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Investing in Carbon Capture and Storage Nature's Way

Time to Give Forests, Mangroves, Peatlands and Climate-Friendly Agriculture a Bigger Role in Combating Climate Change, says UNEP

World Environment Day 2009 – Your Planet Needs YOU!

Press launch:
11.30am – 12 noon, Friday 5 June 2009, Reger Room, Hotel Maritim, Bonn

With Kaveh Zahedi (UNEP Climate Change Coordinator)
&
Barney Dickson (Co-author)

Mexico City/ Nairobi/ Bonn 5 June 2009 – Boosting investments in the conservation, rehabilitation and management of the Earth's forests, peatlands, soils and other key ecosystems could deliver significant cuts in greenhouse gas emissions and avoid even more being released to the atmosphere, a new report by the UN Environment Programme (UNEP) says.

The report calls for the adoption of a comprehensive policy framework under the UNFCCC for addressing carbon management across all ecosystems. Parties currently meeting in Bonn are starting to heed this call.

Achim Steiner, UN Under-Secretary-General and UNEP Executive Director, said: "Tens of billions of dollars are being earmarked for carbon capture and storage at power stations with the CO2 to be buried underground or under the sea."

"But perhaps the international community is overlooking a tried and tested method that has been working for millennia, the biosphere. By some estimates the Earth's living systems might be capable of sequestering more than 50 gigatones (Gt) bof carbon over the coming decades with the right market signals," he added.

"This is also in line with UNEP's Green Economy initiative as for the same dollar, euro, peso or yuan not only are we combating climate change, but potentially delivering additional economic, environmental and developmental benefits from improved water supplies, soil stabilization and reduced biodiversity losses alongside new kinds of green jobs in natural resource management and conservation," he added.

UNEP's Rapid Assessment report '*The Natural Fix? The Role of Ecosystems in Climate Mitigation*' is released to mark World Environment Day 2009, whose global hosts this year are the Government and people of Mexico.

The report comes just under six months before the crucial UN climate convention meeting in Copenhagen, Denmark, where governments need to Seal the Deal on a new, forward-looking treaty.

Key Messages from the Report

- The adoption of a comprehensive policy framework under the UN Framework Convention on Climate Change (UNFCCC) for addressing ecosystem carbon management would be a very significant advance.

- It is vital to manage carbon in biological systems, to safeguard existing stores of carbon, reduce emissions and to maximise the potential of natural and agricultural areas for removing carbon from the atmosphere.

- The priority systems are tropical forests, peatlands and agriculture. Reducing deforestation rates by 50 per cent by 2050 and then maintaining them at this level until 2100 would avoid the direct release of up to 50 Gt C this century, equivalent to 12 per cent of the emissions reductions needed to keep atmospheric concentrations of carbon dioxide below 450ppm.

- Peatland degradation contributes up to 0.8 Gt C a year, much of which could be avoided through restoration.

- The agricultural sector could be broadly carbon neutral by 2030—equal to 6 Gt of CO2 equivalent or up to 2 Gt of carbon if sustainable management practices were widely adopted.

- It is essential that climate mitigation policy is guided by the best available science concerning ecosystem carbon, and decisions should be informed by the overall costs and benefits of carbon management.

- Developing policies to achieve these ends is a challenge: it will be necessary to ensure that local and indigenous peoples are not disadvantaged and to consider the potential for achieving co-benefits for biodiversity and ecosystem services.

- Drylands, in particular, offer opportunities for combining carbon management and land restoration.

Barney Dickson and Kate Trumper of the UNEP-World Conservation Monitoring Centre, which has spearheaded the compilation of the report in collaboration with some 20 leading experts, said: “While more research will be needed to fully capture the carbon and livelihood opportunities from drylands, it is already clear that there is a potentially a big bang for your carbon buck.”

“Their large area means that total carbon potential is high and the often degraded soils means extra carbon could boost agricultural productivity and incomes in some of the poorest parts of the world,” they said.

According to the report, recent estimates indicate that human activities are currently responsible for global carbon emissions of around 10Gt.

The research indicates that there may be scope for tackling 15 per cent of these—perhaps even more – through managing land use changes and carbon in ecosystems.

Forests – the largest sink

Tropical forests hold the largest terrestrial carbon store with an annual global uptake of around 1.3 Gt of carbon, or about 15 per cent of the total carbon emissions resulting from human activities.

Global tropical deforestation rates are currently estimated to be as high as 14.8 million hectares per year (about the size of Bangladesh), while deforestation is responsible for nearly one-fifth of the global greenhouse gas emissions – more than the entire transport sector.

Clearing of tropical forests may release an additional 87 to 130 Gt by 2100, corresponding to the carbon release of more than a decade of global fossil fuel combustion at current rates.

Reducing deforestation rates by 50 per cent by 2050 and then maintaining them at this level until 2100 would avoid the direct release of up to 50Gt of carbon this century. Conventional logging techniques damage or kill a substantial part of the remaining vegetation during harvesting, resulting in large carbon losses.

Improved logging techniques can further reduce carbon losses by around 30 per cent compared to conventional logging techniques.

Forests around the world act as powerful carbon sinks: those in Central and South America are estimated to take up taking up around 0.6 Gt C, African forests somewhat over 0.4 Gt, and Asian forests around 0.25 Gt.

The potential to enhance carbon capture and storage in **boreal forests** – which stretch across Canada, Russia, Alaska and Scandinavia – is low. But they are the second largest stock of carbon, which could be lost to the atmosphere via increased numbers of fires, draining of peatlands, logging and mining.

Temperate forests in Europe and North America have been expanding over recent years—in Europe they are estimated to be capturing and storing between seven and 12 per cent of Europe's emissions. Further reforestation and management could enhance this further.

Agriculture – climate neutral by 2030

The agricultural sector has the largest readily achievable gains in carbon storage if best management practices – such as avoiding turning over the soil and using natural nutrients like compost and manure – were widely adopted.

- Up to 6 Gt of CO2 equivalent, or up to 2 Gt of carbon, could be sequestered each year by 2030, which is comparable to the current emissions from the agricultural sector.

Many of the agricultural practices that store more carbon can be implemented at little or no cost. The majority of this potential – 70 per cent – can be realized in developing countries.

- Fully returning straw to croplands in China could sequester around 5 per cent of the carbon dioxide emission from fossil fuel combustion in that country based on 1990 emissions.

Many agricultural areas in the Tropics have suffered severe depletion of their soil carbon stocks. Some soils in tropical agricultural systems are estimated to have lost as much as 20 to 80 tonnes of carbon per hectare, most of which has been released into the atmosphere.

Agroforestry – where food production is combined with tree planting – has a particularly high potential for carbon sequestration in tropical areas.

- Average carbon storage by agroforestry practices is estimated at around 10 tonnes per hectare in semi-arid regions.

- 20 tonnes per ha in sub-humid and 50 tonnes per ha in humid regions.

- Sequestration rates of smallholder agroforestry systems in the tropics are around 1.5-3.5 tonnes of carbon per ha per year.

Peatlands –chock-full of carbon

Although peatlands cover only a tiny percentage of the Earth's surface they are, metre for metre, the most effective carbon stores of all ecosystems.

- On average peatlands store 1,450 tonnes of carbon per hectare.

- Currently, about 65 million hectares of peatlands worldwide are considered degraded with large quantities of carbon being lost as a result of drainage, with half of these losses occurring in tropical areas.

- Overall draining of tropical peatlands – mainly for palm oil and pulpwood production – leads to annual carbon losses of up to 0.8 Gt per year. Peat fires in South-East Asia are responsible for half of these emissions.

Planting biofuels on drained peatlands can nowhere near compensate for this release of greenhouse gases.

- Combustion of palm oil produced on drained peatland generates 3 to 9 times the amount of CO2 produced by burning coal, equating to a carbon debt requiring 420 years of biofuel production to repay.

Re-wetting of peatlands and replanting of forests in areas that have been deforested can significantly reduce future emissions of greenhouse gases.

Oceans

The oceans are believed to have absorbed around 30 per cent of the historic carbon emissions, making them the second largest sink after the atmosphere itself.

- However, the uptake capacity of oceans and coasts – currently at 2 Gt per year – is both finite and vulnerable.

- Some studies suggest that the ability of oceans to soak up carbon could peak at around 5 Gt per year by the end of this century.

The opportunities for enhanced carbon capture and storage is likely to be in the coastal zones and in coastal ecosystems such as wetlands and mangroves.

- Inshore waters up to 200 metres in depth, which includes coral and seagrass ecosystems, may be responsible for removing just over 0.2 Gt C per year.

- Globally, mangroves may be accumulating around 0.038 Gt C per year, which, when taking their area of coverage into account, suggests that they sequester carbon faster than terrestrial forests.

However, current patterns of use, exploitation and impacts will, if unchecked, lead to coastal wetlands and mangroves becoming carbon sources rather than sinks.

- The report estimates that widespread loss of vegetated coastal habitats has already reduced carbon burial in the ocean by about 0.03 Gt C per year.

The cost of ecosystem carbon management

The cost of ecosystem carbon management can be very low compared to other 'clean energy' options.

- Managing grazing, fertilizers and fire on grasslands to reduce emissions costs as little as US$5 per tonne of carbon dioxide equivalent per year.

- Restoration of soils and degraded land cost about US$10 per tonne, whereas the costs of technological carbon capture and storage are estimated at US$20-270 per tonne of carbon dioxide equivalent.

The economic mitigation potential of forestry would double if carbon prices increased from US$20 per tonne of carbon dioxide equivalent to US$100 per tonne.

- If carbon emissions were valued at US$100 of CO2 equivalent, in 2030 the agricultural sector would be second only to building as potentially the most important sector for achieving carbon cuts.

At this level of carbon pricing, forestry and agriculture combined would be more important than any other single sector, and would retain high importance at even lower carbon prices.

At the moment, however, the international climate regime only partly addresses emissions from land-use change, such as deforestation, and does not provide incentives for reducing carbon emissions from forests and other ecosystems, let alone for conserving them as carbon sinks.

It is expected that governments negotiating the new climate agreement in Copenhagen in December this year will take the first step in this direction by starting to pay developing countries for reducing emissions from deforestation and forest degradation.

The report argues that a more comprehensive system of payments for ecosystem services needs to be considered.

“Our planet’s living systems have developed ingenious, efficient and cost-effective ways to manage carbon. Sending the right price signals to those who make economic and development choices about the value of preserving and effectively managing our forests, grasslands, peatlands and agricultural lands is critical for the success of any climate change mitigation strategies,” the report says.

UNEP and partners, with funding from the Global Environment Facility, have launched a new project among communities in Western Kenya, Niger, Nigeria and China, to assess with greater precision the amount of carbon locked away in different ecosystems and landscapes under a variety of management regimes.

The findings, leading to a global standard upon which carbon investment decisions can be taken, should be available in some 18 months time.

“If the global community can rise to this challenge, the planet’s living systems will be our best allies in the struggle to avoid dangerous climate change,” Mr Steiner concluded.

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Availability on web

The report will be available on the web from 00.30 GMT, 5th June at the following addresses:

http://www.grida.no/publications/rr/natural-fix
http://www.unep.org/publications/