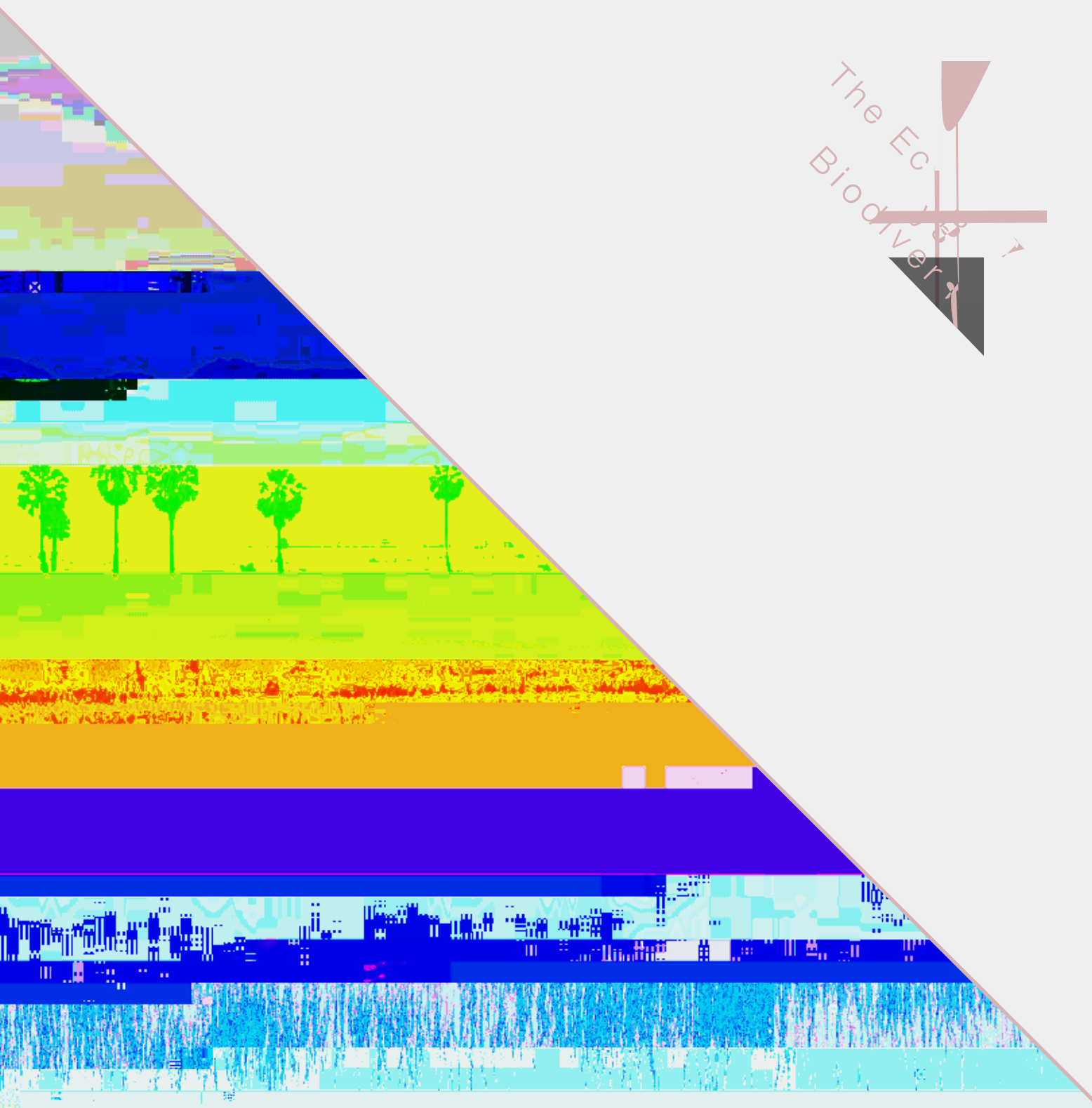
THE ECONOMICS OF ECOSYSTEMS AND BIODIVERSITY FOR WATER AND WETLANDS



Executive Summary

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;OL 0UZ[P[\[L MVY ,\YVWLHU ,U]PYVUTLU[HS 7VSPJ` 0,,7 P institute. Based in London and Brussels, the Institute's major focus is the development, PTWSLTLU[H[PVU HUK L]HS\H[PVU VM WVSPJPLZ VM LU]PYV both on Europe and the global dimension.
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The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and inter - national cooperation for the conservation and wise use of wetlands and their resources.

1. The “nexus” between water, food and energy is one of the most fundamental relationships - and increasing challenges - for society.

2.

The “nexus” between water, food and energy is one of the most fundamental relationships and challenges for society. The importance of this nexus was re-emphasised at the UN Conference on Sustainable Development (Rio+20) in June 2012. The outcome document adopted at Rio+20 “The Future We Want” noted: “We recognize the key role that ecosystems play in maintaining water quantity and quality and support actions within respective national boundaries to protect and sustainably manage these ecosystems” UNCSD (2012, para 122). Wetlands are a fundamental part of local and global water cycles and are at the heart of this nexus. We also expect wetlands to be key to meeting the Millennium Development Goals (MDGs) and the future Sustainable Development Goals (SDGs).

Wetlands are essential in providing water-related ecosystem services, such as clean water for drinking, water for agriculture, cooling water for the energy sector
HUK YLN\SH[PUN ^H[LY X\HU[P[` L N ÅVVK YLN\SH[PVU
In conjunction with their role in erosion control and sediment transport, wetlands also contribute to land formation and therefore resilience to storms. Moreover, they provide a wide range of services that are dependent
VU ^H[LY Z\JO HZ HNYPJ\S[\YHS WYVK\J[PVU ÄZOLYPLZ HUK
tourism.

Notwithstanding the high value of the ecosystem services that wetlands provide to humankind, wetlands continue to be degraded or lost due to the effects of intensive agricultural production, irrigation, water extraction for domestic and industrial use, urbanisation, infrastructure and industrial development and pollu -1.b4ybo5 1 Tf26 0 6 37bo53069 -19 Tw Te astem wetrbounvelooundecisw T* [
fHZUÀ eÀ ` GZ • ^ H [PGZ 0 HZU management, economic, wetlands sediiD [(eto a gher)18ennd supporte[(e.316 TD [(W)m ati Convr)18[(e[(eBiol

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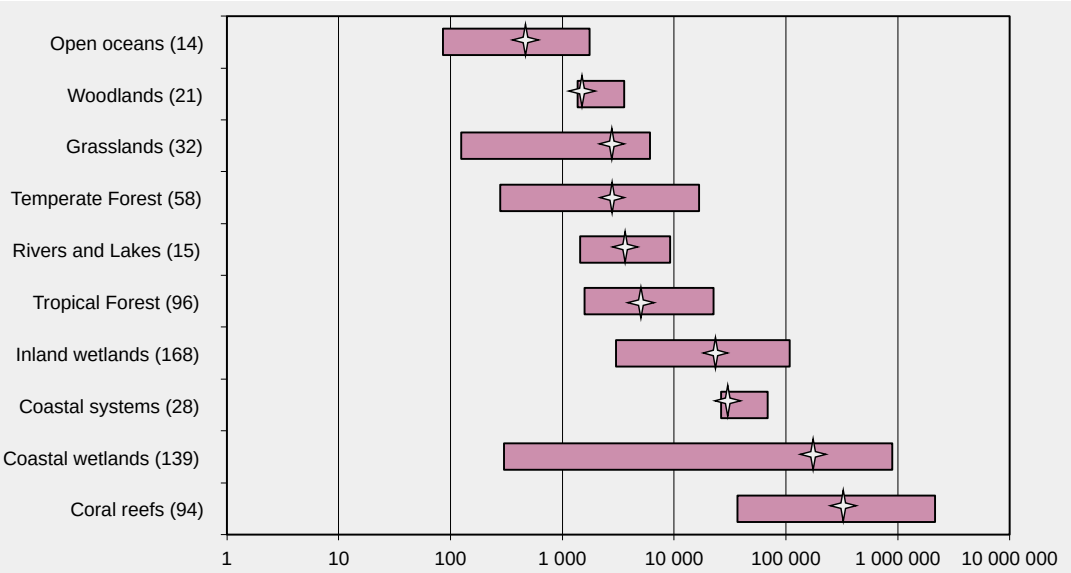
Figure 2 Range of values of all ecosystem services provided by different types of habitat (Int.$/ha/yr2007/ PPP-corrected)[2]



5V[L! ;OL ÄN\YL HIV]L ZOV^Z YHUNL HUK H]LYHNL VM [V[HS TVUL[HY`]HS\L VM I\UKSLZ VM LJ
of values per biome is indicated in brackets; the average value of the value range is indicated as a star sign.
Source: de Groot et al. (2012) building on TEEB (2010).

Table 1 Wetland Ecosystem Services and related ecosystem structures and functions

Ecosystem services	Ecosystem structure and function
Coastal protection	([[LU\H[LZ HUK VY KPZZPWH[LZ ^H]LZ I\M
Erosion control	Provides sediment stabilisation and soil retention
Flood protection	>H[LY ÅV^ YLN\SH[PVU HUK JVU[YVS
Water supply	Groundwater recharge/discharge
>H[LY W\YPÄJH[PVU	Provides nutrient and pollution uptake, as well as retention, particle deposition
Carbon sequestration	Generates biological productivity and diversity

Source: Barbier 2011

[2] The international dollar, or the Geary–Khamis dollar, is a hypothetical unit of currency that is used to standardise monetary values across countries by correcting to the same purchasing power that the U.S. dollar had in the United States at a given point in time. Figures expressed in international dollars cannot be converted to another country's currency using current market exchange rates; instead they must be converted using the country's PPP (purchasing power parity) exchange rate. 1Int.$=1USD.
>L[SHUK]HS\H[PVU Z[\KPLZ OH]L MVJ\ZLK TVZ[VU LJVZ`Z[LT ZLY]PJLZ Z\JO HZ YLJY
TH[LYPHSZ HUK MVVK WYVK\J[PVU HUK ^H[LY W\YPÄJH[PVU HUK TVYL YLJLU[S` VU [

Improved understanding and knowledge will help integrate the value of wetlands and their role in providing key ecosystem services into decision making at local, national and international scales. Incomplete understanding of these can result in favouring provisioning ecosystem services, whose]HS\LZ HYL ^LSS YLÅLJ[LK PU THYRL[Z L N MVVK [PTILY over regulating and supporting services, which are SHYNLS` PU]PZPISL PU THYRL[Z L N ^H[LY W\YPÄJH[PVU ÅVVK HUK Z[VYT WYV[LJ[PVU U\[YPLU[ J`JSPUN

WYVQLJ[Z [OH[JV\SK KLSP]LY TLHZ\Y PU [LYTZ VM ÅVVK YPZR YLK\J[PVU HU

While the value of wetlands for water supply can be considerable, an additional advantage of maintaining them is that wetlands also deliver multiple co-bene ts of signi cant social and economic values, and hence can help address a wide range of needs and objectives. Wetlands act as carbon sinks, helping reduce climate change, and for this reason their degradation (e.g. draining peatlands) can lead to very ZPNUPÄJHU[NYLLUOV\ZL NHZ LTPZZPVUZ >L[SHUKZ HSZV regulate sediment transport thereby contributing to land formation and coastal zone stability. Mangroves JHU OH]L PTWVY[HU[ÄZO U\YZLY` M\UJ[PVUZ HUK WYV]PKL an important source of protein, livelihoods, as well as TH[LYPHSZ HUK M\LS ;OLZL ILULÄ[Z TLYP[ H ZPNUPÄJHU[ re-evaluation as to their importance in order to take [OLT PU[V HJJV\U[ PU [OL WVSPJ` THRPUN WYVJLZZ 4(2005b; TEEB, 2010; TEEB, 2011a; TEEB, 2012a; TEEB, 2012b).

Wetland restoration provides a range of bene ts

30,000 ha of degraded peatland were restored in the state of Mecklenburg-Western Pomerania, Germany between 2000 and 2008. Thereby emissions from degraded peatland of about [*$_2$6equivalents are avoided every year.

(ZZ\TPUN H THYNPUHS JVZ[VM KHTHNL JH\ZLK I` carbon emissions of 70 WLY [*6[OL ILULÄ[VM avoided damage is up to 21.7 million every year (on average 728 per ha). In addition to the creation of habitat for biodiversity, peatland restoration also enhances water retention in the landscape, I\MMLYPUN HNHPUZ[JSPTH[L L_[YLTLZ Z\JO HZ ÅVVKZ and droughts, and thereby facilitates climate change adaptation.

Source: Schäfer 2009

In Louisiana, land loss has already claimed 1,880 square miles of coastal wetlands since the 1930s. In order to address this problem, a Master Plan for the Coasts was approved in May 2012. The Master 7SHU PZ IHZLK VU H [^V `LHY ZJPLU[PÄJ HUHS`ZPZ which was used to select 109 high performing

Integrated decision making should be the new normal.

(YHUNL VM [VVSZ OH]L WYV]LK PU]HS\HS[PU OLSWPUN [V take the values of water and wetlands into account and realising synergies in policy, business and management decisions:

- Land and water use planning and regulation to ensure the sustainable provision of ecosystem services. This includes designating wetlands for water regulation ILULÄ[Z MVY Y\YHS VY \YIHU JLU[YLZ KLÄUPUN UVU conversion zones to safeguard mangroves that provide PTWVY[HU[W\ISPJ NVVKZ ILULÄ[Z VY WYV[LJ[PUN JVHZ[HS HYLHZ MVY ÄZOLYPLZ U\YZLYPLZ 0U HKKP[PVU 4HYPUL :WH[PHS Planning and Integrated Coastal Zone Management may help manage coastal wetlands and deal with the relevant trade-offs (e.g. between provisioning and supporting/regulating ecosystem services). Effective regulation and careful spatial planning helps control some critical pressures on wetlands, which in turn help avoid detrimental effects on provision of crucial local LJVZ`Z[LT ZLY]PJLZ Z\JO HZ ÅVVK WYV[LJ[PVU HUK ^H[LY provision or global ones such as carbon storage.

- Using wetland services to deliver investment and achieve management objectives, by considering wetlands as natural water infrastructure that can offer solutions to meet water management objectives. Cost comparisons can often be favourable for the conservation or restoration of wetlands, even when JVUZPKLYPUN ^H[LY THUHNLTLU[HSVUL L N ÅVVK YPZR HUK WHY[PJ\SHYS` ^OLU MHJ[VYPUN PU JV ILULÄ[Z VU VMMLY (e.g. recreation or tourism).

- Investment to conserve, restore and sustainably manage wetland ecosystem services can be critical to rural communities dependent on natural capital for food, water, fuel and livelihoods and global objectives of climate change mitigation and adaption. It can be a means of cost effectively achieving a range of policy and development objectives, including the Millenium Development Goals (MDGs) and the future SDGs.

Ecosystem restoration creates jobs and improves local livelihoods

0U :V\[O (MYPJH PU]HZP]L ZWLJPLZ OH]L ULNH[P]L PTWHJ[Z on ecosystems and the services they provide, in particular water supply, causing damage to the national economy. For clearing land from invasive species, the programme "Working for Water" was introduced in 1995, providing jobs and training to about 20,000 people from marginalised groups of society per year and thereby also contributing to poverty reduction. The programme "Working for Wetlands" is targeting in particular the restoration of wetlands. The restored Manalana wetland, for example, now contributes provisioning services, such as food, grazing and construction materials, valued at around R3,466 per year to about 70% of local households, in an area where half of the households have an income of less than R5,700 per year. The improvement in livelihood ILULÄ[Z ^HZ LZ[PTH[LK [V IL [^PJL HZ OP costs of restoration

Source: DWAF: http://www.dwaf.gov.za/wfw/ Bushbuck Ridge Project: http://www.un.org/esa/sustdev/publications/africa_casestudies/bushbuck.pdf and Pollard et al. 2008

- Price and subsidy reform [V LUJV\YHNL LMÄJPLU[\ of resources and innovation. This can be done for example by moving to fuller cost recovery for water (paying for the costs of supply) and, where relevant, also by resource pricing (taking into account the value of the resource itself for society). Furthermore, making use of pollution charges, liability and compensation requirements (e.g. for pollution incidents or damage) can reduce the pressures on wetlands and help implement the polluter pays principle. Reforming subsidies can encourage management practices that protect public goods, promote innovation, reduce technological lock-ins and save public budgets for other objectives (Lehmann et al 2011, Withana et al 6,*+

- Payments for ecosystem services to remunerate land uses that deliver ecosystem services, through

Practical recommendations for stakeholders to respond to the value of water and wetlands in decision-making

([[OL global level, there is a need to ensure implementation of the Strategic Plan for Biodiversity 2011-2020, the Ramsar Strategic Plan 2009-2015, the UNFCCC, the MDGs, and strategic planning and implementation of the many Multilateral ,U]PYVUTLU[HS (NYLLTLU[Z 4,(Z ;OL YVSL HUK value of water and wetlands should be integrated in each of these, in order to improve water security and V[OLY ^H[LY YLSH[LK ILULÄ[Z 0[PZ HU H^HYLULZZ HUK NV]LYUHUJL JOHSSLUNL ^P[O WV[LU[PHS MVY ZPNUPÄJHU[Z`ULYNPLZ HUK LMÄJPLUJ` NHPUZ ILJH\ZL PU]LZ[TLU[Z in wetlands are investments in human welfare.

National and international policy makers

‹ 0U[LNYH[L [OL]HS\LZ VM ^H[LY HUK ^L[SHUKZ PU[V decision making and national development strategies – in policies, regulation and land use planning, incentives and investment, and LUMVYJLTLU[4HRL M\SS \ZL VM [OL 5):(7Z 5H[PVUHS)PVKP]LYZP[` :[YH[LNPLZ HUK (J[PVU 7SHUZ process to help with integration;

‹ ,UZ\YL [OH[^L[SHUK LJVZ`Z[LT ZLY]PJLZ VW[PVUZ HUK ILULÄ[Z HYL M\SS` JVUZPKLYLK HZ ZVS\[PVUZ [V land and water use management objectives and development;

‹ +L]LSVW PTWYV]LK TLHZ\YLTLU[HUK HKKYLZZ knowledge gaps, using biodiversity and ecosystem services indicators and environmental accounts. This requires an improved science-WVSPJ` PU[LYMHJL HUK Z\WWVY[ MVY [OL ZJPLU[PÄJ research communities. The recently established Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)[5] could contribute ZPNUPÄJHU[S` PU [OPZ HYLH"

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‹ 0KLU[PM` JV ILULÄ[VWWVY[\UP[PLZ MVY HJOPL]PUN

Gong P, Niu ZG, Cheng X, Zhao KY, Zhou DM, Guo JH, Liang L, Wang XF, Li DD, Huang HB, Wang Y, Wang K, Li WN, Wang XY, Ying Q, Yang ZZ, Ye YF, Li Z, Zhuang, DF, Chi YB, Zhou HZ, Yan J. (2010). China's wetland change (1990–2000) determined by remote sensing. Sci China Ser D, 53(7):1036–1042.