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Restoration of grasslands and forests for climate change mitigation and adaptation, and the promotion of ecosystem services

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I. Introduction

1. Forests and grasslands cover 57.5 percent (2,008.9 million hectares) (FAO 2013) of the land surface in the Asia-Pacific region and provide vital ecosystem services (e.g., water and climate regulation) in support of agriculture, food security and nutrition. Furthermore, these lands offer vast potential to contribute to climate change adaptation by ensuring long-term contributions to community resilience, livelihoods and poverty alleviation, at the same time capturing mitigation benefits through carbon sequestration. However, this potential is constrained by practices that degrade the land and water systems upon which food production ultimately depends. Degradation of Asian grasslands, for example, is estimated to be occurring at a rate of more than 2 million hectares per year, while the cumulative area of degraded forestlands potentially available for restoration in the region is estimated at more than 400 million hectares (WRI 2013). This paper discusses various measures to achieve environmentally sound, economically viable and socially acceptable management of grasslands and forests that restore and enhance their productive capacities (to produce food, timber, fuel, non-wood forest products and ecosystem services) in support of food security and livelihoods, while at the same time contributing to climate change mitigation and adaptation.

II. Overview on forest and grassland restoration in Asia-Pacific

A. State of forests and forest restoration

2. Forests cover 19 percent (592.5 million hectares) of the total land area in Asia and 23 percent (191.4 million hectares) in the Pacific¹ (FAO 2010). An additional 380 million hectares of land in Asia and the Pacific is classified as “Other wooded land”, which includes shrublands and sparse savannah-type ecosystems with tree canopy cover of 5-10 percent (FAO 2010).

3. Rapid decline in the extent of tropical forests is one of the defining characteristics of human development in the region during the past century. Although rates of deforestation have slowed in recent years, conversion of forest land remains a major issue faced by many countries in the Asia-Pacific region. Notwithstanding a net gain in the region’s forest area during the past two decades – primarily due to large-scale afforestation in China – significant areas of natural forests continue to be cleared in many countries. For example, the sum of net forest area losses in Asia-Pacific countries reporting decreased forest areas in the period 2000-2010 totals 21.9 million hectares (FAO 2010). Forest degradation and declining health and vitality also remain major problems confronting Asia-Pacific forests. The detrimental consequences of such forest loss and degradation include the loss of biodiversity and ecosystem services, declining yields of forest products, and consequent negative social impacts including compromised livelihood opportunities and lowered resilience, especially in impoverished forest-dependent communities. However, it should also be noted that forest clearance for agriculture often delivers positive welfare effects for communities including enhanced livelihoods and greater food security. Where such agricultural expansion occurs on forested lands a key is to ensure that various ecosystem services are safeguarded as much as possible, by retaining trees and shrubs as integral parts of the landuse mosaic.

4. Modified natural forests comprise approximately 65 percent of the total forest cover in Asia-Pacific, while undisturbed primary forests account for less than 20 percent. Planted forests constitute the remaining 15 percent (FAO 2010). The cycle of tropical deforestation typically begins with excessive logging, which results in forest degradation and reduces the commercial value of the natural forest. Logged-over forests are then converted to agricultural uses, often to replace land that has lost productivity due to unsustainable agricultural practices. This process is accelerated by the presence of logging roads that provide access to previously inaccessible forest areas. Unproductive farmlands are subsequently abandoned as wastelands, which could potentially regenerate into forests, but natural recovery in areas subjected to intensive anthropogenic effects is often very slow because of soil degradation, recurring disturbances (especially fires), and isolation from intact forests. These degraded

¹ Asia and the Pacific each defined as per FAOSTAT categorization (faostat.fao.org/site/371/default.aspx).

ecosystems usually weaken the provision of ecosystem services and produce minimal social and economic benefits.

5. Much of the reforestation implemented to date involves the establishment of industrial tree plantations, predominantly for the production of pulpwood, using a limited number of species. While these industrial plantations provide economic and attenuating social benefits, only a portion of the ecosystem services and other benefits provided by primary forests are restored. In particular, indigenous biodiversity is often substituted by monocultures of exotic tree species. Plantation reforestation is also limited by factors such as site quality, climate, accessibility and economics. In some cases, efforts to improve agricultural productivity on abandoned lands have been implemented. However, areas that can support viable agriculture constitute a small fraction of vast areas of degraded lands available for restoration.

6. More recently, significant efforts have been made to develop and promote techniques aimed at restoring natural forests on wastelands and rehabilitating heavily degraded forests. In the Philippines, for example, substantive efforts to develop 'Assisted Natural Regeneration' techniques to promote natural forest restoration on wastelands, particularly those infested with the invasive grass *Imperata cylindrica*, offer significant potential. Imperata grasslands are estimated to cover more than 57 million hectares in Asia-Pacific countries. Similarly, 'Analog forestry', developed in Sri Lanka in the 1980s is now being used in a number of Asia-Pacific countries to restore and rehabilitate forests by replicating natural forest dynamics in quasi-natural forests. A variety of other forest restoration and rehabilitation approaches and models have been developed in the region including 'Rainforestation' techniques in the Philippines, mountain closure principles in China, the tropical forest restoration model employed by the Forest Restoration Research Unit at Chiang Mai University (FORRU-CMU). Various community-based forest management approaches, including Joint Forest Management in India, leasehold forestry in Nepal and Community-Based Forest management in the Philippines, seek to achieve sound forest management and forest restoration through giving increased responsibility to local communities and individuals for forest management and rehabilitation and giving them rights to the products from these lands.

7. In recent years, the landscape restoration approach has gained momentum and offers enormous opportunities. The concept is based on the recognition that trees and forests comprise critical components of rural landscapes and that diversity and diversification at landscape levels can enhance ecological and socio-economic resilience. Key elements in landscape restoration include: (i) restoring balance in social, economic and environmental benefits of forests and trees within a broader pattern of land use; (ii) focus on enhancing the functionality of a landscape and the supply of ecosystem services across the range of land uses; and (iii) involving people as central elements of the landscape in implementing practices that aim to optimize land use.

B. State of grasslands and grassland restoration

8. Various forms of grasslands constitute approximately 35 percent (1,225 million hectares) of the land area of the Asia-Pacific region. These include natural landscapes as well as areas dominated by grasses that have formed as a result of deforestation and degradation on former forestlands. Grasslands are distinguished from pasture lands in that they consist primarily of native (or sometimes invasive) vegetation, rather than having been purposely established by humans through seeding. Perennial species are key to economic and resource sustainability as they provide drought forage in variable rainfall climates, protect the organic soil layer, play an important role in nutrient cycling, maintain soil 'health', and in some areas provide fuel for burning to help control woody weeds.

9. The majority of grasslands in the Asia-Pacific region are found in China, Mongolia and Australia. Generally grasslands are too arid – or too fragile – to support crops or dense forests. They also occur where other biophysical constraints on crops and forests are in play; for example, in subalpine and mountain areas. Livestock grazing, which affects plant composition and reduces fuel loads, to varying degrees depending on the intensity and frequency, is the dominant human use of grasslands worldwide. However, grasslands also provide large quantities of wild fruits, vegetables, mushrooms and are host to many wild animal species that make important nutritional contributions to

the people living in these areas. Fire is an important regulator of grassland vegetation, and tends to reduce the abundance of woody plants and promote the growth of herbaceous plants including grasses and forbs. Grazing intensity, which impacts on fire cycles, can consequently affect grassland capacities to renew themselves and cause significant changes in the composition of vegetation. Temperature is also an important regulating factor as many grasslands produce forage only during short growing seasons. Hay-making and additional conservation measures are necessary if overgrazing and degradation are to be reduced.

10. Although estimates of the geographic extent and severity of grassland degradation vary greatly, there is a general consensus that grassland degradation, due to increased pressure from livestock – as a result of growing demand for livestock products – is an issue of serious concern, particularly in Asia. The causes of grassland degradation are complex, variable and contested. However, it is evident that in most instances grassland degradation is the result of interplay between climatic factors, herbivorous animal populations and socio-economic forces.

11. Consequences of grassland degradation include:

- The loss of ‘desirable’ (in terms of providing feed for livestock) perennial grasses and shrubs which can lead to the loss of (pastoral) livelihoods and commodity scarcity;
- Increase in soil erosion (both wind and water-driven) and soil structural decline;
- Hydrological disturbances;
- Infestation by woody weeds;
- Increased frequency and severity of dust storms impacting downwind urban populations;
- Increased carbon emissions and reduced carbon storage;
- Loss of animal and plant biodiversity;
- Loss of livelihoods for local inhabitants; and
- Consequences to neighbouring urban areas including, in some areas, increased exposure to weather effects such as sandstorms and winds.

III. Benefits of forest and grassland restoration

12. Forest and grassland restoration can provide a range of ecosystem-derived environmental, social and economic benefits. Key benefits of forest and grassland restoration are briefly described below.

- ***Biodiversity***

The Asia-Pacific region contains some of the most biologically diverse landscapes globally, with most of the terrestrial biodiversity held within forests. Forest restoration therefore provides clear benefits to biodiversity. The initial recovery of biodiversity through tree planting can be accelerated through colonization by native plant species from nearby seed sources. Restoration of forest habitat facilitates the return of native fauna that seek food and shelter in forests. Recent research has shown that regenerated forests can play an important role in biodiversity conservation, especially with the continuing decrease in the extent of primary forests in the region.

Although less diverse than forests, grasslands also contain a wealth of biodiversity, comprising native flora and fauna that have adapted to the long-term evolutionary forces that have shaped grassland environments.

- ***Ecosystem services***

The Millennium Ecosystem Assessment 2005 defines ecosystem services as the benefits people obtain from ecosystems. The Assessment identified and assessed 24 specific ecosystem services. These include provisioning services such as food, water, timber, and fiber; regulating services that affect climate, floods, disease, wastes, and water quality; cultural services that provide recreational, aesthetic, and spiritual benefits; and supporting services such as soil

formation and protection, photosynthesis, and nutrient cycling. Humans, while being able to use culture and technology to partially buffer against environmental changes, are fundamentally dependent on the flow of ecosystem services.

Forests and grasslands provide many of these ecosystem services, which may be lost or diminished when they are cleared or degraded. However, many of these functions may be recovered through eventual restoration or rehabilitation of forest or grassland ecosystems.

- ***Climate change adaptation***

Climate change will impact society and ecosystems in a variety of ways, for example, by influencing agricultural crop yields, affecting human health and causing changes in productivity, health and ecological processes in forests and other ecosystems.

Agriculture is highly dependent on specific climate conditions. It is difficult to predict the overall effect of climate change on food supplies, including impacts of rising temperatures, increases in CO₂ concentration, shifts in rainfall amounts and patterns, changes in the frequency and severity of droughts and floods, disturbances from pests and diseases, and sea-level rise. However, in general, climate change is expected to make it more difficult to grow crops and raise animals in the same ways and same places as in the past.

Natural ecosystems are also strongly influenced by climate. Climate change and climate vulnerability could fundamentally transform existing ecosystems through relocation or extinction of species leading to disruption of the existing food chain and ecological balance. Sea-level rise could erode and inundate coastal ecosystems, and forests are likely to be impacted by changes in the frequency and intensity of disturbances such as fires, storms, floods, droughts, diseases and invasive species.

In times of severe climatic events and natural disasters, forests and grasslands may contribute to food security by serving as a 'safety net' and, in the longer term, providing flexible livelihood options supporting adaptation by rural communities. Forest- and grassland-based incomes may constitute important parts of diversified income streams for local communities. Community forestry and agricultural cooperatives may also assist in building strong, cooperative social structures that encourage community members to help and support each other, increasing community resilience to adverse events caused by climate change.

Forest and grassland restoration can help regulate micro-climates, influence hydrological cycles, enhance productivity and provision of ecosystem services, and increase the overall resilience of agriculture, natural ecosystems and communities to the impacts of climate change.

- ***Climate change mitigation***

Globally, forests store a vast amount of carbon (approximately 38-39 percent of the global carbon stock in terrestrial ecosystems) (UNDP et al. 2000). While sustainable management, planting and rehabilitation of forests can conserve or increase forest carbon stocks; in contrast, deforestation, degradation and poor forest management reduce them. Extensive forest restoration activities could have far-reaching implications for mitigating climate change by increasing the uptake or "sequestration" of carbon and its storage in forest biomass and soils.

Grasslands are also a major carbon sink, holding 33 percent of the global carbon stock of terrestrial ecosystems (UNDP et al. 2000). Unlike tropical forests, where above-ground vegetation is the primary carbon pool, most grassland carbon stocks are in the soil. Estimation of potential carbon sequestration in grasslands vary widely. However, it is widely acknowledged that grasslands have considerable potential to sequester additional carbon if a broad range of grazing and pasture improvement practices are applied (estimates range from 0.13 to 1.3 tCO₂-e ha⁻¹ yr⁻¹).

- ***Rural development, employment generation and poverty alleviation***

Economic development, increased livelihood options and urbanization in many countries over the past several decades, have reduced the proportion of the Asia-Pacific population that depends directly on forests or grasslands for their livelihood. Nonetheless, degradation of forests and grasslands still affects the lives of a large majority of the region's population, especially impoverished rural-dwellers whose livelihoods depend on agriculture and other nature-based commodities. Absence of opportunities for productive employment is one of the major problems facing many rural communities. An increased focus and targeted public investments in afforestation, reforestation and rehabilitation of grasslands and degraded forests could provide significant economic stimulus in rural areas, enhancing employment opportunities, and alleviating poverty. Similarly, efforts to improve the productivity of livestock, timber and non-timber forest products can also increase rural incomes, enhance food security and help to rebuild diminished natural resource bases. Such stimulus could generate important feedback effects by, not only actively working to rehabilitate forests and grasslands, but also by reducing livelihood pressures to further degrade resources. Increased public investment in rural areas could offer significant potential to improve the management of protected areas, improve watersheds, and reduce the incidence of wildfires.

IV. Constraints and opportunities in forest and grassland restoration

13. There are a number of conditions that constrain the development and implementation of sustainable forest and grassland restoration approaches. Brief analyses and discussion of current barriers to forest and grassland restoration are presented below.

- ***Technical barriers***

Technical barriers to restoration of forests and grasslands are threefold. One aspect relates to access to information and knowledge of appropriate and proven rehabilitation techniques. A second element is lack of access to planting materials, equipment and infrastructure. The third relates to local ecological conditions, including degraded soil, human-induced events such as fire, climatic conditions, competition by invasive species, unfavourable courses of succession, and biotic pressures such as grazing. Given the presence of political will and financing, technical barriers are usually relatively manageable to overcome through research, purchase of required equipment and training.

- ***Economic and financial barriers***

Developing approaches to forest and grassland restoration that optimize financial and livelihood benefits as well as generate improvements in biodiversity has proved challenging. Restoration is often financially less attractive than other land-use alternatives, and there is a recognized need to reduce the costs of restoration to improve its economic viability. This is particularly the case where the public good values of provision of ecosystem services are discounted in land use decision-making. Financing for forest and grassland restoration activities is often not readily accessible, particularly for impoverished local communities; who may in any case have more pressing livelihood challenges than ecological restoration. Similarly, if rates of return are significantly lower than alternative land-uses it will be difficult to motivate private sector investment or to access capital markets. Alternative financing arrangements, including partnerships among communities, government and local government agencies and international and civil society organizations, may offer the best prospects.

- ***Information barriers***

Information and data on the role of grasslands in terms of agricultural production and provision of ecosystem services are very limited. There is a strong need to improve global and regional assessments of services provided by grasslands and to develop scenarios that articulate the consequences of grassland destruction and degradation. Greater attention needs to be given to information promulgation relating to best practices for maintaining grassland ecosystem productivity.

- ***Policy and regulatory barriers***

A variety of policy and regulatory barriers may impede forest and grassland restoration activities. These include: (i) risks related to uncertainties and/or changes in government policies or laws; (ii) weak implementation of policies designed to support restoration activities; (iii) weak enforcement of forest- or land use-related legislation; and (iv) policies and laws that are unfavourable to forest and/or grassland restoration because they are restrictive or they do not address incentives for communities to undertake and sustain restoration activities. The perceived lack of leadership and action by governments to drive restoration programmes and lack of support for the forestry sector within government planning and budget allocation may also pose barriers to forest and grassland restoration.

In many countries, land tenure is also an issue that may present significant challenges in the implementation of forest and grassland restoration activities. These issues include: absence of suitable land tenure legislation and regulation to support security of tenure; absence of clearly defined and regulated property rights in relation to natural resources; and formal and informal tenure systems that increase the risks of fragmentation of land holdings.

- ***Social barriers***

Social conditions and land-use practices that create unfavourable conditions for forest and grassland restoration include: demographic pressures on land use; social conflicts among interest groups; widespread illegal practices and corruption; shortages of available labour to undertake restoration activities; lack of skilled and/or properly trained labour force; and lack of organization in local communities. Furthermore, the prevalence of rural poverty in many developing countries, may constrain local communities from undertaking any activities beyond those likely to improve their circumstances in the short term.

14. These areas of needs also point to opportunities for forest and grassland restoration to improve resilience in forest ecosystems, landscapes and communities. Key drivers of change and areas of opportunity for forest and grassland restoration are briefly outlined below.

- ***Commitment and political will***

A number of examples in Asia and the Pacific demonstrate that strong political leadership and support is a critical driver of forest and grassland restoration and rehabilitation. For example, in both China and Republic of Korea, forest restoration has been made a key priority and enabling environments for restoration have been created through clear policy direction, supported by financial and human resources. A number of countries in the region have developed significant planted forest resources on the back of government-driven plantation programmes. The importance of grassland restoration is also being increasingly recognized especially in regions where grasslands are the major food production option due to the general unsuitability of most land for crop production. Political prioritization of natural resource restoration is generally a prerequisite for attracting necessary financing, including through national and international budgetary processes.

- ***Payments for ecosystem services (PES)***

PES have the potential to offer financial incentives that make reforestation and rehabilitation of degraded forests and grasslands economically attractive activities. Among the range of services provided by forests and grasslands, three specific ecosystem services are currently attracting funding and generating interest worldwide: (i) carbon sequestration; (ii) watershed services; and (iii) biodiversity conservation. The markets for these services have undergone modest growth in recent years and demand is predicted to continue to grow. However, even in these markets there are significant challenges that remain to be addressed, including understanding the fundamental relationships between forest composition/structure and the yields of ecological services. Information insufficiencies are strong contributors to uncertainties over market values for these services. Further, market mechanisms and legal frameworks to facilitate trading are yet to be established in most countries. Also, even where mechanisms exist, they are beset with high transaction costs, particularly in landscapes containing many smallholders. Voluntary markets for carbon are the most developed of these PES systems, with established standards, methodologies and carbon credit registries available to finance particularly afforestation and reforestation projects.

- ***Improved governance***

Good and efficient governance of natural resources and distribution of benefits are central to the success of grassland and forest restoration programmes. Priority governance interventions to support the development of sound policy and regulatory frameworks in natural resources management in Asia-Pacific may include: (i) stakeholder consultation and participation in forest and grassland restoration planning and implementation; (ii) cross-sectoral coordination in forest and grassland restoration planning and implementation; and (iii) policy and legislative review with a view towards reform and improved implementation and enforcement of policies, laws and regulations relating to forests, grasslands and land use. In particular, review and reform of regulations supporting tenure and property rights has been critical in expanding tree cover in countries such as India, Nepal and Viet Nam. In this regard, the recently issued Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security (FAO 2012) provides a framework in which community engagement and investment in forest and grassland restoration could be significantly enhanced in some countries.

- ***Developing capacity in sustainable resource management and accessing markets***

Overcoming the aforementioned social barriers will involve awareness raising, capacity building and development of economically attractive restoration schemes that ensure long-term sustainability of the restored forests and grasslands with the participation of local communities. Development of education, extension and training mechanisms will be key drivers of initial uptake of community-based restoration opportunities. Developing the capacities of communities and other stakeholders in accessing markets for products and services derived from forests and rangelands will also be critical in demonstrating economic benefits deriving from forest and grassland restoration.

V. Restoration of grasslands and forests in the Southwest Pacific

15. Several features specific to southwest Pacific countries may require alternative approaches to restoration of forests and grasslands compared with Asian countries. Perhaps the most significant

difference in Pacific countries is in forest and land ownership. In most Pacific island countries, the vast majority of forests and lands are under various forms of customary ownership, necessitating that any significant restoration and rehabilitation efforts engage the (usually communal) landowners. In some of the smaller island countries, fragmentation of ownership is a significant limiting factor. In New Zealand, a significant proportion of lands that might be targeted for restoration – particularly regeneration of natural forests – are privately owned. In Australia, while the majority of lands are government-owned, most of these are managed by other agents under lease arrangements.

16. In Pacific Island countries, areas of natural grasslands are relatively small, hence the major focus should generally be applied to restoring deforested lands or, particularly, rehabilitating degraded forests and woodlands. Conversely, in Australia, a broader focus might be applied to the vast tracts of grasslands and other wooded lands. As in the broader region, forest rehabilitation and restoration efforts in Pacific island countries also need to take into account the socio-economic setting – including the relatively low incomes of the populace, the relative scarcity of diverse livelihood opportunities and – in several Melanesian countries – the relatively high level of remaining forest cover.

VI. International, regional and national initiatives supporting forest and grassland restoration

17. In the past several years, forest and grassland restoration has captured significant international attention with a number of new initiatives and institutions emerging to promote restoration. For example, the Global Partnership on Forest and Landscape Restoration (GPFLR) is a proactive network that unites governments, organisations, communities and individuals with the purpose of catalyzing restoration of forests and degraded lands that deliver benefits to local communities and to nature, and fulfilling international commitments on forests. GPFLR research estimates two billion hectares of degraded lands are available for restoration worldwide, including 400 million hectares in Southern and Eastern Asia (WRI 2013).

18. In September 2011, a Ministerial Roundtable and Restoration Leadership Forum in Germany issued the ‘Bonn Challenge’, targeting the restoration of 150 million hectares of degraded and deforested land by 2020, to give momentum to global landscape restoration efforts.

19. In an earlier and similar initiative, in 2007, APEC leaders set an aspirational goal to increase forest cover in the APEC region by at least 20 million hectares by 2020, as part of a Declaration on Climate Change, Energy Security and Clean Development. The goal was planned as a cooperative effort to accelerate afforestation and reforestation in some economies and to reduce deforestation in others.

20. A variety of regional networks have also been established in recent years to support restoration and rehabilitation. For example, the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) was launched in 2008 specifically to promote forest rehabilitation, reforestation and afforestation in the region to contribute to the achievement of the APEC aspirational goal. More recently, ASEAN member countries and the Republic of Korea have worked to establish the Asian Forest Cooperation Organization (AFoCO), with a mission to rehabilitate degraded forest land and to reduce deforestation and forest degradation.

21. More broadly, a variety of international conventions, agreements and processes relating to land degradation, biodiversity, climate change and related topics cut across these more specific forest and grassland rehabilitation initiatives. Those that most strongly link to national commitments and action plans include: Convention on Biological Diversity (CBD), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Convention to Combat Desertification (UNCCD), the Ramsar Convention on Wetlands, and the World Heritage Convention.

22. A number of countries have established their own national restoration and rehabilitation programmes. For example, in the Republic of Korea, a government-led reforestation programme has been active for the past 50 years, has doubled the forested area, with more than 60 percent of the country now under forest. In the late-1990s, China initiated its Six Key Forestry Programmes to promote afforestation and greening including a programme on conversion of cropland to forest and

grass and a programme to combat desertification. Similarly, in Viet Nam, the Five Million Hectare Reforestation Programme was initiated in 1998. In 2011, the Philippines initiated its National Greening Programme aiming to rehabilitate forests on 1.5 million hectares nationwide within a period of six years, as a climate change mitigation strategy as well as a means of reducing poverty and providing alternative livelihood activities for marginalized people.

VII. Related FAO initiatives in the region

23. FAO strongly promotes forest restoration and rehabilitation in Asia and the Pacific through a range of initiatives that contribute directly and indirectly to restoration objectives.

24. Recent and forthcoming FAO initiatives contributing directly to forest restoration and rehabilitation include:

- Collaboration with RECOFTC – The Center for People and Forests to develop a series of national case studies identifying best policies and practices for forest restoration. This initiative is anticipated will lay the groundwork for much greater focus, including partnership development, on forest restoration in the region.
- A related workshop on Forest Restoration at Landscape Level in Asia-Pacific held as a pre-session event at the 25th session of the APFC.
- Forthcoming collaboration with the International Model Forest Network and the Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) in implementing a project on Forest Restoration at the Landscape Level in Asia: A Unique Model Forest Approach.
- An FAO Technical Cooperation Programme (TCP) regional project on Applying Assisted Natural Regeneration (ANR) for Restoring Forest Ecosystem Services in Southeast Asia, which has built on experiences with an earlier Edouard Souma Award-winning ANR project in the Philippines.
- A number of other current or recent FAO TCP and Trust Fund projects with strong forest restoration and/or rehabilitation components including: (i) Enhancing Community-based Forestry Management in Cambodia; (ii) Technical assistance for Leasehold Forest and Livestock Programme in Nepal; (iii) Technical assistance to the Review and Scaling Up of Leasehold Forestry in Nepal; (iv) Participation of Tree Plantation Farmers in Sustainable Forest Management in Thailand; (v) Capacity building and institutional development for participatory natural resources management and conservation in forest areas in Mongolia (vi) Market-oriented agroforestry to reduce poverty in Quang Nam province in Viet Nam. Additionally, several Global Environment Facility (GEF) projects in early-commencement or late-formulation stages have strong forest restoration components, including projects being implemented or planned in China, Mongolia, Sri Lanka, Myanmar, and Cambodia.
- Global guidelines for restoring the resilience of dryland forest landscapes are being finalized by FAO and its partners. These will provide a common global framework for assuring successful planning, implementation and monitoring and evaluation of restoration programmes and projects related to dryland forest landscapes and degraded lands.
- Planned launching of Forest Landscape Restoration Mechanism in 2014 to support the implementation as well as monitoring and reporting of forest and landscape restoration (FLR) at the country level, contributing to the achievement of the Bonn Challenge.
- A wide range of awareness raising activities and information materials relevant to forest rehabilitation and restoration have been produced in recent years including (among others): *In search of excellence: exemplary forest management in Asia and the Pacific*; *Helping forests take cover*; *Growing green assets: Removing constraints to private sector investments in forestry in Asia and the Pacific*; and *Forests beneath the grass*.

25. A number of activities have also been implemented by FAO in relation to forestry and climate change in the region with strong relevance to forest restoration. In particular, the UN-REDD

programme is active in the Asia-Pacific region, with 15 partner countries. The programme supports national REDD+ Readiness efforts through provision of direct support to the design and implementation of UN-REDD national programmes and complementary support to national REDD+ action. Also relevant to forest restoration are two FAO TCP projects relating to: (i) Climate change adaptation and resilience with microwatershed approaches in Cambodia; and (ii) Support to the regional framework on climate change adaptation in the Eastern Himalayas. Yet another TCP project on linking communities to voluntary carbon markets in forestry has recently been completed.

26. Indirectly, a large number of FAO initiatives in the region contribute to creating enabling environments for forest restoration and rehabilitation including those relating to: (i) the Asia-Pacific Forestry Sector Outlook Study; (ii) forestry strategic planning; (iii) policy development; (iv) poverty alleviation and livelihood creation; (v) participatory forest management; (vi) forest tenure reform; (vii) forest financing; (viii) payments for ecosystem services; (ix) forestry education and capacity building; (x) forest invasive species management; (xi) agroforestry; (xii) forests and natural disasters; (xiii) building resilience; and (xiv) biodiversity conservation.

27. In 2010, FAO started a process of building a Global Agenda for Sustainable Livestock on broad based, voluntary and informal stakeholder commitment to act towards improved sector performance by targeting natural resource protection, while including poverty reduction and public health protection. One of the Agenda's three focus areas, '*Restoring value to grasslands*' pursues better management of grazing land which contributes to carbon sequestration, protection of water resources and biodiversity, whilst enhancing productivity and livelihoods. Agenda partners will explore and promote the financial and institutional innovation required for the delivery of grassland-related services. Initial outputs of the initiative are (i) a synthesis of non-market benefits of grassland restoration; and (ii) an assessment of global grassland carbon sequestration potential.

28. As one of the key challenges has been finding reliable and affordable ways to measure how much carbon is being sequestered by agricultural mitigation projects involving grasslands, FAO has developed a methodology that provides an affordable way to reliably estimate the amount of GHG emissions removed from the atmosphere through improved management of grasslands. The methodology is being applied to a pilot project in Qinghai Province, China, which will eventually be able to deliver significant carbon offsets for a period of 10 years. After that point, the restored grasslands will have stored as much carbon as it is possible for them to do, and incomes from carbon trading will wind down. But the lands involved will have been brought back to full productivity and livestock systems will have shifted to a sustainable model.

VIII. Points for consideration

29. Policies and programmes for forest and grassland restoration need to be site-specific and holistic, taking into account the array of ecosystem services provided by forests and grasslands and the livelihood impacts on rural communities. The Conference may wish to request FAO to increase support to the efforts of member countries to broaden forest and grassland restoration in the region, with emphasis on the following topics:

- Enhancing community resilience by strengthening community capacities to restore and rehabilitate forests and grasslands and assisting efforts to link communities to markets for forest- and grassland-based products and services.
- Exploring opportunities for financing of forest and grassland rehabilitation and restoration including through international organizations, mechanisms, programmes and facilities.
- Assisting in advocacy, building awareness and engagement of key decision-makers in support of forest and grassland restoration, especially considering the potential long-term benefits for food security, poverty alleviation and livelihoods.
- Creating enabling environments for forest and grassland rehabilitation and restoration including through support to the development of sound policy and regulatory frameworks for enhancing biodiversity and productivity through landscape restoration approaches, and including review and revision of tenure arrangements.

- Exploring opportunities and defining next steps for adapting and implementing the global guidelines on dryland forest landscape restoration in Asia and the Pacific.
- Establishing effective mechanisms for engaging and working across sectors at landscape levels to implement effective programmes for forest and grassland restoration.

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