 3. View of the Campo Verde reforestation area on degraded pastures 7 years after starting (Photo by BAM)

From *Eucalyptus* monocultures to high diversity mixed forests: bringing together wood production and tropical forest restoration	
1. Proponent	University of São Paulo – "Luiz de Queiroz" College of Agriculture (USP / ESALQ) - *Laboratório de Ecologia e Restauração Florestal – LERF and Laboratório de Silvicultura Tropical - LASTROP*
2. Country of implementation	Brazil
3. Location	Aracruz (State of Espírito Santo), Mucuri and Igrapiúna (State of Bahia)
4. Implementation period	2011 - 2012
5. Restoration option	Restoration of degraded forests for production ✓ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ☐ Intervention level ✓
7. Target/Main objective	Temporary mixed plantations of *Eucalyptus* and a high diversity of native trees to produce wood and offset part of the costs of planting and maintaining tropical forest restoration.
8. Target group or users	Small to large farmers who need to restore degraded sites in marginal areas of production.
9. Partners & collaborators	The University of São Paulo, FAPESP, The Atlantic Forest Restoration PACT, pulp and paper companies and the NGO *Organização de Conservação da Terra*.
10. Context (initial situation) and challenge (problem) addressed	The areas had been used previously for cattle grazing (degraded pastures), followed by several rotations of *Eucalyptus* planted in monoculture plantations and were then converted to a mixed forest composed of *Eucalyptus* and a high diversity of native trees to offset the costs of tropical forest restoration.
11. Process and methodological approach, techniques and tools used	Use of active restoration through tree seedling plantation to establish a high diversity mixed forest following the best commercial silvicultural techniques available to grow and harvest trees.
12. Field-level practices implemented	Up to 30 native tree species were intercropped with *Eucalyptus* at a 2x3 or 3x3 m spacing. Common silvicultural practices (soil fertilization, weed- and ant-control) for all seedlings, either native or *Eucalyptus* were adopted. The native trees were grouped in rows according to three main ecological groups to facilitate future harvesting. We used two types of native seedling rows: 10 species of intermediate growth rate in one type of row and 10 latter successional species alternated with 10 fast-growers in the other type of row. These types of native species rows were alternated with rows of clonal *Eucalyptus* in a 1:1 proportion.
13. Innovative aspects	This was the first time *Eucalyptus* was intercropped with a high diversity of tropical tree species. We used controlled conditions and tested this silvicultural solution in large scale in three different sites. As part of the same experiments, we also compared these

	high diversity mixed forests with traditional restoration plots and pure *Eucalyptus* plots to serv as controls.
14. Outcomes	The survival rates of all species in these high diversity mixed stands was generally the same as in *Eucalyptus* monocultures and in traditional restoration sites. The competition with *Eucalyptus* slowed the growth of the fastest growing native trees, and did not affect the slow-growers. So far, two of the three sites have been harvested using both chainsaw and animal traction in one site and harvesters and forwarders in the other site. The volume of wood produced in the first rotation of *Eucalyptus* and the damage of harvesting operations on native trees were measured. *Eucalyptus* grew larger in mixtures and yielded approximately 75% of the basal area produced by monocultural stands even considering that they accounted for only 50% of the trees in mixed stands. *Eucalyptus* may be used for additional rotations either permanently or until the desired financial return has been achieved. Depending on the landscape context, when there are near sources of seeds and other propagules, natural regeneration potential may be high and can occupy the space left after the harvest of *Eucalyptus*. Most of the mixing effects we observed (increased growth of *Eucalyptus* and slowed growth of native trees) were attributed to competition for water. Thus, we suggest that the native fastest growing species are planted after the final harvest of *Eucalyptus* (if already not present as a result of natural regeneration).
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	This solution applies to small- to large-scale forestry and can be easily replicated in other regions of the tropics if seedlings of *Eucalyptus* and 10-30 or more different native species are available. Even when the volume produced is not enough for commercial operations, the wood produced can be used within the property for fencing and other constructions, firewood and other valuable uses.
16. Main challenges faced	The high costs of restoring tropical forests and the need to develop economically viable ecological restoration projects with economic returns are the reasons that encouraged us to develop these high diversity mixed forests. Now that this has been successfully tested, landowners can adopt similar solutions and adapt to their regions at the scale they need in a way to achieve the highest conservation values and the maximum economic return.
17. Key messages and lessons learned	– The system is a viable option for forest landscape restoration; – Tree survival is high, the growth of individual *Eucalyptus* trees is increased in the mixed plantation, while the growth of some native trees is decreased (specially the naturally fast-growing ones); – The natural regeneration in the understory can be abundant and depends on the matrix the plantation is embedded in; – The harvesting of *Eucalyptus* causes some damage to neighbouring planted native trees and to seedlings from natural regeneration, but the damage may be compensated by their growth after *Eucalyptus* removal.
18. Source(s) describing the case	Amazonas, N. T., Forrester, D. I., Silva, C. C., Almeida, D. R. A., Rodrigues, R. R., & Brancalion, P. H. (2018). High diversity mixed plantations of *Eucalyptus* and native trees: An interface between production and restoration for the tropics. Forest Ecology and Management, 417, 247-256. Amazonas, N. T., Forrester, D. I., Oliveira, R. S., & Brancalion, P. H. (2018). Combining *Eucalyptus* wood production with the recovery of native tree diversity in mixed plantings: Implications for water use and availability. Forest Ecology and Management, 418, 34-40.

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Silva, C. C. (2018) Impacto ecológico e silvicultural do uso e colheita de eucalipto consorciado com espécies arbóreas nativas para a restauração da Mata Atlântica (Doctoral dissertation, Universidade de São Paulo).

19. Contributors

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Photos (Please indicate title and credit for each high-resolution photo)

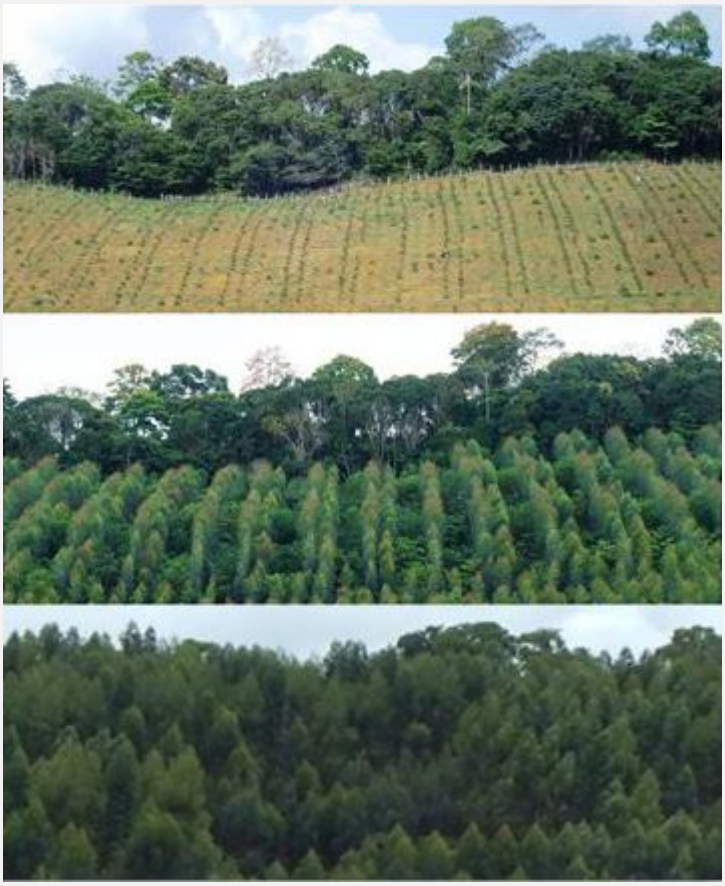

Figure 1. Growth of a mixed forest composed of Eucalyptus intercropped with a high diversity of native trees in an experimental site in Igrapiúna (Bahia), Brazil. Photos were taken one week after planting, 30 and 44 months after planting. (Photos by Carina Camargo)

Figure 2. A mixed plantation of Eucalyptus and a high diversity of native trees (on the left) and a traditional forest restoration plot (on the right). Both forests were planted on the same day in Aracruz, Espírito Santo State, Brazil, and had 51 months when the picture was taken. Note that the mixed plantation was composed of double rows of native trees intercropped with double rows of Eucalyptus, which grew taller but did not close the canopy over native trees, that could still access full sunlight. (Photo by Nino Amazonas).

Strengthening cocoa value chain for upscaling FLR through agroforestry in Guatemala	
1. Proponent	International Union for Conservation of Nature (IUCN)
2. Country of implementation	Guatemala
3. Location	*Franja Transversal del Norte*[10], Guatemala
4. Implementation period	2011 – 2019
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ✓ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ✓ Planning ✓ Assessment / Monitoring ☐ Intervention level ✓
7. Target/Main objective	To promote agroforestry restoration in the Biological Corridors of the Lachuá Ecoregion and to improve people´s livelihoods through the strengthening of cocoa production and supply chains, as well as ensuring an adequate source of funding from both public and private investors.
8. Target group or users	Cocoa producers, field technicians and government officers.
9. Partners & collaborators	Fundalauchuá (Fundación Lachuá)
10. Context (initial situation) and challenge (problem) addressed	The cacao market in the world has currently an unmet demand of about 150,000 metric tons of fermented dry cacao beans. In Guatemala, as in other Latin American countries with cacao production, this situation is perceived as a window of opportunity to make this crop a source of income and employment generation for small, medium and large producers who live in areas with potential for the development of this crop. Currently, Guatemala contributes only to 0.26% of the global cacao production with around 5,000 ha. The goal of the N Strategic Plan of the Cacao Agro-chain of Guatemala[11] (2016-2025) is to increase the cacao area up to 15,000 ha during the next 10 years. Cacao agroforestry systems have a high conservation value and potential for landscape restoration in areas that have been degraded over the years due to the advance of the agricultural frontier, through unsustainable crops, livestock, and other factors. In the last 20 years the country has invested in the forestry sector a total of USD 173 million through the forestry incentives PINFOR and PINPEP[12]. While PINPEP is still in place, in September 2015 a new program, PROBOSQUE[13], replaced PINFOR to continue with this effort for an

[10] The Northern Transversal Strip is a region of Guatemala limited, to the north, by an imaginary line between the Vértice de Santiago in Huehuetenango and Puerto Modesto Méndez in Izabal and, to the south, by La Mesilla in Huehuetenango and Lake Izabal. It comprises, from west to east, part of the departments of Huehuetenango, Quiché, Alta Verapaz and Izabal

[11] The document of the strategy can be found, in Spanish, here: https://www.maga.gob.gt/download/enac16-25.pdf

12 PINFOR is the Forest Incentives Program. PINPEP is the incentive program for holders of small areas of forest or agroforestry land.

[13] PROBOSQUES is the incentive program for the establishment, recovery, management, production and protection of forests in Guatemala.

	additional period of 30 years with the aim of contributing to the government target of restoring 1.2 million ha of degraded forest land. The National Restoration Strategy of Guatemala was designed and approved in 2015. Its main economic support is the PROBOSQUE program, as well as PINPEP. The National Restoration Strategy has been supported by IUCN through ROAM (the Restoration Opportunities Assessment Methodology) implementation and the facilitation and strengthening, since 2014, of the National Forest Landscape Restoration Roundtable. The restoration strategy aims at generating income and livelihoods improvement through addressing poverty and natural resource degradation. It clearly seeks to establish public-private partnerships and attract investment, to strengthen value chains and promote the demand for sustainable products from restoration actions. In line with the different FLR related policies and programs, since 1997 IUCN - in coordination with INAB (the National Forestry Institute), CONAP (the National Council of Protected Areas), MAGA (the Ministry of Agriculture, Livestock and Food), local governments and Fundalachuá - is promoting the conservation of the Lachuá ecoregion through (i) governance strengthening; (ii) natural ecosystem management and promotion of sustainable forest management; and (iii) sustainable productive economic options, such as agroforestry. Since 2016, IUCN and Fundalachuá shifted their action towards the development of business models focusing on supply-demand of added value products and building alliances with the public and private sector to scaling up the experience, including the improvement of access to technologies and market products. Under this framework, IUCN and Fundalachuá are promoting the establishment of new areas of agroforestry systems (cocoa + forest species), seeking financial leveraging with government incentives, impact investments and formal banking. Based on the Lachuá experience and in the framework of the National Cocoa Strategy, an expansion of cocoa production is planned (establishment of at least 15,000 ha of cocoa in SAF by 2025) in other areas, in particular in the Verapaz area (Lachuá, Cahabón, Polochic) and the southern part of Petén.
11. Process and methodological approach, techniques and tools used	The methodological approach defined the strategy of intervention as an innovation model operating through five dimensions: production technology, commercialization, organization, governance and finance. – Production technology: Creating conditions and capacities for the production of highquality cocoa with the potential for commercialization in high-value specialized markets. – Commercialization: Creating conditions and capacities for the implementation of associative models for small producers through centers for collection and transformation which aggregate value to production, and guarantee quality and quantity in stocks, giving producers the power for negotiating directly with international buyers. – Organization: Creating the conditions to allow that producers' associations have the capacity of absorbing all the production of their associates, pay in advance through revolving funds or credits, and invest in the infrastructure required to ensure an adequate supply of grains in quality and quantity to the buyers. – Governance: Developing multistakeholders platforms for the management of the production chain with a strong public support in cooperation with the private sector. – Finance: Providing opportunities and prospects for private investors, as well as promoting public investment.
12. Field-level practices implemented	Field activities are mostly represented by technical support and capacity building for the establishment of cocoa agroforestry systems, including the identification, selection and reproduction of high value genetic material through cloning superior trees. This

	generated 85,000 cloned plants in the Lachuá Ecoregion which are expected to produce 1,000 kg/ha/year with proper management.
13. Innovative aspects	The innovative aspect is represented by the strong focus on strengthening the value and production chains of a specific commodity (cacao) in order to generate the conditions and the enabling environment (political, institutional and economic) for upscaling FLR through agroforestry models based on this commodity. Indeed, project results have motivated the government to prioritize the promotion of the cocoa production and the creation and integration of policies and government programs such as the "Zero Hunger" program, Forestry and Agroforestry Incentive Programs, the Rural Outreach Program, and the National Fund for Agricultural Development. By integrating human, technical and financial resources; and using the experience generated in Lachuá, these programs will become an economic engine of broad institutional base to generate employment and increase income in the most marginalized areas with great land base potential for cultivating cocoa agroforestry systems in the *Franja Transversal* del *Norte* Region in Guatemala.
14. Outcomes	The Project generated a change within the cocoa vale chain, from production to commercialization, as well as to the services supporting it, such as organization, governance and finance, showing that it is possible for organized groups of small-scale producers to manage a profitable production model without affecting the natural resources of the landscape. Specifically, the results obtained where the following: – 500 producers involved and 776 ha of cocoa agroforestry implemented – Increased cocoa yields from 180 kg/ha to 500 kg/ha (70 kg/ha to 192 kg/ha dry grain) – Increased average annual income of an estimated USD 1,411 per producer – Creation of 315 new full-time jobs – Positioning and access to the international cacao bean market through trade agreements allowing 236 small organized private producers of Alta Verapaz selling their product with annual revenue of USD 197,400 – “Bean to bar” market: Commercial alliances with 36 chocolate enterprises from the international market of United States, Europe and Asia, allowing a price increase from USD 2.28/kg to USD 4.5/kg (USD 4,500 per metric ton) – Improved consistency of dry-fermented grain in terms of quality and volume, with fermentation rates between 70% and 90% and grain moisture between 7% and 7.5% – A financial program relying on an operational plan for production and the creation of a revolving fund, guarantying that the material needed for production will be in the quality and quantity required – More than USD 1 million invested by the government in supporting agroforestry models – Setting up of three collection and processing centers strategically located in producing areas in Cahabón and Lachuá Ecoregion, especially with the opening of the Cacao Verapaz Company which links producers directly with chocolate companies.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	Institutional conditions that need to be in place are the coordination of policies and government programs integrating human, technical and financial resources. Moreover, the impact of field activities must be reflected in increasing income and employment in marginalized areas. Under this context, while public investments can create the conditions for natural assets to be managed for the delivery of a range of societal benefits, the role of private finance and the need for business models at different levels have been identified as critical components.
16. Main challenges faced	Main challenges have been mostly related to the strengthening of value chain and unlocking private finance at the necessary scale, including: – matching quantity and quality (different groups) to respond to increased demand;

	– diversifying buyers; – providing evidences of impact on farming systems, livelihoods and ecosystem services; – need for a substantial increase in the pipeline of investable projects; – need for systematic de-risking of projects that are often perceived as unfamiliar and risky by the conventional finance sector; – construction of investment vehicles of an appropriate size and familiarity to interest institutional investors.
17. Key messages and lessons learned	Nature conservation wasn't always regarded as the obvious route to development. In Guatemala, where farmers are sustainably growing cocoa while conserving forests, it has become just that. Sustainable cocoa products allow Guatemalan farmers to earn up to USD 1000 per hectare, compared to USD 60 per hectare for subsistence agriculture. Strengthening the cacao producer organizations and improving supply chain performance motivate producers to continue establishing cacao agroforestry production systems. At the same time, more actors such as government, private companies, and non-governmental support agencies are interested in making investments to promote cacao cultivation, trying to take advantage of the current market opportunities through the improved business environment. All this generates a virtuous cycle which allows upscaling of FLR at the landscape level.
18. Source(s) describing the case	https://i-m-magazine.com/?p=1053 https://www.uncommoncacao.com/lachua-guatemala https://www.iucn.org/node/31940
19. Contributors	Silvio Simonit, Orsibal Ramírez and Leander Raes, all from IUCN
20. Photos	

Figure 1. IUCN has strengthened livelihoods of rural communities in Guatemala through the improvement of the value chain of the cocoa production. (Photo by IUCN ORMACC/ Erick Ac)

Figure 2. Local producers of Alta Verapaz region participated in Cocoa Field Schools on pre-production, production, value added and marketing. (Phot by: IUCN ORMACC/ Erick Ac)

Productive rehabilitation of tropical cattle ranching lands in Colombia	
1. Proponent	Colombian Sustainable Cattle Ranching Project (*Proyecto Ganadería Colombiana Sostenible*)
2. Country of implementation	Colombia
3. Location	The Colombian Sustainable Cattle Ranching Project (CSCRP) takes place in 87 municipalities of 12 departments, grouped into five ecoregions where cattle ranching exists close to protected areas: Lower Magdalena, Cesar River Valley, Coffee Ecoregion (Quindío, Risaralda, Caldas, Tolima and Valle del Cauca), Oak Corridor (Boyacá and Santander) and Andean Foothills (Meta).
4. Implementation period	2012 – 2020
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ✓ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ☐
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ☐ Intervention level ✓
7. Target/Main objective	To promote the adoption of environmentally friendly silvopastoral systems in Colombian livestock farms in order to enhance natural resource management, ecosystem services (biodiversity, soil and water conservation, and carbon sequestration) and productivity. The Project focused on overcoming the main barriers to the adoption of land use practices that benefit both farmers and the environment, by: (i) improving productivity in participating farms through Silvopastoral Systems – SPS; (ii) enhancing connectivity and reducing land degradation through different Payment for Environmental Services - PES schemes; and (iii) enabling a wider adoption of SPS by building the capacities of farmers and extensionists and strengthening institutions in the livestock sub-sector.
8. Target group or users	Cattle ranchers of five Colombian ecoregions (> 85% of participating farms were small and medium sized).
9. Partners & collaborators	FEDEGAN (lead executing agency); CIPAV[14], FONDO ACCIÓN[15] and The Nature Conservancy (allies and co-implementers); GEF and the UK government (funding agencies), and The World Bank (implementing agency).

[14] CIPAV - *Fundación Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria (www.cipav.org.co).*
[15] Fondo Acción is a Colombian non-profit organization of the private regime working on themes such as sustainable rural development, conservation, climate change, and the protection and development of children and adolescents, with an emphasis on early childhood (https://fondoaccion.org/en/home/)

10. Context (initial situation) and challenge (problem) addressed	Cattle ranching contributes 1.4% of Colombia's gross domestic product (GDP) and 21.8% of the agricultural GDP and generates 810,000 direct jobs that represent 6% of national employment and 19% of employment in the agriculture sector. Cattle grazing occupies approximately 39.2 million hectares, equivalent to 34.3% of the Colombian territory and supports a bovine population of 23,475,022 animals. Most conventional livestock systems rely heavily on grass monocultures where external inputs are used to compensate for the loss of essential ecological processes such as nutrient cycling and biological pest control. The main negative environmental impacts of these unsustainable livestock systems are the destruction and fragmentation of natural ecosystems, soil erosion and degradation, biodiversity loss, water pollution, loss of hydrological regulation and increased greenhouse gas emissions.
11. Process and methodological approach, techniques and tools used	Technical assistance: Project beneficiaries received free technical advice for participatory farm planning, establishing and managing SPS, enhancing animal welfare and restoring strategic ecosystems in their farms. Payment for environmental services: Two PES schemes were applied. One rewarded biodiversity conservation resulting from forest and wetland protection or the implementation of SPS; the other scheme promoted intensive silvopastures for their contribution to carbon sequestration. Demonstration farms: These small to medium-sized farms were part of the project's strategy for technology transfer and were intended to support the cultural change of conventional farmers. They were used to (1) evaluate silvopastoral innovations; (2) generate information on the established SPS; (3) train ranchers, students, technicians and professionals; (4) serve as a model for cultural change towards sustainable livestock production, which includes the transmission of values and intergenerational exchange; and (5) showcase behaviors of respect for nature. Research, innovation and monitoring: Research done within the Project provided a better understanding of the effects of SPS on productive, economic, environmental and social indicators at the farm and landscape scales. Continuous monitoring for more than 6 years confirmed the productive and environmental benefits of SPS. Project innovations include new silvopastoral arrangements for different ecoregions, the identification of species well adapted to each productive context and strategies for implementing and managing SPS. Focal species: The project identified a set of native trees and palms of global conservation concern, which were planted or managed in SPS and riparian forests in order to enhance connectivity and the conservation value of livestock dominated landscapes.
12. Field-level practices implemented	Fenced forests: Forest fragments and riparian corridors were fenced to prevent trampling and browsing from livestock and enhance their connectivity and conservation value. Scattered trees in pastures: 30 to 50 trees per hectare, planted or protected in paddocks. Intensive silvopastoral systems (ISPS): From O-2,000 meters above sea level, ISPS include 5,000 or more fodder shrubs and up to 500 trees per hectare. The most common shrub species are *Leucaena leucocephala, Tithonia diversifolia and Guazuma ulmifolia*, combined with fruit trees, timber trees or palms. Above 2000 meters of altitude, ISPS include 100 native trees per hectare, interspersed with 2000 forage shrubs planted in strips of four rows every 40 meters. Fodder hedges: Strips of fodder shrubs planted in high density. They include a line of trees at the center, planted 3 m from one another. Mixed fodder banks: crops of fodder shrubs (rich in protein, minerals and vitamins) combined with herbaceous plants such as legumes, sugar cane and tall grasses (rich in

	soluble sugars and fiber), designed to maximize biomass production and provide cut-and-carry fodder throughout the year. Live fences: lines of native and/or timber trees that separate paddocks. They provide shade, act as biological corridors for some organisms and provide complementary resources for the farm such as fodder, fruits and wood.
13. Innovative aspects	– Technical assistance for sustainable ranching was implemented on an unprecedented scale and required a great capacity building effort – External demonstration farms with explicit commitments to help meet public policies to reduce deforestation and manage strategic ecosystems – Method demonstrations for farmers through field days in participating farms – PES for carbon sequestration in participating farms – An inter-institutional public policy committee (two ministries and the national planning department) that articulated the project's activities to international goals – An inter-institutional arrangement where the livestock sector accepted the challenge of leading silvopastoral training based on agroecological principles
14. Outcomes	– Four open calls and 44,100 farmers approved for participation, 79.3% of which (3,250) were still active at the end of the Project. – 8,060 people trained in field days, 221 technicians and external professionals trained in sustainable cattle ranching and 2,807 beneficiaries of technology brigades. – Personalized support to participating farmers interested in establishing silvopastoral systems (5,978 technical visits for plantings in one semester). – A total of 30,080 hectares of silvopastoral systems and 4,572 hectares of intensive silvopastures established; 3,329 hectares of enrichment planting in natural forests (until June 2019). – 15,538 hectares of scattered trees in paddocks, established through natural regeneration.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Funding to cover implementation costs and to provide incentives for farmers – A large-scale training and technology transfer program – Infrastructure to provide technical assistance for small farmers – Financial and technical resources for adaptive monitoring and research – Technical knowledge about tree species adapted to the needs of livestock systems (tolerant to drought and cattle browsing)
16. Main challenges faced	– High mortality of planted trees and shrubs during implementation phase associated with climatic uncertainty (three ENSO episodes during 8 years of implementation, with extreme and unpredictable weather, prolonged drought periods and atypical heat waves) – Geographic dispersion of participating farms – Imperfect land tenure
17. Key messages and lessons learned	– Farms should be concentrated in watersheds. The proximity and spatial aggregation of participating farms are critical for the efficient use of resources in a large-scale project such as this one. – Land use planning and training of farmers are required for the successful implementation and should have sufficient funding. – Technical assistants and extension workers must receive special training to develop a holistic vision of cattle ranching and the application of agroecological principles.

18. Source(s) describing the case	Giraldo C., Chará J., Uribe F., Gómez J.C., Gómez M., Calle Z., Valencia L.M., Modesto M., Murgueitio E. 2018. Ganadería Colombiana Sostenible: entre la productividad y la conservación de la biodiversidad. Pp 31-61 en: Halffter, G., M. Cruz y C. Huerta (Comps.). Ganadería sustentable en el Golfo de México. Instituto de Ecología, A.C., México, 432 pp. Federación Colombiana de Ganaderos - FEDEGAN. 2006. Plan Estratégico de la Ganaderia Colombiana 2019. Federación Nacional de Ganaderos de Colombia. Bogotá, Colombia. 296p. Federación Colombiana de Ganaderos - FEDEGAN. 2014. Disponible en: http://www.fedegan.org.co/estadisticas/produccion-0-2014. Federación Colombiana de Ganaderos. Bogotá, Colombia. Federación Colombiana de Ganaderos - FEDEGAN. 2018. Coyuntura ganadera 2018. Federación Colombiana de Ganaderos. Bogotá, Colombia. 14p.
19. Contributors	Zoraida Calle (Coordinator, Ecological Restoration Area, CIPAV and of the Colombian Programe of ELTI - Environmental Leadership & Training Initiative, Yale School of Forestry and Environmental Studies) and Enrique Murgueitio (CIPAV Executive Director)

20. Photos

Figure 1. The silvopastoral system as practiced in a farm in Cascajal, Piojó – Atlántico. (Photo by Carlos Alfaro)

Figure 2. The silvopastoral system as practiced in a farm in Palmarito - El Retorno, Guaviare. (Photo by Adolfo Galindo and Walter Galindo)

Restoration of mangrove ecosystems through community forestry in Myanmar	
1. Proponent	FREDA (Forest Resource Environment Development and Conservation Association) ACTMANG (Action for Mangrove Reforestation)
2. Country of implementation	Myanmar
3. Location	Pyindaye Reserved Forest (Pyapon Tsp, Ayeyarwady Region, Myanmar)
4. Implementation period	1999 – ongoing (Phase V: 2019 – 2024)
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ✓
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ☐ Intervention level ✓
7. Target/Main objective	Restoration of degraded mangrove forests and rehabilitation of abandoned paddy fields through mangrove reforestation with a community forestry approach.
8. Target group or users	Communities living within the Pyindaye Reserved Forest
9. Partners & collaborators	FD (Forest Department of Myanmar) FUGs (Forest User Groups) consisting of household heads, including villagers of all wealth classes, landless, young adults and women Tokio Marine (Tokio Marine & Nichido Fire Insurance Co. Ltd)
10. Context (initial situation) and challenge (problem) addressed	The mangroves in the Ayeyarwady Region experienced severe degradation and deforestation in the past decades. Due to the necessity of fuelwood and timber, the mangrove areas of the Ayeyarwady Delta had been particularly overexploited since the 1970s. Many degraded areas were later converted to rice fields and shrimp ponds so that by 2000 only 46% of the original 2623 km^2 of mangroves in 1978 were left. In the project area rice productivity strongly declined after about 10 years and as a result many fields were abandoned. Ultimately, the depletion of the previously mangrove-dominated landscape left local communities with limited livelihood options and highly vulnerability to tropical storms (Cyclone Nargis in 2008).
11. Process and methodological approach, techniques and tools used	The project made use of the Community Forestry Instruction (1995) to restore mangrove forests together with local FUGs. Through a collaborative approach between the FD, local communities, NGOs and researchers, the strategy was to find locally adapted solutions to restore degraded mangrove areas and to jointly develop community forestry management plans for the long-term success. The methodology included field trials and research, capacity-building and trainings.
12. Field-level practices implemented	– Nursery establishment at different sites for 12 mangrove species – Mangrove planting on abandoned paddy fields – Enrichment planting and regeneration improvement felling in degraded mangrove forests

	– Livelihood development for communities including revolving fund for aquaculture and crab farming – Eco-tourism trial – Capacity-building and environmental education for local communities
13. Innovative aspects	Additional activities to improve community livelihoods included crab farming in existing degraded mangrove areas and different types of aquaculture and agrosilvofishery on villagers' land.
14. Outcomes	– 2 639 ha of mangrove reforested (as of March 2019) – 4 279 households from 26 villages have forest user rights through the CFI (Phase I to IV) – Improved livelihoods of both FUG and non-FUG (non-timber forest products) – Increased awareness on the importance and sustainable use of mangroves in the wider project area – Reduced disaster risk for local communities
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Knowledge on characteristics of the specific ecosystem, local mangrove species, and climatic and hydrological conditions – Collaboration between the Forest Department, local communities and regional NGOs as mediators – Local communities' awareness of mangroves' benefits and willingness to contribute to their restoration
16. Main challenges faced	Previous: – Complete soil degradation made the successful planting difficult – Encroachment of shrimp pond agriculture and salt production areas – Cyclone Nargis destroyed 25 000 ha of mangrove plantations in 2008 Current: – Commercialization rights for FUGs – Limited funding (roughly USD 650 / ha needed)
17. Key messages and lessons learned	Community-based mangrove restoration has high potential but needs long-term planning.
18. Source(s) describing the case	FREDA, ACTMANG, 2012. Ten years in Pyindaye. Restoration of mangrove ecosystems and community development. Thin Publishing House, Yangon Springate-Baginski O, Than MM, Wah NH, Win NN, Myint KH, Tint K, Gyi MKK, 2011. Community forestry in Myanmar. Some field realities, 50 p. Webb EL, Jachowski NRA, Phelps J, Friess DA, Than MM, Ziegler AD, 2014. Deforestation in the Ayeyarwady Delta and the conservation implications of an internationally-engaged Myanmar. Global Environmental Change, 24, 321–333
19. Contributors	Mélanie Feurer (Bern University of Applied Sciences, Switzerland) and Koichi Tsuruda (ACTMANG, Japan)
20. Photos	

Figure 4 Mangrove nursery managed by staff members from the surrounding communities © Mélanie Feurer 2015

Figure 2 Community forestry user group members in front of a 11-year old Bruguiera sexangula plantation © Mélanie Feurer 2015

Empowering local communities for restoration of coastal landscape in Ayeyarwaddy, Myanmar	
1. Proponent	The Center for People and Forests (RECOFTC)
2. Country of implementation	Myanmar
3. Location	Pyar Pon Township of Ayeyarwaddy Region, located in low lying Ayeyarwady Delta in the southwestern part of Myanmar.
4. Implementation period	2015 – 2018
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ✓ Restoration or rehabilitation of mangroves ✓
6. Focus of the case	Process ✓ Planning ☐ Assessment / Monitoring ☐ Intervention level ☐
7. Target/Main objective	RECOFTC sought to empower local communities to restore, conserve and legally manage degraded coastal landscapes by partnering with relevant stakeholders. The aim was to secure fair benefits and ensure the sustainable livelihoods of local communities in Pyar Pon Township.
8. Target group or users	1,083 households/families from 22 community forestry user groups (CFUGs) participated.
9. Partners collaborators	RECOFTC and the Forest Resource Environment Development and Conservation Association (FREDA), with support by the Myanmar government's Forest Department (FD), implemented these interventions under the Norwegian Embassy in Yangon-funded "Scaling Up Community Forestry" (SUComFoR) project.
10. Context (initial situation) and challenge (problem) addressed	Local communities living along the coast in Pyar Pon Township were vulnerable to climate-induced, socio-economic shocks. The forests and rice paddies of the low lying Ayeyarwady Delta provided the sources for community livelihoods. But due to salt intrusions, 49% of the paddy fields were unproductive. This increased local pressures on the forest, which decreased at a rate of 1.9% per year between 1990 and 2015. The forests also faced threats from external illegal logging, unsustainable shrimp farming and salt production. These threats were evident in the severe reduction and fragmentation of surrounding mangrove forests. Mangrove forests were instrumental in protecting the settlements and agricultural lands from cyclones. Although their income relied on forests, local people were unable to play a meaningful role in restoring and conserving the landscape since the area was classified as reserved forest. Local communities lacked legal recognition of their rights and responsibilities. Instead, they were viewed as illicit collectors of firewood, crabs and other forest products.
11. Process and methodological approach, techniques and tools used	Community forestry (CF) places local communities at the heart of natural resource management. It was promoted in the Ayeyarwady Delta to support the legal recognition of local communities and assist them in restoring and conserving the landscape. It was done through the following process: Needs and interests were identified: A situational analysis was followed by a capacity development needs assessment. Participatory methods were used to jointly assess the

	availability of forest land for the program, the interests and needs of local communities to participate in the program and the gaps in the capacity of stakeholders. A climate vulnerability assessment was also conducted to identify the sources of vulnerability and how they could be addressed through the program. Trainings were designed and delivered: A landscape workshop was organised at the township level to discuss collaboration among stakeholders, including government, Civil Society Organizations (CSOs) and local communities. It was followed by general trainings at the national, township and local levels on developing community forestry management plans, enhancing livelihoods and markets, strengthening community forestry institutions and managing forest conflicts. The approach was cascading, where the participants would immediately apply the knowledge and skills in their localised context. Those trained at the national level—Forest Department officials and CSO staff—would then train stakeholders at the township level. Community Forest Management Committee members would then train their respective CFUG members. Support was provided for CF formalization and management: RECOFTC supported local communities to follow the 9-step formalization process outlined in the Community Forestry Instructions (1995, revised 2016 and 2019). This process coincided with additional trainings. Communication products, including posters, booklets and newsletters, were produced to increase awareness among stakeholders and increase their participation. Once communities had CF certificates, they were provided further training and financial resources for restoration practices. Each local community received between USD 5,000 and USD 8,000 to establish nurseries and plantations, including mangroves. Policy issues were addressed at the national level: The challenges of establishing community forests were documented and shared at the national level through policy forums and networks. RECOFTC helped establish a local network of CFUGs, which provided opportunities for local CFUGs to collaborate with one another to address the common issues facing the landscape. This network was connected to the national level through the Community Forestry National Working Group, a national multi-stakeholder platform that discusses issues related to community forestry.
12. Field-level practices implemented	With this support, participants from 22 CFUGs formed CFMCs, developed community forest management plans and agreed on internal regulations and benefit sharing mechanisms. They also worked to formalise their rights and secure their tenure, which mitigated conflict with private companies. When empowered with these rights, the communities effectively dealt with the problems facing their landscape and coordinated with the Forest Department to restore and conserve the area. CFUGs set up rules and regulations to control the harvesting of forest products. They have also planted 585,000 mangrove seedlings across 1500 ha in 2017, and 225,000 mangrove seedlings across 600 ha in 2018. These actions have reduced forest degradation and contributed to reforestation efforts within the CFs. To encourage people to protect the forests, CFUGs have focused on livelihood enhancement through agroforestry. Members grow forest and seasonal crops while culturing crabs in the mangrove forests. Fences have also been erected for protection. With these interventions, local communities have reported higher incomes from the mangrove seeds, fish, crabs and prawns.
13. Innovative aspects	By focusing on formalizing rights and enhancing livelihoods, this case provided local communities with the support and resources needed for them to protect and reforest their degraded landscape. By empowering people to make the decisions on forest management, this approach ensures ownership of action and financial viability. This is necessary to sustain participation following a project's completion.
14. Outcomes	Local communities now have greater control over the natural resources they use for their livelihoods, including 4,159 ha of forest.

	The CFUGs also have concrete plans to restore the forest through mangrove plantations. This will protect their agricultural land and increase the supply of forest products. In 2018, 90% of CFMC members who were interviewed reported better forest health and reduced degradation. This was 10% higher than in 2016. Of those interviewed, 60% also said the forest plays a larger role in their livelihoods. This is compared to 20% who reported this in 2016.
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	Landscape beneficiaries need to be the primary focus of restoration practices. Institutional frameworks are necessary to support local initiatives but are not sufficient by themselves. Projects must incorporate community needs and interests and provide capacity development when necessary. This often also requires supporting multiple stakeholders who face capacity issues when engaging with local communities. Communities working to reduce deforestation and implement reforestation policies need to have strong rights and secured tenure based on customary practices. This ensures effective participation from local stakeholders and guarantees fair benefits.
16. Main challenges faced	Local communities rightfully expect restoration practices to increase their livelihoods through forest products. But improvement in the condition of degraded forests is a slow process which does not allow for a rapid increase in the supply of forest products. Local communities may be forced to look for alternative livelihood options, which can potentially redirect interest in forest landscape restoration (FLR).
17. Key messages and lessons learned	The equitable participation of local people is a precondition for FLR to be successful. The formalization of rights and tenure, the enhancement of livelihoods and the development of key capacities are important when encouraging local communities to engage in restoration and address issues of forest degradation. If these are not secure, FLR will not be successful
18. Source(s) describing the case	Feurer, M. 2017. The role of mangrove community forests for climate change adaptation in the Ayeyarwady Delta, Myanmar. M.Sc. thesis School for Agricultural, Forestry and Food Sciences HAFL, Bern University of Applied Sciences BFH. RECOFTC, 2018. Scaling Up Community Forestry in Myanmar (SUComFor): Final report, submitted to the Royal Norwegian Embassy of Myanmar. Regional Community Forestry Training Center for Asia and the Pacific- RECOFTC.
19. Contributors	Aung Kyaw Naing, Lok Mani Sapkota, Jeffrey Williamson, Anna Roebuck and Martin Greijmans (RECOFTC)
20. Photos	

Figure 1. Participants examine agroforestry designs including crab culturing and the conservation of natural mangroves.
(Photo credit: RECOFTC)

Figure 2. A mangrove nursery in Pyar Pon Township.
(Photo credit: RECOFTC)

Restoration and community management of mangroves in the western part of Madagascar	
1. Proponent	World Wildlife Fund (WWF) Madagascar
2. Country of implementation	Madagascar
3. Location(s)	West coast of Madagascar
4. Implementation period	Since 2010
5. Restoration option	Restoration of degraded forests for production ☐ Restoration of degraded forests for protection ☐ (Ecological restoration of protective functions, e.g. soil, water, biodiversity) Rehabilitation of degraded forest land through planted forests ☐ Rehabilitation of degraded forest land through agroforestry and/or silvopastoral systems ☐ Management of secondary forests ☐ Restoration or rehabilitation of mangroves ✓
6. Focus of the case	Process ☐ Planning ☐ Assessment / Monitoring ☐ Intervention level ✓
7. Target/Main objective	Improving the resilience of the mangrove ecosystem to ensure the maintenance of its ecological functions and improving the well-being of the communities to alleviate pressures on this ecosystem due to the overexploitation of resources.
8. Target group or users	Members of the local basic communities (COBA), fishermen's cooperatives members, federations of the COBAs and civil societies members.
9. Partners & collaborators	Region, Districts, Municipalities Decentralized technical services, especially the Regional Directorate of Agriculture, Livestock and Fisheries (DRAEP) and the Regional Directorate for Environment and Sustainable Development (DREDD) Civil society members National and international NGOs and programs
10. Context (initial situation) and challenge (problem) addressed	Madagascar's mangroves are the second largest mangrove swamp in the Western Indian Ocean (WIO) region with relatively high mangrove diversity (8 species). The annual deforestation rate in Madagascar showed that mangrove ecosystems suffered less than other forest ecosystems. However, the irrational exploitation of resources and the massive arrival of migrants mostly from the south part of Madagascar to settle in the mangrove areas is a threat to this ecosystem. Migrants are in search of survival means, potential resources and markets, and their practice converting mangroves areas into cultivated land leads to a consequent loss of mangroves. The local governance of natural resources is still weak, and the impacts of climate change are real. For the Manambolo-Tsiribihina delta, between 1990 and 2000, it is estimated a loss of 38.9% of the total area of mangroves. To tackle this degradation, WWF identified priority sites for restoration and defined strategies to cope with threats and pressures on this ecosystem.
11. Process and methodological approach, techniques and tools used	Community-based approach. A participatory and inclusive approach integrating local communities along the restoration process. It empowers them as actors and beneficiaries in the process of improving their life quality.

	Multi-level and multi-stakeholder holistic approach: As the legislative framework alone does not preserve natural resources, collaboration with other actors (NGOs, associations, ...) for improving the living standards of community people is required. During its interventions, WWF and its partners demonstrated how the positive impacts of conservation can improve the quality of life of communities. This intervention is based on a community management transfer system, a tool set up to empower local communities in Madagascar. Through this management transfer system, WWF strengthens the communities on their capacities to manage these natural resources, providing technical and organizational support for community-based organizations. WWF also supports communities through the promotion of income-generating activities to diversify community sources of income and thereby reducing the pressure of over-exploitation of mangroves. The field team presence is essential in order to build a relationship, trust and to ensure real appropriation of activities.
12. Field-level practices implemented	– Support on implementation of the sustainable management plan – Sensitization and mobilization sessions for COBas members and the community, and promote their empowerment – Taking into account the social (community involvement, choice of IGA, development of collaboration) and cultural aspect of the region (e.g. community meal during the restoration campaign, festive driving campaign) when implementing all activities of restoration – Monitoring system implemented with communities´ members (Patrol led by "polisin'ala")
13. Innovative aspects	Proximity support provided through establishment of a direct fund for local partner associations to carry out their activities. This strengthens the technical and institutional skills of these structures, allowing them to carry out their mission according to their mandate.
14. Outcomes	– 1,600 households in the 12 local communities are empowered in the sustainable management of the 47,000 ha of mangroves – 560 ha of degraded mangrove areas planted – Keeping the ecological goods and services of the mangroves (e.g., recurrence of the mangrove crabs in the restored sites) which benefit the local communities and subsequently improve the food security and their incomes (beekeepers, community tourism ...) – Reduction of deforestation of mangroves is observed within areas managed by communities – Communities are aware of the link of mangrove restoration and the availability of halieutic resources (crabs, shrimps, ...)
15. Conditions (institutional, economic, social, cultural, environmental) for successful replication in a similar context	– Spatial, technical and scientific framework of the restoration process allowing all stakeholders to harmonize their approach – Presence of a structure / space of consultation for the various actors concerned – Building relationships and trust – Local communities are aware and convinced of the economic and social importance by preserving the mangrove ecosystem – Combined approaches with local culture (traditional dance…), village festival (football match, poems contest…) – Integrate the activities in a regional scale plan (e.g., fisheries management plan, regional development plan…)

16. Main challenges faced	– Difficult accessing and isolation of certain sites – Securing restoration area – Sufficient support at the level of local / regional policy makers – Integration of migrants (especially seasonal migrants) in the structures in place (COBAs)
17. Key messages and lessons learned	– Active restoration is a way of engaging communities and showing them that they are part of the solution for the preservation of the environment – Local communities are the core of the mangrove management mechanism – Considering various local dynamics (social, economic, cultural) in the implementation activities especially alternative income generation activities – Ensure the durability of the results/achievements/impacts by integrating them into a stable structure such as municipalities (e.g., integration of restoration activities, protection of the restored area into a municipal decision) – Always think about diversification of the sources of income – Periodic appraisal with the community members is important
18. Source(s) describing the case	Shapiro A., et al. 2019. The mangroves of Madagascar - cover, status and trends 2000-2018. WWF Germany and WWF Madagascar Jones T., L. Glass, S. Gandhi, L. Ravaoarinorotsihoarana, A. Carro, L. Benson, G. Cripps. 2016) Madagascar's Mangroves: Quantifying Nation-Wide and Ecosystem Specific Dynamics, and Detailed Contemporary Mapping of Distinct Ecosystems. Portland University. Projet Eco-Régional REDD+. 2015. Forêts Humides de Madagascar (PERR-FH), Consortium Wildlife Conservation Society (WCS), Office National pour l'Environnement (ONE), Madagascar National Parks (MNP), Association ETC TERRA Edmond R., H. Razakanirina , H. Rakotondrazafy, T. Ramahaleo. 2012. Vulnérabilité des mangroves de la cote oust de Madagascar au changement climatique : cas des écosystèmes des mangroves de Belo sur tsiribihina et de Masoarivo. DBEV et WWF MWIOPO
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Photos	

Figure 1. Women leading mangrove restoration in Benjavilo village, Manambolo delta, western Madagascar. (Photo by Tony Rakoto, WWF) MDCO

Figure 2. Women from Manombo Village, western Madagascar are spending a whole afternoon sorting out mangrove propagules before planting them. (Photo by Pauline Dame / WWF Madagascar)

LESSONS FROM THE CASE STUDIES FOR THE SUCCESSFUL IMPLEMENTATION OF FLR IN THE TROPICS

Addressing the FLR principles and guiding elements

Most of the case studies illustrate the application of three or more FLR principles, especially principles 2 (*stakeholder engagement and participatory governance*), and 3 (*multiple function restoration*). Efforts to address principle 1 (*landscape focus*) are least represented. Of the guiding elements, the most deployed among the case studies are *stakeholder engagement* (G6), *stakeholder capacity* (G10), *restoration for livelihood improvement* (G15), *restoration of degraded forests and rehabilitation of degraded forest lands* (G18), *income opportunities* (G25), *participatory planning, decision-making and monitoring* (G9) and *biodiversity conservation and restoration of ecological functions* (G14).

Key conditions and lessons

The case studies show a number of important conditions for successful replication. Some of the lessons learned are described below (as they apply to the principles and guiding elements).

Landscape/land-use planning [P1, GE1, GE3; and P2, GE9]

- Landscape approaches are designed to function at multiple scales, from influencing sustainable land-use decisions by individuals to reforming national and regional land-use planning policies and guidelines (case study 10, Brazil)
- Long-term land-use planning is required for the successful implementation of FLR. It needs to be done with good knowledge of the landscape and the identification of the key actors influencing land-use decision-making (case study 10, Brazil)
- Planning should link and integrate activities at larger jurisdictional scales (case study 17, Madagascar), and sufficient funding should be allocated (case study 14, Colombia)

Land tenure and rights [P1, GE4; and P2, GE5, GE6, GE12]

- Community forestry is an important land-tenure mechanism through which local communities can gain formal rights to access, manage and restore forests, which, in turn, they can use to improve their livelihoods (case study 7, Cambodia)
- To ensure the effective participation of local stakeholders and guarantee fair benefits, communities need to have strong rights and secured tenure based on customary practices (case study 16, Myanmar)

Stakeholder engagement and commitment—addressing community needs and interests [P2, G6]

- Stakeholder engagement, especially among local communities, plays a big role in the success of forest restoration projects (case study 6, Ethiopia). It helps in laying the groundwork for effective partnerships among government, community forestry groups, and the private sector (case study 7, Cambodia)
- FLR should focus on shared services and goods with widespread appeal in the community (case study 3, Ecuador)
- Active restoration is a way of engaging communities and showing them they are part of the solution for environmental conservation (case study 16, Madagascar)
- The engagement of local stakeholders and the provision of incentives for local communities are key factors in convincing concerned parties that assisted natural regeneration (ANR) can be used to restore forests for the protection of watersheds as a shared objective (case study 4, Philippines)
- Enabling local communities to participate in forest activities and use forest products produced in planted areas helps them believe and develop a sense of ownership towards surrounding forests. This improves not only forest production but also forest conservation (case study 6, Ethiopia)

Awareness and recognition of benefits [P2, G6, G12]

- Strong awareness among local people and communities of the direct and indirect (economic and social) benefits of FLR is essential for obtaining their commitment and support for FLR (case study 4, Philippines; case study 16, Madagascar)
- No matter how much technical and financial support is provided, and no matter how many village meetings are run, the sustainability of FLR can never be guaranteed if the benefits of restoration are not immediately evident and while rural populations continue to grow and aspirations rise (case study 5, Thailand)
- Perceptions of an environmental crisis due to forest loss can strongly influence people's motivation to plant trees, on farms or off (case study 3, Ecuador)

Institutional coordination and supporting arrangements [P2, G5]

- Institutional conditions that need to be in place to support FLR include the coordination of policies and government programmes to integrate human, technical and financial resources (case study 13, Guatemala)
- Institutional frameworks are necessary to support local initiatives at the landscape scale (case study 16, Myanmar)
- The durability of FLR interventions can be enhanced by integrating them into stable structures such as municipalities (e.g. by integrating restoration activities and the protection of the restored areas into municipal decisions) (case study 17, Madagascar)

Collaboration and cooperation [P2, G6, G9, G10]

- Collaboration and cooperation among stakeholders contribute to the success of FLR (case study 4, Philippines; case study 15, Myanmar). Among other things, this requires building relationships and trust (case study 17, Madagascar), and the clear distribution of roles (case study 2 – Ghana)

Participation and participatory approaches [P2, G6, G9]

- The equitable participation of local people is a precondition for successful FLR (case study 16, Myanmar)
- Participatory approaches have proven to be effective in capacity building where training is linked to the implementation of community forestry activities (case study 7, Cambodia)
- Participatory approaches conducive to the success of FLR involve the active, balanced cooperation of national, provincial and municipal agencies with non-governmental organizations and research organizations, according to the objectives of local landowners and implementing factual corporate social responsibility (case study 3, Ecuador)

Leadership [P2, G9, G10]

- Projects should engage locally trusted, respected and visionary leaders (case study 3, Ecuador)
- The success of multistakeholder platform will be enhanced when key groups of actors in the landscape champion the identified priority actions and by the ongoing flow of information beyond platform meetings (case study 10, Brazil)

Dialogue process [P2, G6, G9, G7, G12]

- Dialogue processes are important for building long-term partnerships (case study 9, Brazil). For a dialogue platform to be truly inclusive, it must not only make space so that different stakeholders can participate but enable actors to present and negotiate their priorities (case study 9, Brazil)
- A central tenet of a landscape approach is that the end goal is not pre-defined but determined by the stakeholders through a process of visioning and balancing trade-offs, and this requires clear dialogue structure and objectives (case study 10, Brazil)

Capacity development [P2, G10, G5, G9]

- The development of key capacities is important for encouraging local communities to engage in restoration and address forest degradation (case study 15, Myanmar)

Investments and business plans [P2, G12; P5, G24]

Although public investments can create the conditions for natural assets to be managed for the delivery of a range of societal benefits, private finance and business models at different levels are critical components of FLR (case study 13, Guatemala)

Use of local knowledge [P3, G16]

Within communal arrangements, it can be beneficial to allow people the space and flexibility to learn from each other, share knowledge, and experiment with different species and methods (case study 3, Ecuador)

Important success factors include the use of local knowledge about soils, species interactions and the appropriateness of species selection, and institutional alliances to improve silvicultural technology (case study 11, Peru)

A condition for success is combining approaches with aspects of local culture (e.g. traditional dance, village festivals, football matches and poem contests) (case study 17, Madagascar)

Livelihood provision, alternative income generation activities and diversification [P5, G23, G24, G25, G26]

FLR should be implemented using a sustainable economic/livelihood provision model (case study 2, Ghana)

Opportunity costs for not converting degraded forest areas into agricultural lands need to be accounted for, for example through payments for environmental services, carbon credits, or alternative livelihoods (case study 2, Ghana)

Always think about diversification of the sources of income (case study 17, Madagascar)

Applied research [P5, G22, G23; P6, G28, G29, G31]

The enabling conditions for FLR need more research (case study 6 – Ethiopia)

The spatial, technical and scientific framework of the restoration process should allow all stakeholders to harmonize their approaches (case study 17, Madagascar)

Technical knowledge [P5, G23; P6, G31]

The major obstacle to using native species for large-scale restoration is the lack of adequate knowledge about their biological characteristics and silvicultural traits. Information about appropriate seed storage, propagation methods and silvicultural treatment options has to be adequately retrieved, compiled and applied, and the knowledge communicated (case study 3, Ecuador)

A condition for successful restoration is knowledge of characteristics of the specific ecosystem, local species, and climatic and hydrological conditions (case study 15, Myanmar)

Monitoring and documentation [P6, G30, G31, G32]

The careful monitoring and documentation of results can help verify the most cost-effective approaches to FLR and help convince observers of its feasibility (case study 4, Philippines)

Establishing an effective monitoring and evaluation system is a key for the successful implementation of FLR (case study 2, Ghana; case study 11, Peru)

Communication—targeted and consistent information campaigns [P6, G31, G32]

Replicating ANR as an important FLR approach requires targeted and consistent information campaigns to generate interest in the approach based on its cost-effectiveness and capacity to develop biologically diverse forest cover, and to increase understanding that forest restoration cannot be achieved solely by planting (case study 4, Philippines)

An effective information-sharing mechanism is essential so that all participants know who is doing what in the landscape (case study 10, Brazil)

5 The way forward

The first priority in the conservation and use of tropical forest landscapes should be sustainable management, because this will prevent degradation and thus render restoration unnecessary. If policies are sound and sustainability the goal of all stakeholders, the prospects for maintaining and enhancing functional forest landscapes are good. Wider issues such as population pressure, globalization and especially climate change, however, are putting increasing pressure on resources, and land degradation has become widespread. Thus, FLR is needed as a way of restoring the functionality of degraded landscapes, enabling local people to obtain decent livelihoods and improving environmental outcomes.

Restoring forest landscapes and sustainably managing and protecting existing forests are a cost-effective strategy for reaching the goals of the Paris Agreement on climate change. The SDGs and several other globally agreed policy instruments include FLR as a tool for achieving the aspirations such instruments embody.

The ambition of this set of guidelines is to support the goals and aspirations of stakeholders in the implementation of FLR and to inform decision-makers and practitioners in the development of successful FLR processes, programmes and projects. A number of immediate actions can be taken to encourage the use of these guidelines at the national and local levels, including the following:

- Test and apply the guidelines as a reference and guiding document in the development of FLR processes at national and subnational levels.
- Use the guidelines as a vehicle for increasing capacity in tropical countries to undertake FLR, in combination with other specific guidelines, tools and approaches.
- Identify landscapes where FLR is necessary, feasible and a local priority and make long-term commitments to the implementation of FLR, including putting in place mechanisms for learning and exchanging information between such landscapes and sites within them.
- Promote the guidelines among international organizations and interested stakeholders as an important contribution to the existing community of practice, and support strategies for influencing the development of FLR-conducive strategies at the national and subnational levels.
- Use the guidelines to advocate FLR in broader international conventions and processes.
- Monitor the impacts of these guidelines on changing practices in forest and landscape use throughout the tropics.

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GLOSSARY

Adaptive management	Process by which people adjust their management strategies to better cope with change, while also maintaining the integrity of their forest management objectives (Wollenberg et al. 1999)
Afforestation	The establishment of a planted forest on non-forested land
Agroforest	A complex of trees within an area broadly characterized as agricultural or as an agroecosystem
Alien species	A species, or subspecies introduced outside its normal past and present distribution
Carbon offset	The result of any action undertaken specifically to prevent the release of carbon dioxide into the atmosphere and/or to remove it from the atmosphere
Biological diversity/biodiversity	The variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems [From the articles of the 1992 Convention on Biological Diversity]
Degraded (natural) forest	Forest that delivers a reduced supply of goods and services from a given site and maintains only limited biodiversity. It has lost the structure, function, species composition and/or productivity normally associated with the natural forest type expected at that site
Degraded forest landscape	Forest conditions other than those found in primary or managed natural and planted forests. “Landscape” is defined in this context as a cluster of interacting ecosystem types of forest and other woodland vegetation
Degraded forest land	Former forest land severely damaged by the excessive harvesting of wood or non-wood forest products, poor management, repeated fire, grazing or other disturbances or land uses that damage soil and vegetation to a degree that inhibits or severely delays the re-establishment of forest after abandonment
Elastic capacity of a forest ecosystem	Dynamic forest processes within a range of changing vertical forest structure, species composition, biodiversity and productivity normally associated with the natural forest type expected at that site
Environmental services	All benefits that people obtain from natural or semi-natural ecosystems, including provisioning, regulating, cultural and supporting services
Endemic species	A species native to, and restricted to, a particular geographical region
Enrichment planting	The planting of desired tree species in a modified natural forest or secondary forest or woodland with the objective of creating a forest dominated by desirable (i.e. local and/or high-value) species
Forest degradation	The reduction of the capacity of a forest to produce goods and services (in which “capacity” includes the maintenance of ecosystem structure and functions)
Forest fallow	The intermediate time between two periods of shifting agriculture. In a functional shifting agricultural system, the fallow period is long enough that a functional secondary forest stand can develop (e.g.>20 years)
Jurisdictional area	An area in a country under the control of a subnational government entity which is different from that in neighbouring areas
Native species	A species that occurs naturally in a region
Land-use planning	The systematic assessment of land potential and alternatives for

	optimal land uses and improved economic and social conditions through participatory processes that are multisectoral, multistakeholder and scale-dependent. The purpose of land-use planning is to support decision-makers and land users in selecting and putting into practice those land uses that will best meet the needs of people while safeguarding natural resources and environmental services for current and future generations (FAO 2017)
Natural regeneration	Renewal of trees by self-sown seeds or natural vegetative means (Ford-Robinson, cited in Wadsworth 1997)
Non-wood forest products	All forest products except timber and wood, including products from trees, plants and animals in the forest area
Nutrient cycle	A natural process in which nutrients, mainly minerals, are taken up from the soil, used for plant growth and, once the plant dies, returned to the soil through decomposition processes
Old-growth forest	A primary or secondary forest which has achieved an age at which structures and species normally associated with old primary forests of that type have sufficiently accumulated to act as a forest ecosystem distinct from any younger age class (UNEP/CBD/SBSTTA 2001)
Permanent forest estate	Land, whether public or private, secured by law and kept under permanent forest cover. This includes land for the production of timber and other forest products, for the protection of soil and water, and for the conservation of biological diversity, as well as land intended to fulfil a combination of these functions
Pioneer species	Heavily light-demanding and short-lived species that can rapidly invade large canopy gaps in disturbed natural forests and colonize open land
Planted forest	A forest stand that has been established by planting or seeding
Primary forest	Forest which has never been subject to human disturbance, or has been so little affected by hunting, gathering and tree-cutting that its natural structure, functions and dynamics have not undergone any changes that exceed the elastic capacity of the ecosystem
Reforestation	The re-establishment of trees and understorey plants at a site immediately after the removal of natural forest cover
Resilience	The capacity of an ecosystem to recover from perturbations (biotic and abiotic)
Secondary forest	Woody vegetation regrowing on land that was largely cleared of its original forest cover (e.g. carried less than 10% of the original forest cover). Secondary forests commonly develop naturally on land abandoned after shifting cultivation, settled agriculture, pasture, or failed tree plantations
Silviculture	The art and science of producing and tending forests by manipulating their establishment, species composition, structure and dynamics to fulfil given management objectives
Stakeholders	Any individuals or groups directly or indirectly affected by, or interested in, a given resource (in this case forest)
Shifting agriculture	Used here as a synonym for shifting or swidden cultivation. The burning and cleaning of forest vegetation and subsequent planting of agricultural crops for short periods (e.g. 1–5 years) followed by abandonment
Succession	Progressive change in species composition and forest structure caused by natural processes over time
Sustainable forest management	The process of managing forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undesirable effects on the physical and social environments

Sustained yield	The production of forest products in perpetuity, ensuring that the harvesting rate does not exceed the rate of replacement (natural or artificial) in a given area over the long term
Tenure	Agreement(s) held by individuals or groups, recognized by legal statutes and/or customary practice, regarding the rights and duties of ownership, holding, access and/or usage of a particular land unit or the associated resources (such as individual trees, plant species, water or minerals) therein
User rights	The rights to the use of forest resources as defined by local custom or agreements or prescribed by other entities holding access rights. These rights may restrict the use of particular resources to specific harvesting levels or specific extraction techniques
Woodlot	Small forest stands up to several hectares in size that allow some productive and protective management

ANNEXES

ANNEX 1: EXISTING GUIDELINES AND TOOLS FOR TROPICAL FOREST LANDSCAPE RESTORATION

(1) GUIDELINES AND TOOLS PREPARED BY CPF MEMBERS and ORGANIZATIONS ASSOCIATED TO THEM	
International Tropical Timber Organization (ITTO)	**ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests (2002)** Scope: Tropical Forest, Forest level, policy level *First guidelines developed for pantropical use with a focus on restoration of degraded natural "primary" tropical forests and the particular role of managing secondary forest successions and rehabilitating degraded forest land that can be potentially restored. Designed as a (i) knowledge base for forest restoration of degraded forests' management, (ii) planning tool at the local and landscape level, (iii) basis for stimulating best management practice, (iv) contribution to a policy framework for forest restoration and secondary forest management*
	Restoring forest landscapes - An introduction to the art and science of forest landscape restoration **(in collaboration with IUCN, 2005)** Scope: Tropical Forest, landscape level, policy level as well as implementation and monitoring *Technical report divided in a "guideline" and a "tool" part. The guideline part representing the latest thinking on the emerging concept of forest landscape restoration at the time. It widened the field from forest restoration to forest landscape restoration and from policy to practice.*
International Union for Conservation of Nature (IUCN)	**Guidelines for Forest Restoration in Ghana (2006)** Scope: national (Ghana), forest level, policy level *Guidelines stating 10 principles and the respective strategies and actions to take for FLR in Ghana*
	Principles and Practice of FLR (2011) Scope: regional (drylands, Tropical Americas https://portals.iucn.org/library/sites/library/files/documents/2011-017.pdf)
	Rehabilitation and Restoration of Degraded Forests (2003) Scope: Global, forest and landscape level, policy and implementation *Guideline defining deforestation and FLR, laying out the necessity of FRL and explaining the main concepts of FLR in its first chapters. The following chapters do explain the options for FLR measures on site level and do introduce the concept of landscape level FLR. A collection of case studies does complete these guidelines*
	Restoration Opportunities Assessment Methodology (ROAM, in cooperation with the WRI, 2014) Scope: Global, process framework at national level, policy level *Step-by-step analytical framework that enables countries to identify suitable restoration techniques and priority areas for restoration. When applying ROAM user are guided through*

	a three-step assessment form (i) Preparation and planning, over (ii) data collection and analysis to (iii) Results to recommendations: Testing the validity and relevance of the assessment results. A ROAM application can deliver six main results: (i) identifying priority areas for restoration; (ii) prioritizing relevant and feasible restoration intervention types; (iii) quantifying costs and benefit; (iv) analyzing the finance and investment options-, (v) estimate the values of additional carbon sequestered; (vi) come up with a diagnostic of 'restoration readiness' and strategies for addressing major policy and institutional bottlenecks. ROAM also includes a guidance to assess how existing tenure rights in areas targeted for restoration are likely to influence FLR implementation.
	Restoration Ecosystem Service Tool Selector (RESTS,2016) Scope: Global, process framework at national level, policy level *Decision framework for identifying models to estimate forest environmental services gains from restoration aiming to help specialist in finding and understanding the right ecosystem service assessment tool for their purpose, covering 13 assessments tools (ARIES, Co$ting Nature, EcoMetrix, EnSym, Envision, ESR for AI, EVT, InVEST, LUCI, MIMES; NAIS, SoIVES, TESSA*).
	Forest Restoration Prioritization Tool (ROOT, in cooperation with NatCap amd University of Minnesota, 2016) Scope: Global, process framework at national level, policy level *Open access environmental services software tool assisting with FLR planning and optimizing the location of forest restoration activities and to support increased ecosystem service benefits. The information is provided through (i) maps representing how alternative restoration strategies would affect the provision of multiple environmental services, (ii) trade-off curves depicting the relationship between two alternative restoration objectives and (iii) restoration portfolios identifying optimal restoration strategies.*
International Union of Forest Research Organizations (IUFRO)	**Implementing Forest Landscape Restoration - A Practitioner's Guide (2017)** Scope: Global, landscape level, policy and implementation level *The 2017 IUFRO tool is developed as a modular package that focuses on a set of well delimited chapters including (i) Governance and Forest Landscape Restoration; (ii) Designing a Forest Landscape Restoration Projects; (iii) Technical Aspects of Forest Landscape Restoration Project Implementation; (iv) Monitoring Forest Landscape Restoration Projects; (v) Climate Change Mitigation and Adaptation in Forest Landscape Restoration; and (vi) Communicating Forest Landscape Restoration Results. The particular chapters of the guidelines are structured in explanatory sections and further readings as well as sections with advice for practical application sections also containing important key questions, checklists and other tools for the realization of FLR.*
	Spotlight Tool (2015) Scope: global, landscape level, policy level *Tool presenting complex restoration initiatives in a simplified way with the aim to provide a quick rating of where a given FLR project stands relative to different criteria. The tool leads to better communication of technical issues among specialists and also among specialists and decision makers and stakeholders. The tool aims to combine restoration and climate change mitigation and adaptation aspects and to contribute to restoration at large scales.*
Food and Agriculture	**Forest Restoration Monitoring Tool (2012)** Scope: Global, Forest and partly Landscape level, planning, implementation, monitoring

Organization of the United Nations (FAO)	*Checklist that guides users through the (i) assessment of the initial situation of a FLR site, (ii) the assessment of the field implementation and (iii) monitoring and result checking. The tool is very easy to understand and provides comprehensive tools for quick assessments of FLR actions before, during and after FLR activities*
	Global guidelines for the restoration of degraded forests and landscapes in drylands (2015) Scope: Ecological area (drylands), landscape level, policy, implementation and monitoring level Reference book with detailed step-by-step instruction for different levels of FLR, from policy making to planting trees, predominantly focusing on drylands and not on forests directly. The guidelines than consist of three main chapter on (i) Guidelines for policy makers, (ii) Guidelines for practitioners, (iii) FLR monitoring and evaluation. The publication contains an extended collection of case studies.
Center for International Forestry Research (CIFOR)	**Decision support tools for forest landscape restoration: Current status and future outlook (2018)** Scope: Global, landscape level, planning and monitoring *A report serving as a tool for reviewing existing knowledge and experience on support tools for FLR, including (i) Tools for preparation and assessment; (ii) Tools to evaluate potential restoration outcomes; and (iii) Tools for prioritization, spatial planning and species selection. The report identifies a gap in tools for the implementation of landscape-scale restoration initiatives and for guiding monitoring and adaptive management. The review also reveals that available tools primarily focus on assessing restoration opportunities at a broader scale, rather than within landscapes where implementation occurs*
World Resources Institute (WRI)	**The Atlas of Forest and Landscape Restoration Opportunities (in collaboration with IUCN and the University of Maryland, 2009)** Scope: Global, landscape level, policy level *Information management tool in the form of an interactive atlas, aiming to help identifying opportunities for restoration. First published in 2009 and reviewed and expanded over time to cover today all main forest biomes. Contains interactive information on the following six main topics: (i) Bonn Challenge Pledges; (ii) Restoration Opportunities; (iii) Forest Condition; (iv) Current Forest Coverage; (v) Potential Forest Cover; (vi) Human Pressure*
	The Restoration Diagnostic (2015) Scope: Global, landscape level, monitoring *Method for developing FLR strategies by rapidly assessing the status of key success factors. Developed to help implementing findings of a ROAM process. It features comprehensive definitions on FLR, describes its benefits and lists important key success factors. A part on diagnostics delivers comprehensive checklists to identify existing and missing key success factors for forest landscape restoration within a country or landscape by (i) selecting the "scope" within which to apply the diagnostic, (ii) evaluating whether or not key success factors for FRL are in place and (iii) Identifying strategies to address missing factors. The tool also contains case studies in South America and Africa that were conducted using the Restoration Diagnostics and provides examples on using the methodology*
	Scaling up Regreening: Six Steps to Success (2016) *Scope: Global, Landscape level, policy level*

	Guideline laying out and describing six important main steps for successful FLR implementation: (i) Identify and Analyze Existing Regreening Successes; (ii) Build a Grassroots Movement for Regreening; (iii) Address Policy and Legal Issues and Improve Enabling Conditions for Regreening; (iv) Develop and Implement a Communication Strategy; (v) Develop or Strengthen Agroforestry Value Chains and Capitalize on the Role of the Market in Scaling Up Regreening; (vi) Expand Research Activities to Fill Gaps in Knowledge About Regreening. "Scaling up Regreening" is a mix between a guideline and a tool as it involves guiding principles that are then accompanied by suggestions for implementation on the ground.

(2) INITIATIVES RELEVANT TO FLR	
The Bonn Challenge (multi-agency approach), global policy approach	**FLR Approach of the Bonn Challenge** Scope: global, landscape level, policy level. *The FLG approach of The Bonn Challenges includes forests landscapes: The approach comprises eight guiding principles: (i) Focus on landscapes; (ii) Restore functionality; (iii) Allow for multiple benefits; (iv) Leverage suite of strategies; (v) Involve stakeholders; (vi) Tailor to local conditions; (vii) Avoid further reduction of natural forest cover; (viii) Adaptively manage*
New York Declaration on Forests (NYDF)	**FLR Approach in the NYDF** Scope: global *The New York Declaration on Forests from 2014 includes a total of ten goals among which one goal is to (v) restore 150 million ha of degraded land by 200 and an additional 200 million ha by 2030. Further goals aim at enabling conditions such as the establishment of a strong international framework (vi, vii), better financing (viii, ix), and improved forest governance and secure forest and land tenure for local communities and indigenous peoples (x). The NYDF is supported by an action agenda and an assessment framework for monitoring.*
Global Partnership on Forest and Landscape Restoration (GPFLR)	**GPFLR Case studies** Scope: Global, Landscape level, case studies *Comprehensive collection of case studies on Forest and Landscape restoration providing an evidence base for FLR outcomes by (i) Illustrating the many variations of FLR interventions, pathways, and governance arrangements, (ii) guiding future interventions for scaling out and scaling up, (iii) establishing key linkages between local context, specific interventions and socio-environmental outcomes, (iv) serving as a foundation for a global FLR practitioner network*
African Forest Landscape Restoration Initiative (AFR100)	**Voluntary Guidelines for Forest Landscape Restoration under AFR100 (2017)** Scope: Regional (Africa), landscape level, policy level *Voluntary guidelines covering a so called FLR Options Framework and the following 8 FLR principles: (i) Restoring multiple ecosystems functions; (ii) Integrated management of landscapes; (iii) Restoration strategies supporting multiple interventions; (iv) Participatory decision making; (v) Protection of natural ecosystems to enhance resilience; (vi) Monitoring, learning and adapting; (vii) Policy coherence around national commitments and land use (viii) Nationally owned and driven*

	Guiding Principles for Measuring and Monitoring Progress on Forest and Landscape Restoration in Africa Scope: Regional: (Africa), landscape level, policy level and monitoring *Set of principles for monitoring activities focusing on the (i) definition of the scale of the FLR effort; (ii) selection on indicators based on AFR100 framework and on specific goals; (iii) selections of the resources with focuses on using cross-sectoral approaches and already existing monitoring networks. Guideline with emphasis on the inclusion of (i) socioeconomic, (ii) political, (iii) financial and (iv) biophysical aspects*
(3) OTHER COLLABORATIVE INITIATIVES ON FLR GUIDELINES AND TOOLS	
Darwin Initiative and the Royal Botanic Gardens	**Restoring Tropical Forests – a practical guide (2013)** Scope: Biome (tropics), forest level, implementation and application *Comprehensive practitioners guide with detailed descriptions of activities to be conducted in the field. Subdivided in the following the three parts (i) understanding and planning of FLR, (ii) Implementation in the field from nursing and planting over maintaining and (iii) setting up forest restoration research units for monitoring. Only tool in the current FLR context that provides an in-depth description of FLR measures beyond the assessment, planning and monitoring.*
Society for Ecological Restoration (SER)	**International Standard for the Practice of Ecological Restoration (2016)** Scope: Global, including terrestrial, freshwater, coastal and marine ecosystems *The standards include 6 key concepts: (i) based on an appropriate local reference ecosystem; (ii) pre-identification of the target ecosystem's key attributes; (iii) preference of natural recovery processes; (iv) highest and best effort progression towards full recovery; (v) drawing on all relevant knowledge; (vi) stakeholder engagement. A specific procedure is suggested for the development of targets and evaluation of six key ecosystem attributes including: absence of threats, physical conditions, species composition, structural diversity, ecosystem functionality, and external exchanges. Specific standard practices are given from the planning and design stage to the post-implementation maintenance.*
Forestoration Partners LLC	**Forest and Landscape Restoration Case Study Bank and Atlas: A Global Resource for Research, Policy and Practice (2019)** Scope: Global, landscape level, case study Planed but not yet implemented database data base for FLR case studies.

ANNEX 2: SUMMARY OF GUIDANCE FOR FINANCING FLR AND ECONOMIC EFFICIENCY

Forest restoration is a major effort that requires substantial resources to develop a vision and to subsequently conceptualize and implement it before arriving at a sustainability phase. The ambition is that, over time, the restored forest and mosaic landscapes will become sustainable from an ecological, social and financial perspective. The first three phases – visioning, conceptualization and implementation – typically require targeted funding. Examples of funding sources include national budget funding and international funding, including multilateral finance such as through the GCF, the GEF and multilateral development banks and also bilateral finance from donor countries and international foundations. Opportunities for private investment or blended finance (with shares of public and private finance) are expected to increase as FLR projects transition towards the sustainability phase.

Although forest degradation can take place over a short period, restoring forests and non-forest lands entails continuous effort over long timespans. There are two distinct development pathways for degraded forests: 1) towards a more intensively used, mosaic landscape that includes a variety of land-uses, from agroforestry to industrially managed forests; and 2) towards restored natural forest, including secondary forests, where the provision of multiple environmental services and biodiversity conservation are primary objectives, at least in the early stages of restoration.

Over time, industrially managed forest restoration in functional landscapes may, through economic diversification, avoided damages and new marketable products, create a net positive financial impact (private benefits) as well as net positive economic impacts (public benefits) relative to the status quo land use.

The economics of restored natural forest are not equally attractive for private investors. Significant financial resources are rarely available for the transformation of degraded forest to natural forest. In only a few cases, value chains for timber and NTFPs exist that generate marketable products early on. The core question is how to incentivize local land users and attract external investors to engage in a restoration pathway in which sustainable natural forest management will be the ultimate land use. Such efforts will only be long-standing if they provide social and ecological benefits and above that are economically attractive and financially viable, to the extent that they can provide sufficient incentives to outcompete alternative land uses.

Strategic landscape planning is recommended for both development pathways. Stakeholders need to be identified, and the expected monetary and non-monetary costs and benefits ensuing from the land over time need to be assessed. This will help anticipate the trade-offs likely to occur among competing interests in the course of landscape transformation. Moreover, modalities for achieving an equitable distribution of costs and benefits among the stakeholders need to be agreed in order to achieve lasting FLR. Strategic landscape planning processes require significant data, including on environmental and social outcomes and the financial benefits of forest goods and environmental services.

FLR processes also require conducive policies and financing models to ensure that it is economically competitive, in addition to equitably sharing benefits. This is particularly true when the objective is to restore natural forests rather than to create industrial forests in mosaic landscapes. An option could be to require investors pursuing an industrial forest pathway to earmark a certain percentage of the land under their jurisdiction for natural forest development. Alternatively, fiscal returns from industrially managed forests could be earmarked for investments in the restoration of natural forests.

REDD+ offers a possible funding stream that serves the purposes of FLR and helps mitigate climate change. Although there are many synergies between the two approaches, it is also important to recognize that they have different goals. REDD+ focuses on reducing carbon emissions and enhancing carbon sinks, and other benefits, such as enhancing ecological integrity and social wellbeing, are ancillary. FLR aims to improve ecological integrity and social well-being, including by enhancing carbon stocks and creating ancillary benefits. Nevertheless, aligning FLR processes and REDD+ strategies can create positive incentives and make these available for FLR interventions in the form of jurisdiction-level programmes and projects.

Guidance and recommended actions

Guidance on financing FLR

Sufficient resources must be committed to initiate FLR processes and implement FLR interventions

FLR needs considerable initial resources but returns may often only be realized in the mid to long term. Restoration and rehabilitation efforts incur what has been called a "time tax", which is the time that society must spend waiting for a resource to regrow, during which the resource cannot be used and must be nursed. This implies costs without immediate returns on investment.

While small projects can be clustered to create synergies and increase efficiency, additional funding sources need to be unlocked by highlighting the importance of FLR to sectors beyond forestry.

Successful restoration projects need to address long-term funding, through multiple strategies tailored to the different phases of the restoration process. The portfolio can be broadened to include environmental services or to tap the potential of mechanisms such as biodiversity offsets[16] and climate funding, including carbon markets with results-based payments.

Recommended actions:

(1-1) **Develop a FLR financing strategy according to the FLR phases**. Consider multilateral finance for the initial readiness phases, blended public-private finance for intermediate stages and domestic and/or international private finance or blended public-private finance for the final sustainability phase.

(1-2) **Formulate FLR interventions, following the procedures of the main international agencies that provide financial incentives for FLR**, such as the Green Climate Fund (GCF), the Global Environmental Facility (GEF), the World Bank Climate Funds, the UNFCCC Adaptation Fund and others

(1-3) **Analyse the potential and develop schemes that allow payments for environmental services** (PES) at landscape level, including carbon, water, biodiversity and tourism

(1-4) **Develop REDD+ strategy at landscape/jurisdictional level** for results-based payments and evaluate its risks, costs and benefits and their implications for other land-use options

(1-5) **Encourage private-sector investments** (national and international), e.g. by providing guarantee funds.

(1-6) **Establish measures to ensure compliance** with agreed management and restoration procedures and performance standards for the private sector.

(1-7) **Tap on the new and additional sources of funding FLR**, as promoted by the Bonn Challenge, the SDGs, the UNFCCC, CBD, UNCCD, the New York Declaration on Forests among others

(1-8) **Create awareness amongst different stakeholders** within countries on the opportunities of financing and capacity building to develop sound proposals.

References and examples of good practices:

Sustainable financing for forest and landscape restoration (FAO-UNCCD 2015)
Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions (Verdone 2015)
Towards effective national forest funds (FAO 2015a)
Generic guide and modular training package to assist countries in developing national forest financing strategies
Integrating diverse social and ecological motivations to achieve landscape restoration (Jellinek et al. 2018)
The economics of ecosystems and biodiversity (TEEB 2009)
Payments for Environmental Services in Latin America as a Tool for Restoration and Rural Development (Montagnini and Finney 2011)

[16] Biodiversity offsets are measurable outcomes for biodiversity conservation that are meant to compensate in full for biodiversity impacts or losses associated with economic development (Jellinek et al. 2018).

Guidance on economic viability of FLR investments

Economic and financial viability is essential for succeeding with FLR goals and objectives

FLR processes, programmes and projects can only be sustainable if they are economically and financially viable. If initial financial inputs through e.g. projects to FLR are high and the return is unsure and often in the distant future, investment will be difficult to justify.

Thus, it is important not only to focus on the financing of forest restoration, but about understanding the economics of the restoration process itself and the economic viability of investments, e.g. towards SFM. There is a need to create better tools and better data on costs and outcomes.

Recommended Actions:

(2-1) **Prepare cost/benefit analyses** of the planned FLR programmes and projects including non-monetary benefits and their values

(2-2) **Develop business cases for forest restoration investments** and communicate them to interested private sector stakeholders

(2-3) **Explore opportunities for market-based incentives** such as results-based carbon payments and transfer payment mechanisms for environmental services.

(2-4) **Determine how to gain added value for the goods and services provided through restoration activities**. These may include: developing adequate sources of income for the rural poor; eco-tourism; reducing wastage; improving the quality of products being marketed.

(2-5**) Conduct, at programme and project level economic analysis of pilot FLR initiatives** that can guide policy formulation more effectively in the use of incentives

References and examples of good practices:

FAO – CBD project: Cost/Benefit analysis for FLR investments
A Cost-Benefit Framework for Analyzing Forest Landscape Restoration Decisions (Verdone 2015)
Value for Money: Guatemala's Forest Landscape Restoration (Colomer et al. 2018)
Enhancing food security through forest landscape restoration: Lessons from Burkina Faso, Brazil, Guatemala, Viet Nam, Ghana, Ethiopia and Philippines (Kumar et al. 2015)

Guidance on Investment Environment

Enable a favorable environment for investment in the restoration and sustainable management of degraded forests and landscapes

The economic challenge in FLR is to make the restored forest lands and other land-uses a profitable activity that is attractive to investors and competitive. In this respect it has to be noted that currently, most environmental services provided e.g. by natural forests, are unpaid for, and there are only a few functioning mechanisms for collecting payments for environmental services. Thus, creating the right conditions for investment and resource mobilization for FLR
is key.

Recommended Actions:

(3-1) **Provide framework conditions** (e.g. legal, policy, institutional, fiscal and tenurial) to attract investments to FLR (including simplified access to information)

(3-2) **Assess potential investors needs and concerns** regarding the investment environment

(3-3) **Promote simple and inexpensive technologies** that directly address investors' needs

(3-4) **Develop conflict resolution mechanisms** to handle trade-offs arising from competing land-use interests, particularly if new investment opportunities arise (e.g. mining in restored forest sites).

References and examples of good practices:

Sustainable financing for forest and landscape restoration: Opportunities, challenges and the way forward. FAO/UNCCD. 2015b
Global guidelines for the restoration of degraded forests and landscapes in drylands: building resilience and benefiting livelihoods (FAO 2014)
Coalition for Private Investment in Conservation' Blueprints: http://cpicfinance.com/blueprints/

Guidance on local income opportunities

Improved income opportunities for forest and agricultural products will provide an incentive for local stakeholders to participate in FLR

An ultimate aim of FLR is that local people may be able to generate significant incomes from restored forests and landscapes. Market demand and the prices paid for products often determine whether the chosen land-use concept is profitable and attractive to farmers and rural communities. Also, local processing of forest products adds value and may translate into higher prices for the raw materials.

Community managed forests are often seen as valuable to attracting sustainable investments, especially considering its risk management attributes.

The creation of alternative revenue generating activities and the promotion of viable small and medium enterprises can contribute to the success of landscape initiatives.

Recommended Actions:

(4-1) **Promote the local-level and value-added production and processing** of agricultural, wood and non-wood forest products.

(4-2) **Strengthen forest-producer organizations and locally based small and medium enterprises** and support their market access.

(4-3) **Promote forest-related income opportunities and market access for women** as important determinants of the local acceptability of FLR implementation.

(4-4) **Develop opportunities to partner with communities, projects or institutions** (public and private) with processing and marketing experience to strengthen efforts to gain access to markets.

(4-5) **Consider local opportunities for alternative income sources for the rural poor**, which are not based on land ownership and natural resources extraction.

(4-6) **Explore community-based forest management schemes** based on forest goods and services and develop investment strategies

References and examples of good practices:

Community forestry and FLR: Attracting sustainable investments for restoring degraded land in SE Asia (Gritten et al. 2018)
Forest landscape restoration for livelihoods and well-being (Erbaugh and Oldekop 2018)
IUCN Gender responsive restoration guidelines

Guidance on sustainable supply chains from FLR

From its initial stage, FLR processes and interventions should seek to build sustainable supply chains for the goods produced in restored forest landscapes

Sustainable supply chains comprise the organizations, activities and processes associated with all stages of the business processes involved in planning, sourcing, processing, manufacturing and delivering goods and services issues from forests and mosaic landscapes.

A sustainable supply chain is one that minimizes negative environmental and social impacts, addressing issues such as water and energy use, pollution, the treatment of workers, biosecurity, marginalized people, biodiversity and land use.

Recommended Actions:

(5-1**) Identify the potential to develop green-supply chains** for products produced in restored forest landscapes.

(5-2) **Build on existing sustainable supply-chain initiatives**, such as those associated with certification and timber legality, with the aim of making similar processes more accessible to local and indigenous communities and smallholder farmers.

(5-2) **Develop instruments to support financial returns for sustainable forest land-use options**, including mechanisms to provide payments for environmental services in restored landscapes

(5-4) **Scope potential marketing opportunities and value-chains for lesser-known timber and non-timber forest product**s, as appropriate

(5-5) **Create enabling conditions**, including incentives, access to finance and fair taxes, and simplified regulations, to develop sustainable supply chains for promising products from restored forests and agroforestry.

(5-6) **Develop public–private partnerships** for sharing the incremental costs and ensuring the viability of initiatives to create sustainable supply chains in restored forest landscapes.

(5-7) **Assist local and indigenous communities and smallholder farmers** to develop sustainable supply chains for the goods they produce on restored forest lands, such as by improving transport and communication infrastructure, subsidizing the cost of product-tracking systems, instituting purchasing policies that favour sustainable smallholder production, and boosting marketing efforts.

References and examples of good practices:

The buzz on green supply chains – TFU (2018)
Is community forestry open for business (Greijmans and Gritten 2015) World Forestry Congress Durban
Topical at “Sustainable Supply Chain”: https://www.itto.int/economic_market/supply_chains/

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