

Submission to the CBD Secretariat according to Decision X/3, A. paragraph 8(c) by the NGO EcoNexus, July 2011

Contact: Helena Paul (h.paul@econexus.info) & Antje Lorch (lorch@ifrik.org)

Information concerning innovative financial mechanisms

With Decision X/3, A, paragraph 8(c) "invites parties, relevant organisations and initiatives [...] to submit information concerning innovative financial mechanisms that have potential to generate new and additional financial resources as well as possible problems that could undermine achievement of the Convention's three objectives [...]".

This submission focuses on experiences with offset programmes, showing examples and concerns that have arisen from them and that are relevant to ideas of developing biodiversity offset systems or similar mechanisms.

1 Introduction

In the UN Framework Convention on Climate Change (UNFCCC), a market approach was built into the Kyoto Protocol from the start. Now within the CBD, the model presented for biodiversity is that of the carbon market. But there are major problems with this approach: the carbon markets have led to corruption, human rights violations, failure of regulation and a broad range of unintended negative social and environmental impacts. Meanwhile, emissions have increased. We believe that biodiversity markets will fail to stem biodiversity loss and will be a major distraction from the real priorities.

Innovative Financial Mechanisms is a broad term that covers many items. In this submission to the CBD we focus on *offset programmes*. It is critical that any discussions about biodiversity offsets in the international arena take into consideration the serious, empirically demonstrated flaws in existing offset markets for both carbon and biodiversity.

As members of civil society organisations who have observed and participated in both the discussion in the UNFCCC and the CBD, we are concerned about the move towards offset programmes as so-called Innovative Financial Mechanisms (IFMs).

We base our concerns on the experiences with Carbon Offsets, especially with the EU's Emissions Trading Scheme (ETS), the US Wetland Banking, the Business and Biodiversity Offsets Programme (BBOP) and discussions at national level.

We have seen fraud in carbon trading, lack of sufficient monitoring, compensation for damages instead of avoidance and mitigation, and the understanding that it is acceptable to destroy biodiversity in a given location if biodiversity is protected or

'improved' somewhere else.

We raise general concerns about zoning biodiversity into areas of high and low value, especially its lack of scientific basis, about fragmentation versus integrity especially with respect to concepts like 'forest mosaics' that will further increase the damaging effects of fragmentation, and about the difference of 'price' and 'value' that will need to be applied to biodiversity. We already see the practical problems of carbon offsets where only one 'commodity' is traded, while biodiversity offsets will require assessments of the biodiversity that will be destroyed, the location of the offset measures and the offset measures themselves. We wonder about the practical implications when locations and catchment areas stretch across political borders.

Last but not least we see the real danger that biodiversity offsets can lead to human rights violations not only once but twice over, when Indigenous Peoples and Local Community rights are violated both at the location of the initial project as well as at the location of the offset measure.

It should be highlighted that these concerns are not voiced by civil society only.

On 14 July 2011, on the final day of the Second meeting of the *Transitional Committee* (TC) in Tokyo, a group of 13 developing countries formally tabled a document on the operational elements for the establishment of the *Green Climate Fund* (GCF) under the United Nations Framework Convention on Climate Change (UNFCCC; TWN 2011).

The document notes:

“The private sector in developed countries is encouraged to make supplementary contributions and donations to the Fund. However, resources of the Fund should not be used for subsidizing corporations or financial institutions of developed countries (as the Fund is established to provide resources to developing countries). Such contributions shall not include payments by companies for offsetting in the carbon trade, as financial resources provided by carbon markets are to enable developed countries to implement their mitigation commitments and are not contributions towards the financing commitment of the developed countries in accordance with the Convention.”

We believe that these comments help to show why biodiversity offsets - instead of helping to protect biodiversity - enable companies to continue destroying biodiversity outside so-called 'hotspots'. This is not a sustainable way to protect biodiversity.

2 Experiences

2.1 Carbon Offsets

Carbon offsets were originally developed in the US and set out in its 1990s *Clean Air Act*, as part of its *Acid Rain Programme*. In the development of this offset system "industry successfully lobbied local government to replace existing and proposed air

quality regulations with a **trading programme**" (Lohmann 2006). The US were a key actor in installing offsets in the Kyoto Protocol - even though the US later did not ratify it.¹

Carbon offsets attempt to reduce climate issues to linear measurements of CO2 equivalents (CO2e). Thus one source of CO2e can be set against another, regardless of the processes involved. This concept of equivalence is already questionable for CO2, but even more so for biodiversity. Ecosystem functions and biodiversity are complex and therefore extremely difficult or impossible to reduce to tradable commodities.

How would decisions be reliably made about whether one area is genuinely equivalent to another in order to decide whether or not there is "*no net loss*"? Yet this is crucial for offsetting to achieve that aim of "*no net loss*".

2.1.1 Emissions Trading Scheme

The European Union Emissions Trading Scheme (EU ETS) was launched in 2005 and is the largest multi-national emissions trading scheme in the world. However already 4 years later, the failure of carbon markets to limit carbon emissions has been admitted in the EU:

"The EU's emissions trading scheme has so far failed to deliver any reductions in CO2 emissions while at the same time strangling energy-efficiency investment in the electricity sector, according to a former European Commission official" (Euractiv, 22 April 2009).

We are afraid that biodiversity offsets could in a similar way mask continued biodiversity loss. Susan Walker (Biodiversity and Conservation team, Landcare Research, New Zealand) notes in a scientific article:

"Their proliferation without credible solutions suggests biodiversity offset programs are successful 'symbolic policies,' potentially obscuring biodiversity loss and dissipating impetus for action." (Walker et al. 2009).

2.1.2 Carbon Credit Fraud

Not only has the ETS failed to deliver CO2 reductions, it has also become the victim of Carbon Credit frauds, as Europol, the EU law enforcement agency had to state in a press release in 2009:

"The EU Emission Trading System (ETS) has been the victim of fraudulent traders in the past 18 months. This resulted in losses of approximately 5 billion Euros for several national tax revenues. It is estimated that in some countries, up to 90% of the whole market volume was caused by fraudulent activities."²

Seven men are currently charged in the UK with conspiracy to cheat the public revenue

1 Further details on this issues see our publication "Carbon - The New Cash Crop? Paul (2010)

2 The original press release is not online available any more. A follow-up was published by Europol in 2010.

and conspiracy to transfer criminal property over their £38m carbon trading VAT fraud in 2009 (Inman & Webb 2009). Another three men are charged in Belgium for allegedly siphoning 3 million Euro from the carbon trading market.

In January 2011, spot carbon trades were halted in the EU, after the theft of 30 million Euros of carbon allowances from customers' accounts by computer hackers were discovered in Eastern Europe. Subsequently emission trading exchanges remained closed in and beyond February 2011, since the exchanges failed to improve their IT security. The European Commission, which runs the EU's trading scheme, had closed trading until exchanges would meet minimum software security standards.

A statement by the EC to this effect, led to a plunge of carbon prices within half an hour (Macalister 2011).

2.1.3 Lessons for a biodiversity offset market

As we have seen above, Carbon Credits have now become a tradable commodity, on which traders can make large-scale gains and losses, and they are vulnerable to fraud. The same will be true for a biodiversity offsets market.

Furthermore, the big money is not in the carbon credits themselves, but in the carbon credit derivatives markets. It would be extremely dangerous to allow a derivatives market to develop on top of a biodiversity offsets market, since this would simply add to the instability and lack of accountability in such a market, as well as further reduce the connection between offsets and positive impacts on biodiversity. However, it is questionable whether the development of such a derivatives market could be prevented if biodiversity offsets were to become established.

While the argument might be that biodiversity offsets - in contrast to carbon credits - would be dealing with physical objects like plants and animals, this is only partly true since biodiversity and ecosystems are more than just the list of species and size of populations. The interactions within ecosystems are fundamental to the dynamics and resilience of the whole and this is not adequately addressed under the term *ecosystem services* which is increasingly used instead of the broader term *ecosystem functions*.

2.2 Wetland Banking

US Wetland Banking³ deals with offsets for damage or destruction of wetland sites in the USA. It is the longest standing ecosystem/biodiversity offsets system in the world.

According to its Market Features & Rules (Ecosystem Marketplace),
"when a land developer fills or otherwise impacts a wetland they may buy offsets from a mitigation banker. The mitigation banker restores, enhances, creates or preserves an area of wetland to generate credits."

Some key problems with wetland banking have been identified in the following areas:

- 1. Ecological monitoring:** There has been no serious, systematic assessment of wetland banking in the USA. In other words, there is very little evidence to show

³ Information about the US Wetland Banking is available at the *Ecosystem Marketplace* website.

whether the approach really works to conserve wetlands (Robertson & Hayden 2008).

There is growing evidence, that wetland banking does not have the desired ecological effects:

- The majority of projects (67%) that restored or created wetlands independently (i.e. not through a mitigation bank) were not successful at meeting permit requirements in terms of wetland area (Kettlewell et al. 2008, see also Mack & Miacchion 2006).
- In Ohio, scientists looked at the twelve oldest of the state's 25 wetland mitigation banks. Although these had been studied and monitored by the Army Corps and the Environmental Protection Agency (EPA), the study found that many were not up to standard when checked against stringent scientific criteria. Indeed, against these measures only three banks scored in the "successful category" while five passed in some areas and failed in others. The remaining four failed nearly every assessment, functioning more like shallow dead pools than wetlands. Even more disturbing was that none of the government agencies charged with oversight were taking the bank managers to task for this (Worldwatch 2008: 129).

- 2. Compensation instead of avoidance and mitigation:** There is evidence that the Wetland Banking in the US focuses predominantly on compensation rather than other aspects of the mitigation hierarchy such as avoidance and minimization (mitigation) (Hough & Robertson 2009). This is a serious pragmatic problem with offsets: they often do not encourage reducing or avoiding impacts, but rather move immediately to compensation. This finding is also confirmed in other jurisdictions, for example in Canada (Clare et al. 2011).

If due attention is not paid to every stage of the mitigation hierarchy, offsets can easily act as a kind of *perverse incentive* to development.

- 3. Offset location and equivalence:** Choosing an offset site is a critical decision. Experience from the US show that in this programme questionable locations were chosen outside the impacted watershed: locations that did not meet the '*like for like*' criteria (Kettlewell et al. 2008).

2.3 Business and Biodiversity Offsets Programme

The Business and Biodiversity Offsets Programme (BBOP) is a collaboration of some 50 companies, financial institutions, governments and civil society organisations, who are members of its Advisory Group. It is involved in piloting biodiversity offset projects and has developed principles for them.

At the *Global Business of Biodiversity Symposium* in July 2010, Kerry ten Kate of BBOP noted that what companies want are access to resources, a license to operate, access to capital, markets and a seat at the policy development level, and that therefore agreeing to protect biodiversity in exchange for access to land and resources is in the

interest of business. This echoed remarks made by the company Rio Tinto earlier.

Example: Ambatovy project

The Ambatovy project in Madagascar is used by BBOP as a pilot case study and was described by Ten Kate as a successful example. Composite offsets are proposed to protect Anhera forest to offset damage to similar forest around a Rio Tinto's proposed nickel mine.

In the *Business and Biodiversity Offsets Programme*, the aim is to enable companies to do business - and thereby destroy biodiversity - in area A in exchange for restoring or protecting area B.

However, ecosystems work as wholes and their resilience may well depend on their integrity being maintained. Different areas of biodiversity are not necessarily equivalent.

3 General concerns

3.1 Replacing existing legislation?

Just as with carbon offsets, any biodiversity offset system has the potential to replace, dissipate and/or counteract planning regulations and legal requirements on international, national and regional levels. Existing legislation concerning environmental impact assessments would also need to be incorporated.

3.2 Zoning into high and low value areas?

Biodiversity offsets could easily lead to zoning biodiversity into high and low value areas and trading commitments to the protection of "high value biodiversity areas" for access to resources such as mining on areas designated as being of lower value. In addition, the company can earn reputation and cash from having its name attached to the high biodiversity areas.

However, there is little scientific basis for high biodiversity and low biodiversity area classification schemes, let alone an agreed methodology for such classification. Considering the significant economic interests at stake, this entails an important risk of unfounded classifications.

3.3 Forest mosaics

Conservative International describes their *Forest mosaics* project as giving forest companies the opportunity to "reduce deforestation in the Brazilian rainforest, improve local livelihoods and protect biodiversity - all while making a profit".

Like a patchwork quilt, it proposes to set up a mosaic of planned "locations and intersections of natural reserves, protected areas, plantations, agricultural land, infrastructure and settlements", leaving it to "landowners and other stakeholders" to determine which areas are most suitable for agriculture and forestry, which areas

should be protected to "conserve water, store carbon and provide other ecosystem benefits" and which habitats are crucial for the survival of species. As Conservation International points out: in this case the landowners who should play a crucial role in this would be paper and pulp companies who are among the largest landowners in the Brazilian Amazon.

The main problem with the mosaic concept is that it seems to ignore the significant impact fragmentation has on forest biodiversity and other ecosystems. For many species, fragmentation is one of the main causes of their decline. Top predators especially, which play a crucial role in the food chain, tend to be unable to survive in a fragmented ecosystem. The decline of these species will have impact on the entire ecosystem.“ (See also section 3.5 on fragmentation.)

Another significant problem with the mosaic concept is that it assumes a highly participatory and equitable physical planning process to determine the different land uses in a certain area. This assumption is detached from the realities in most countries, where local and national elites and economically powerful actors like corporations will be able to manipulate land planning processes to their advantage, thus marginalizing less influential actors and groups like Indigenous Peoples, small farmers and women. Experiences with forest carbon offset schemes have demonstrated how the latter risk losing their lands and livelihoods when the forests and lands they depend on suddenly increase in economic value.

Institutions like the FAO have pointed out the risks of sudden increases in value of land for people who do not yet have secure rights to those lands.

Although industry presents the mosaics concept to show that exploitation/production and conservation can go together, it is not clear whether this is really possible. Fragmentation of ecosystems is likely to degrade them and to reduce biodiversity. It may have crucial impacts on total biodiversity for example by altering the food chain through the removal of top predators or other adverse effects. Local communities - especially indigenous people - are unlikely to benefit. Altogether this proposed *Forest mosaic* appears more like a desk exercise of mapping than a response to the realities on the ground.

3.4 Catchments, locations and political borders

How is the catchment area of an ecological region determined, and what areas are taken into account for the location of offsets? Ecosystems are not necessarily bound to national or other political borders.

If the effect of biodiversity destruction takes place across a border, will the offsets be located on both sides the border, effectively cutting the area in two smaller areas? Or will offsets only be located on one side of the border? Would this lead to countries being able to sell off their responsibilities to protect biodiversity to other countries?

3.5 Fragmentation versus Integration

Offsetting the destruction of one part of an ecosystem in a different location leads to

fragmentation of ecosystems. Such fragmentation by market forces stands against the need to protect ecosystem integrity and integrated approaches.

In intact forest landscapes for example, even the building of a road leads to fragmentation, with increases in the relative length of forest edges and an increase of edge effects. Among other effects, trees on the edges of such fragments are vulnerable to drought, wind and fire (Laurance 2005).

"Edge effects in fragmented forests have now been well documented (e.g. Gascon et al. 2000) and include: increased tree mortality, especially amongst large mature trees of high biodiversity value (Laurance et al. 2000a); impairment of seed germination (Bruna 1999), shift to pioneer tree species; increased vines, which block out light preventing forest regeneration (Laurance et al. 2001b) and negative responses of butterflies, ants, beetles and termites (Laurance et al. 2000b). Edge effects have serious ecological consequences, which may threaten the survival of the remaining forest fragment (Gascon et al. 2000)." (Cotter 2003).

Fragmentation therefore not only affects the area on which biodiversity is directly damaged or destroyed, but also surrounding areas. Can biodiversity offsets account for this? When do intact areas become too small to function?

Fragmented ecosystems including forestry and forest mosaics, and protected areas of high biodiversity may not be consistent with protecting ecosystem functions and biodiversity. In this context we all too often do not actually understand how to protect biodiversity because we do not understand the relationships between species in the affected areas. So-called high biodiversity regions risk being isolated or enclosed and set against or traded for development of low biodiversity/carbon regions (zoning).

In order to retain their resilience, ecosystem integrity must be retained, but a market approach may not be coherent with this need.

3.6 The difference between price and value

At the aforementioned *Global Business of Biodiversity Symposium*, Pavan Sukhdev, TEEB study leader, talked about the difference between *price* and *value*. He stated that nature is largely economically invisible and that it is the aim of TEEB to make its economic services more visible. However, *price* is not the same as *value*. The aim of the TEEB is to give a *shadow price* to biodiversity.

Such an approach is - in spite of good intentions - at best confusing. TEEB is very clear that all the values of nature - its health, psychological, spiritual, and aesthetic values - are beyond price, yet TEEB speaks of a shadow price that may include all these values.

Example: Mangrove forest versus shrimp farming

Pavan Sukhdev described an example of a short-term economic return - a shrimp farm - versus a long term value that it replaces - the mangroves.

In this example, cutting down the mangroves results in a timber sale of USD

600, and shrimp sales in USD 9,600. Subsidies for shrimp farming amount to USD 1,200. However after 4-5 years, shrimp farming becomes unviable and restoration will have to be carried out.

In contrast, mangroves provide long-term fish nurseries and storm protection for the coast, so the long-term value of the mangroves is higher than the return for shrimp farming.

One point that Sukhdev stated himself while giving this example is that these economics do not recognize communities.

According to Sukhdev, the value of nature is infinite; and that expressing value is much more complex than simply putting a price on nature, which he says he is often asked to do. However this - putting a price on nature - is exactly what biodiversity offsets would have to do if they are to function in the market.

It is not clear how nature can be valued without naming a price, especially with regard to creating markets. In addition, a widely acknowledged problem with markets is that they generally take a short-term approach to extracting profits, whereas the health of biodiversity has to be seen in a long-term context.

TEEB itself is not able to suggest ways to prevent short-term exploitation by citing long-term values.

Another example of the difference between price and value comes from Russia in 2010, showing how absurdly wrong things can go, when financial estimates are required.

Example: Pavlovsk seed bank

In 2010, the Russian state sold the land on which the *Pavlovsk Research Station*, part of the *N.I. Vavilov Research Institute of Plant Industry* is located, to a private developer who wants to build houses there. The research station is a seed bank for fruit trees and berries, including almost a thousand types of strawberries and black currants from 40 and 30 countries respectively, 600 varieties of apples from 35 countries, and more than a hundred varieties each of gooseberries, cherries, plums, red currants, and raspberries. In contrast to other seed banks, seeds are not stored as frozen seeds, but are grown on an area of about 500 hectares. An estimated 90% of the varieties are not available in other seed collections. (Vidal 2010, Pearce 2010, Jégo 2010).

"In what appears Kafkaesque logic, the property developers argue that because the station contains a 'priceless collection', no monetary value can be assigned to it and so it is worthless. In another nod to Kafka, the government's federal fund of residential real estate development has argued that the collection was never registered and thus does not officially exist." (Vidal 2010)

After an international campaign, the auctions to sell the land to private owners have been halted for the time being, but its future is still unclear.

3.7 The desire for simplicity versus actual complexities

The need for simplicity and speed (e.g. to get an economic project approved) versus the complexities of the assessments are already a well-known problem in the carbon market, where the complexities of the so-called MRV (measurement, reporting and verification) are continuously discussed.

For biodiversity offsets the complexities of assessment are much greater since the biodiversity to be destroyed as well as the proposed offset location and proposed measures need to be assessed - and these assessments need to go beyond a list of the species present to somehow include its intrinsic values.

The tensions that already exist in the carbon market between the demands of the market approach for simplicity and speed and the need for clear baselines and independent assessment of claimed benefits will be much greater for biodiversity offsets. Promoters of the carbon market currently seek generalisations and general assumptions about benefits in order to enable the process to move forward. Generalisations, however, will be impossible for biodiversity offsets, where every ecosystem, its location, species web, health, psychological, spiritual, and aesthetic values, is unique - as are the locations that are to be used as offsets.

As Walker et al. (2009) note:

“Viable trading requires simple, measurable, and interchangeable commodities, but the currencies, restrictions, and oversight needed to protect complex, difficult-to-measure, and non-interchangeable resources like biodiversity are costly and intractable. These safeguards compromise trading viability and benefit neither traders nor regulatory officials.“ [...] “We posit that weak technical design and lax enforcement are predictable features of regulatory biodiversity trading, and that sound and well-intentioned ecological advice is unlikely to correct this.”

3.8 Offsets on marginal lands

Besides an appropriate assessment of the biodiversity to be destroyed, a second assessment is required for the location at which the offset measures are meant to take place. The last years have seen a growing trend to describe land as 'marginal': un-used, under-utilized, idle, not used for agriculture or commercial purposes, and therefore available for other, more profitable, purposes. Even though the term “marginal” is not well defined, it can describe areas which are not biodiversity hotspots or which are not biodiverse in themselves, but which are also important for biodiversity and ecosystem resilience. Some local community uses might increase biodiversity without being visible to Western eyes.

The assumption that large quantities of 'marginal' land exists and can be used to solve the problems of climate change has been criticised before (African Biodiversity Network et al. 2008). Proposing to 'improve' the biodiversity of such lands will cause the same problems and can lead to human rights violations (see below).

4 Human Rights violations

Already, problems occur when the establishment of a protected area conflicts with the local and indigenous communities living there. The CBD has previously acknowledged these problems, but has been unable to solve them. At the same time human rights violations occur where land is taken over for different purposes (such as mining, large-scale agriculture, industrial development, road building etc.) and where no formal land titles exist or established rights are violated. Biodiversity offsets could even harm local and indigenous communities twice over: once at the site where development is planned, but also the biodiversity offset results in a protected area that exclude them from accessing resources on which their livelihoods depend.

Human rights violations are very likely to occur when forest and other land that was previously of little value but used by economically marginalized groups like landless peasants, women and Indigenous Peoples suddenly becomes attractive for economically valuable purposes (such as mining, large-scale agriculture, industrial development, road building etc). In addition, land can become the focus of attention when it is considered 'marginal' (unused, underutilized etc.) and therefore available as an offset-location.

Often these areas are in fact used, often by parts of society that are marginalized themselves. Areas might also hold spiritual or religious value and are therefore (for example) not used for agriculture (African Biodiversity Network et al. 2008).

A number of countries do not yet have clear land tenure rights, or otherwise the granting of such tenure is biased against those using the land for their own survival. The issue of formal tenure and titles to land have already been identified by the FAO (2009) as a factor in dealing with the food crisis.

Helena Paul and Antje Lorch

*EcoNexus
London/Amsterdam
July 2011*

5 References

African Biodiversity Network, Biofuelwatch, EcoNexus, the Gaia Foundation, Salva La Selva & Watch Indonesia (2008): *Agrofuels and the Myth of the Marginal Lands*.

<http://econexus.info/publication/agrofuels-and-myth-marginal-lands>

Business and Biodiversity Offsets Program: <http://bbop.forest-trends.org>

Clare S., Krogman N., Foote L. & Lemphers N. (2011): *Where is the avoidance in the implementation of wetland law and policy?* Wetlands Ecology and Management 19(2): 165-182

Conservation International: *A Mosaic Landscape*.

http://www.conservation.org/sites/celb/fmg/articles/Pages/04012010_a_mosaic_landscape.aspx

Cotter J. (2003): *Mahogany Logging Causes Fragmentation of the Brazilian Amazon*. Paper submitted to the XII World Forestry Congress, 2003, Quebec City, Canada.

<http://www.fao.org/DOCREP/ARTICLE/WFC/XII/0553-B1.HTM#fn1>

DEFRA (2011): *The Natural Choice: Securing the value of nature*. National Environment White Paper. DEFRA, UK. <http://www.defra.gov.uk/environment/natural/whitepaper/>

Ecosystem Marketplace: *US Wetland Banking*.

http://www.ecosystemmarketplace.com/pages/dynamic/web.page.php?section=biodiversity_market&page_name=uswet_market

Euractiv (2009): *Carbon trading 'stifling EU energy-savings potential'*. 22 April 2009.

<http://www.euractiv.com/en/energy-efficiency/carbon-trading-stifling-eu-energy-savings-potential/article-181502>

Europol (2010): *Further investigations into VAT fraud linked to the Carbon Emissions Trading System*. Press release, 28 December 2010.

<https://www.europol.europa.eu/content/press/further-investigations-vat-fraud-linked-carbon-emissions-trading-system-641>

FAO (2008): *Climate change, bioenergy and land tenure*. High-level conference on food security: the challenges of climate change and bioenergy. Rome, 3-5 June 2008.

http://www.globalbioenergy.org/uploads/media/0805_FAO_-_climate_change_bioenergy_and_land_tenure.pdf

FAO (2009): *Responding to the food crisis: synthesis of medium-term measures proposed in inter-agency assessment*. Report by G. Viatte, J. De Graaf, M. Demeke, T. Takahatake & M. de Arce; FAO, Rome. http://www.fao.org/fileadmin/user_upload/ISFP/SR_Web.pdf

Global Business of Biodiversity Symposium: <http://www.businessofbiodiversity.co.uk>

Hough P. & Robertson M. (2009): *Mitigation under Section 404 of the Clean Water Act: where it comes from, what it means*. Wetlands Ecol Manage (17): 15–33.

Inman P. & Webb T. (2009): *Seven charged in carbon trading VAT fraud case*. The Guardian, 26 January 2011, <http://www.guardian.co.uk/environment/2011/jan/26/seven-charged-carbon-trading-vat-fraud-case>

Jégo M. (2010): *Russia backs away from plans to break up the unique Pavlovsk seed bank*.

Guardian Weekly, 12 October 2010.

<http://www.guardian.co.uk/environment/2010/oct/12/russia-seed-bank-vavilov-pavlovsk>

Kettlewell C.I., Bouchard V., Porej D., Micacchion M., Mack J.J., White D. & Fay L. (2008): *An assessment of wetland impacts and compensatory mitigation in the Cuyahoga River Watershed, Ohio, USA*. Wetlands Volume 28(1): 57-67; DOI: 10.1672/07-01.1.

Laurance W.F. (2005): *Forest-climate interactions in fragmented tropical landscapes*". In: *Tropical forests and Global Atmospheric Change*; Malhi Y. & Phillips O. (eds.), Oxford University Press, Oxford.

Lohmann L. (2006): *Carbon Trading: a Critical Conversation on Climate Change, Privatization and Power*. The Corner House, UK.

<http://www.thecornerhouse.org.uk/resource/carbon-trading-0>

Macalister T. (2011): *Traders condemn EU's 'Mickey Mouse' carbon market after botched trading statement*. The Guardian, 21 January 2011.

[http://www.guardian.co.uk/environment/2011/jan/21/emissionstrading-eu?](http://www.guardian.co.uk/environment/2011/jan/21/emissionstrading-eu?INTCMP=ILCNETTXT3487)
INTCMP=ILCNETTXT3487

Mack J.J. & Micacchion M. (2006): *An ecological assessment of Ohio mitigation banks: vegetation, amphibians, hydrology and soils*. Ohio EPA technical report WET/2006-1. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus OH.

N.I. Vavilov Research Institute of Plant Industry: <http://www.vir.nw.ru>

Paul H. (2010): *Carbon - The new cash crop*. The Land, Autumn 2010 (9):15-18

<http://www.econexus.info/publication/carbon-new-cash-crop>

Pearce F. (2010): *The battle to save Russia's Pavlovsk seed bank*. Guardian Environment Network, 20 September 2010.

<http://www.guardian.co.uk/environment/2010/sep/20/campaign-russia-pavlovsk-seed-bank>

Robertson M. & Hayden N. (2008): *Evaluation of a Market in Wetland Credits: Entrepreneurial Wetland Banking in Chicago*. Conservation Biology 22(3): 636-646.

TEEB (2008): *Interim report to the European Communities*. The Economics of Ecosystems and Biodiversity. <http://ec.europa.eu/environment/nature/biodiversity/economics/>

Third World Network (2011): *Developing countries submit document for Green Fund establishment*. TWN Info Service on Climate Change, 16 July 2011.

<http://www.twinside.org.sg/title2/climate/info.service/2011/climate20110703.htm>

Vidal J. (2010): *Pavlovsk seed bank faces destruction*. The Guardian, 8 August 2010.

<http://www.guardian.co.uk/environment/2010/aug/08/pavlovsk-seed-bank-russia>

Walker S., Brower A.L., Stephens R.T.T. & Lee W.G. (2009): *Why bartering biodiversity fails*. Conservation Letters 2:149–157. <http://onlinelibrary.wiley.com/doi/10.1111/j.1755-263X.2009.00061.x/abstract>

Worldwatch (2008): *State of the World 2008: Innovations for a Sustainable Economy*. Especially Chapter 9 *Banking on Biodiversity* by R. Bayon.

<http://www.worldwatch.org/node/5559> and

http://www.worldwatch.org/files/pdf/SOW08_chapter_9.pdf