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The Hague Environmental Law Facility

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THE HAGUE ENVIRONMENTAL LAW FACILITY

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Executive summary

This report analyses the means for better compliance and enforcement of international environmental law and aims at identifying constraints, needs and possibilities to improve the urgently needed implementation and enforcement of international environmental law on national and local levels. To achieve this goal the UNEP review of international public compliance and non-compliance procedures and international private sector regulations have been analysed and conclusions were drawn to tackle the non-compliance gaps. The last chapter introduces satellite imagery as a tool for better verification and enforcement of international environmental law and recommendations from the latest development in the sector are formulated to propose the concrete steps that have to be taken.

It became clear that *third party missions for monitoring and objective verification of self-reported review information* of the treaty provisions in combination with the development of *strong verification provisions inside the environmental agreements* themselves are needed as baseline for improved compliance. Here the inclusion of NGOs for detecting non-compliance and reporting, following the example of the Convention on International Trade of Endangered Species (CITES), should be explicitly included in other conventions, especially in the biodiversity and chemical clusters.

For the compliance procedures International Technical Means of verification (ITM), in addition to the mostly insufficient national means of verification (NTM), are recommended to be administered by *independent international verification institutions*. These verification bodies have to be supported by enforcement mechanisms leading to adequate remedies and consequences. Here the status of The Hague as a legal capital would provide an appropriate environment for an international verification institute. As Hettling (2008) comments that verification and enforcement shall not be divided, this institution could enable the required *coordinated approach of triggering non-compliance procedures inside Multilateral Environmental Agreements (MEAs)i.A. suspending trade privileges or initiate capacity building for recurring non-compliance. It also should increase the effective MEA coordination on national level*, between the different involved MEA focal points and ministries in the implementation of the policies, which is still at a very early stage.Several MEA-Secretariats accordingly stated the need for assistance in compliance and enforcement measures, which would include training for civil servants, prosecutors and judges. Furthermore, enforcement powers have to be enhanced at the national level to ensure compliance on a local scale.

To effectively increase the enforcement powers at local level *a coordinated cross-sector approach* respective to the local and thematic context has to be taken. This means the *triggering of international private sector regulation mechanisms*, such as the OECD national-contact points and inspection panels of multilateral financial institutions, building connections to *intergovernmental investigation and inspection organisations* (e.g. IMPEL, Eurojust) and the *inclusion of non-governmental organisations* for improved reporting and verification. These efforts should be connected to the political process and compliance mechanisms inside the respective MEAs conferences of the parties. In all these approaches affected *communities* have to be, as far as possible, the integral part of the capacity building measures and enforcement actions.

Regarding the use of satellite imagery as verification and enforcement tool there are no foreseeable legal constraints on e.g. privacy claims. However it should be included in *tailor-made provisions in the environmental agreements* and has to be accompanied with *clearly defined and coordinated multilateral non-compliance procedures*. Especially for *high risk sites and actors* earth observation monitoring is an appropriate option in the increasing regulatory efforts in national and international environmental law. Key in future deployment is a *clear idea whether or not earth observation is actually needed in the context of the regulatory challenge* in terms of financial efficiency and deterrence effectiveness.
The GMES services of LIMES, G-MOSAIC and MARISS are delivering envisaged open source data for potential users, which offer future opportunities in monitoring for legal compliance and enforcement. MARISS is already active in the regulation of coastal and high-seas activities by e.g. using SAR-data with integrated ship detection services for near real time ship detection. G-MOSAIC operates in areas of illegal logging and illicit crop monitoring and supported the illegal

mining sites for the Kimberley-process under the GMOSS network for monitoring of security and stability (put duration of project). The proposed The Hague Environmental Law Facility could establish the respective networks and build the legal capacity for a coordinated and functioning GMES service for law enforcement by offering workshops for judges and prosecutors on the topic and link them to respective data sets.
This was also requested by enforcement agencies i.A. Eurojust and Interpol.
To ensure its practical impact on legal enforcement *common standards for the processing and product generation of satellite data* has to be assured by the technical experts. International courts should nominate an independent expert to ensure neutrality and the court should order own images whenever possible. There are a number of technical possibilities to avoid manipulation during the image processing which has to be included in the acquisition process, additionally, raw and pre-processed data should be made available to the court if requested. *The use of satellite imagery has to be integrated into the existing rules of the tribunals and international courts* to support efficiently the taking of evidence and strengthen the courts authority and judgement through stronger proof. Again The Hague with its unique setting of international courts and tribunals and technical organisations such as the Netherlands Space Office, the TNO and several private earth observation technology companies has the potential to develop the world's leading expertise in this field.

1. Introduction

"Natural systems that support economies, lives and livelihoods across the planet are at risk of rapid degradation and collapse, unless there is swift, radical and creative action to conserve and sustainably use the variety of life on Earth. That is a principal conclusion of a major new assessment of the current state of biodiversity and the implications of its continued loss for human well-being." (Global Biodiversity Outlook, CBD, 2010)

" The rapid increase in MEAs addressing a multitude of environmental matters and the wide range of decisions taken by their governance bodies has resulted in widespread concern that MEAs are not complied with and not enforced, or are inadequately implemented, and that implementation efforts at both national and international levels are insufficiently coordinated." (UNEP 2006)

UNEP lists 216 multilateral environmental agreements for most of our natural resources and related economic activities, tendency rising. If we just have a brief look at the reality of some of our on-going global environmental destruction, against all our formulated intentions in environmental conventions, economic guidelines and financial performance standards, one must considerably question their effectiveness. It might be appropriate to ask if the ongoing development in international environmental law should be focused on compliance and enforcement. Two brief examples are Indonesia and Brazil. Indonesia despite of being a member to the International Tropical Timber Agreement (ITTA), the United Nations Framework Convention on Climate Change, the ASEAN Convention on Transboundary Haze Pollution, The United Nations Convention on Biological Diversity and the Ramsar Convention on the securing of Wetlands, the burning of rain forest and peatland is still going on at a large scale in Borneo and Sumatra. Main actors are the companies of APRIL& APP, Jardine Matheson, a company from the UK, which is obliged under OECD and ITTA, and Sinar Mas, a state owned Indonesian company. As a member of the OECD Brazilian companies are obliged to adhere to the, now revised, OECD guidelines. Apart from that they are member to following conventions obliging them to protect indigenous rights and the environment: The Tropical Timber Agreement (ITTA), the Convention on Biological Diversity, The Framework Convention on Climate Change and its Kyoto Protocol, the Convention concerning Indigenous and Tribal Peoples in Independent Countries, the Convention concerning the Protection of the World Cultural and Natural Heritage, the Statutes of the International Union for Conservation of Nature and Natural Resources (as revised in 1996) and the Treaty for Amazonian Cooperation. However, that doesn't seem to prevent the building of the Jirau-Electricity Hydroenergy facility with Suez Engergy of France, who is as well OECD member and signed the ITTA, at the Madeira, breaking environmental legislation and forcing illegal resettlements, allowing Veracell a brazil-swedish paper producing joint venture to illegally slash rainforest for monocultures and Holcim as Swiss company member of the OECD, to pollute water and air with toxic substances.

Of course there are far more cases all over the world from the release of toxic chemical sewages into rivers in the United States to slashing of rain forest for pulp and paper production in Tasmania. Most disregard of international environmental law takes place in the forestry, oil and mining sector, where the principle of prior informed consent with indigenous communities and effective grievance mechanisms are lacking, rarely respected or enforced under violent pressure, leaving the affected people no choices to compromise.

This paper will analyse the factors of lacking compliance and enforcement in the development of international environmental law, especially inside the UNEP Montevideo Programme, and examine satellite monitoring as a potential new tool to increase the ability of different actors from civil society to regulators to prevent and react proactively to those breaches.

2. Compliance and Enforcement mechanisms under International Environmental Law

Talking about compliance under multilateral environmental agreements (MEAs) is more differentiated than one might expect. This is partly due to the absence of authoritative definitions of compliance. Fine distinctions need to be drawn between implementation and compliance, between international and domestic compliance mechanisms, between performance information and environmental baseline data, between verification and monitoring missions, between primary implementation assistance and non-compliance response assistance, and between penalties and compensation liabilities.
In the course of the last 50 years there has been a striking multiplication of multilateral environmental treaties. More than 210 multilateral environmental agreements are listed by the UN Environmental Programme (UNEP) of which 200 were adopted after 1951 and most of those after the 1972 UN Conference on the Human Environment in Stockholm. Among the most popular agreements are the UN Framework Convention on Climate Change, the Vienna Convention for the Protection of the Ozone Layer, the Convention on Biological Diversity, the Convention on the Law of the Sea and the Convention to Combat Desertification.
In spite of the rising numbers of treaties the environmental degradation is becoming more acute. This is primarily due to the fact that strong provisions inside the agreements are rare and mostly not contain any specific reference to verification, as a first step to detect non-compliance. Some of the new accords provide for general implementation review systems and in the development of the conventions implementation and compliance committees were established to address lacks in the parties' capacities. However, the official wording for a review system in the agreements is usually weak and not well elaborated.
The Montreal protocol (1989) to the Vienna Convention on the Ozone Layer is internationally considered to be the most successful MEA. It was the first multilateral environmental agreement which unambiguously constituted a formal mechanism to identify and address non-compliance of the parties to the convention.
In 2007 the UNEP Department for Environmental Law and Conventions was mandated to conduct a comparative analysis of compliance mechanisms under selected representative MEAs on nature conservation, hazardous materials, the atmosphere and marine environment. It showed that almost all of the 19 MEAs analysed contain national performance review information provision requirements and most have dispute resolution procedures included, but only a small number embody non-compliance response mechanisms. Following, the according procedural steps in a compliance process are summarized.

2.1. Performance Review Information

Most capacity building activities and international studies focus on the performance review information, which information is mostly gathered from national self-reporting. This, in most of the cases, is carried out according to formulated guidelines or templates.
What is more striking is that just less than a third of the MEAs provide for verification of the data in national reports or for third-party monitoring of national reporting systems.
Another omission is that of agreements that regulate transactions the two most recent do not contain obligations for reporting of details to the regulated transactions, which generates severe information gaps in the assessment of the MEA-performance.
Further a harmonisation of reporting formats and joint reporting of MEAs regulating overlapping sites have a great potential. The respective research and work is carried out by several international organisations including the World Conservation Monitoring Centre and the United Nations University.
In relation to monitoring and verification, potential interlinkages exist in carrying out third-party monitoring operations and verification missions. Thus, a verification mission might be multitasked to assess aspects of compliance for several MEAs.

2.2. Multilateral Procedures to consider Non-Compliance (NCPs)

In dealing with non-compliance procedures it is important to distinct them to dispute resolution procedures which only occur if sufficient damage has been done to the legal order or in conflict situations. The purpose of these procedures is to address non-compliance in a non-adversarial method by identifying the Parties' compliance difficulties and facilitate better compliance. Most of the MEAs already have or are in the development phase of a NCP. A contrast that occurs is that none of the marine conventions have a NCP. Attention to the non-compliance body under the COP/MOP, which is mostly an Implementation or Compliance Committee, can be brought by the Party itself, other members, the secretariat or in some cases third parties that perform a monitoring role. An enhanced coordination is slight as most on the NCPs are directly linked to sensitive balance in negotiations.
However, coordination benefits among MEAs could be in the more effective triggering of NCPs through sharing of performance information in respective clusters of MEAs or if dealing with international trade indicating a Parties' similar non-compliance under a different regime through e.g. corrupted customs.

2.3. Non-Compliance response measures

Measures of responding to non-compliance have to be classified into incentives – technical and financial assistance; and disincentives – penalties, such as suspension of trade privileges or stricter reporting requirements. Distinguished also has to be between implementation assistance, which occurs at an earlier stage, and non-compliance response assistance. All of the MEAs provide technical and mostly financial implementation assistance, but only a minority sets out specifically assistance to non-compliance mechanisms. Where they do, two provide a conditional national compliance action plan. Disincentives to continued non-compliance can be imposed in less than a quarter of the MEAs surveyed. They include additional information on non-compliance response by the parties or imposition of warnings and penalties. Additional obligations, trade sanctions, suspension of privileges and liabilities are contained in those impositions.
Interlinkages across MEAs could maximise the effect of non-compliance responses for the respective Party. Thus, the coordination of implementation assistance across MEAs in cases of lack of environmental management capacity to address recurrent non-compliance would increase the effectiveness by avoiding duplication and piece-meal work.

> *Non-compliance response assistance measures could be easier to coordinate across MEAs than general implementation assistance measures because they are nominated as priorities through NCPs and are fewer in number than general requests for assistance. Similarly, the coordinated imposition of penalties against a serially non-compliant Party would have greater deterrent impact than ad hoc penalties. Coordination would be likely to be useful across MEAs within a cluster but could also be useful across MEAs that regulate common activities, such as international trade in or manufacturing of particular products.*

2.4. Dispute Settlement

Procedures in dispute situations are clustered under three compulsory actions, which are negotiations, conciliation and arbitration. They range from provisions to have parties negotiate bilaterally in good faith to legally binding arbitration resolution procedures.
All but four conventions have provision on dispute settlement but except on the UNCLOS Migratory Fish agreement have no compulsory binding procedures. As the disinclination of a compulsory adversarial arbitrated dispute settlement could result in extensive costs for the regime the trend is going towards multilateral NCPs to manage political relationships vital to the integrity and viability of the MEA regimes.

A potential was seen in a common dispute resolution body especially within clusters, including the nomination of standing panels of experts which could be specified within the respective conciliation or arbitration annexes. Although it appears to be widespread avoidance of Parties to third party resolution, the recent case of Micronesia towards the Czech Republic of building a large scale coal plant indicates a future usability.

2.5. Compliance interlinkages

Greatest concentration of interlinkages especially among clusters is explored in performance review information. To be mentioned is that biodiversity related MEAs enjoy the greatest synergies in general implementation. Other interlinkages occur within the clusters of hazardous substances and the atmosphere, with exception from the marine cluster. Cross-cluster interlinkages can solely been identified between the biodiversity and the atmosphere cluster. The report further concludes that the success of interlinkages between MEA compliance mechanisms at the international level relies largely on the effectiveness of interlinkages in implementation across MEAs at the national level. In relation to take-up at the national level, capacity-building to enhance interlinkages in national implementation of MEAs is being delivered by some intergovernmental organisations, such as UNDP, UNEP and WCO. Several international organisations that are partly non-governmental also seek to build implementation capacity.
The most significant of these is the International Network for Environmental Compliance and Enforcement (INECE), which has developed a set of environmental compliance and enforcement (ECE) indicators for assessing domestic program performance. Such capacity building seeks to enhance national systems for domestic implementation of individual MEAs and, to a lesser extent, to build domestic interlinkages between them. However, the UNU has conducted national case studies of institutional coordination in relation to the implementation of MEAs that touch specifically upon interlinkages in domestic implementation. A brief survey of national implementation data suggests that, except for countries in North America and Europe, domestic interlinkages in implementation across MEAs are at very early stages of development and mostly concern the establishment of integrated environmental monitoring databases rather than integration of performance information.

3. The UNEP/DELC Montevideo Programme for the Development of Environmental Law and the Colombo process on Compliance and Enforcement

The UNEP Department for Environmental Law and Conventions (DELC), which hosts most of the MEAs, in 1982 developed a long term strategic guidance plan for international environmental law, called the Montevideo Programme. Part of the mandate accorded, UNEP was to undertake programme activities in regard to the conclusion of international agreements and the development of international principles, guidelines and standards.
The programme is reviewed every ten years, has to be approved by the UNEP Governing Council and is now entering to its fourth period. The Montevideo Programme III was organized under the three major topics of effectiveness of environmental law, conservation and management and relationship with other fields. The compliance with and enforcement of Environmental law has been a critical cross-cutting issue since the beginning of Montevideo I. By analysing the half period review of Montevideo III and the proposals of the expert meetings on the preparation for Montevideo IV following key points, mostly for research, regarding better implementation, compliance and enforcement had been identified:

3.1. Identified needs for better ICE inside the UNEP Montevideo Programme IV:

- Assessment of national environmental legislation before negotiations

- development of relevant strategies, mechanisms and national laws
- studies on effectiveness and compliance with environmental law, identifying underlying causes of non-compliance
- studies on the environmental effectiveness of domestic law
- national environmental strategies or action plan to assist implementation
- review mechanisms at subregional, regional and global levels
- evaluate and as appropriate, promote the use of criminal and administrative law and enforcement of domestic and national environmental law
- effective involvement of non-state actors in promoting implementation of and compliance with international environmental law
- study experience regarding dispute settlement provisions of international environmental agreements in order to assess the effectiveness of those provisions
- Explore legal and practical means of promoting and protection appropriate public participation in the implementation of, compliance with and enforcement of environmental law, taking into account intra- and inter-generation equity
- Organize training on laws and procedures relating to access to environmental information and public participation in processes leading to environmental decision-making
- promoting dialogue and public participation in environmental matters especially in the context of environmental impact assessment
- improving education in environmental law
- support efforts to ensure that environmental agencies, institutions and organisations, particularly in industrializing countries, have access to internet-based legal database
- assess states use of tools such as eco-labelling, certification, pollution fees, natural resource taxes and emissions trading and assist, as appropriate, in the use of such tools
- promote the development and assess the effectiveness of voluntary codes of conduct and comparable initiatives that promote environmentally and socially responsible corporate and institutional behaviour, to complement domestic law and international agreements

3.1. Identified emerging Issues regarding ICE of Environmental Law by expert sessions towards the 26th UNEP Governing Council:

- Institutional and governance arrangements, including the presence of corruption and weak systems of regulation and accountability
- Changes in existing institutions and the development of new ones may be sometimes necessary, particularly at the national level, relating to the management of common pool/ open access resources (e.g. issues of ownership and access to resources, rights to participate in decision making, etc.)
- Overview over existing international agreements/obligations of countries and their compliance to them

3.2 The Colombo process for compliance and enforcement

Especially under effectiveness of IEL inside the Montevideo III Programme, the department of environmental law and conventions started the *Colombo Process* on compliance and enforcement of environmental law in the beginning of 2006. The aim was to develop responses to factors inhibiting implementation and enforcement of MEAs. Under its mandate the participating high-level experts identified following challenges to effective implementation, compliance and enforcement:

¥ **Institutional Structures:**

1. development, harmonization, application and reinforcement of environmental legislation, capacity building, and increased coordination amongst focal points for MEAs
2. Increase ownership of the outcome of negotiations and need to include stakeholders in implementation (private sector, NGOs, youth, women, academia and the media) Involve local communities in negotiations
3. The need to address enforcement at the local and community level, as this is where many of the actual problems with the ineffective and unsuccessful implementation of MEAs persist

¥ **Interlinkages:**

1. willingness and ability of Parties to comply and enforce the obligations contained in MEAs which are directly influenced by the political, economic, social and legal acceptability of those obligations to the Parties
2. The need for more studies on extended cost-benefit analyses in order to demonstrate the value of ecosystem services
3. Encouraging and assisting national and local governments to identify synergies and inter-linkages between various MEAs

The identified instruments of the following expert meeting in Geneva 2006 for better implementation and enforcement are:

1. The need for investment in human resources to implement and enforce MEAs on including in the training of personnel and officials dealing with cross cutting issues of MEAs (such as parliamentarians, judges, prosecutors, customs officials, police officers, teachers, etc.)
2. The importance of including objective procedures for the verification of national reporting as part of all compliance regimes
3. The need for a periodic review assessing and reporting on the effectiveness and performance of MEAs in reducing environmental degradation as an essential tool in increasing their effectiveness, raising awareness and inducing compliance
4. The importance of recognizing that integrated assessment and environmental impact assessment are important tools in the decision making process and that their use can raise the level of environmental protection and ensure that environmental factors are treated on par with economic and development factors
5. To further undertake a comparative analysis of existing compliance regimes under MEAs with a view to making appropriate recommendations to the Governing Council of UNEP
6. Encouraging the Parties to MEAs to view ‘peer-pressure’ as a mechanism to induce more effective compliance with and enforcement of MEAs and to apply it equitably

In the follow up process UNEP/DELC produced the Manual on compliance and enforcement of MEAs, the guide for negotiators of MEAs and the comparative review of compliance mechanisms under selected MEAs. These studies should assist the parties in a more coherent approach of the various involved actors in the task of implementation, compliance and enforcement at the national level.
UNEP organised several related activities for the harmonisation of MEAs on implementation and reporting, conducting workshops for the different MEA-clusters, building interlinkages to ecosystem services and natural capital and MEA related education activities.
However, in the study conducted for the Dutch Ministry of Foreign Affairs and the Ministry of Housing, Spatial Planning and the Environment in *2009* the interviews with the different UNEP MEA secretariats, the regional offices, IUCN Centre of Environmental Law, WTO commission and related UN bodies still concluded various short comings and proposals.
To enhance the IEL regional coverage worldwide the IUCN Academy of Environmental Law proposed to organise seminars, trainings and conferences to facilitate cooperation between the secretariats and relevant stakeholders and through that improve implementation, compliance and enforcement, which is an ongoing cross-cutting issues of all MEAs. A pool of experts to ad hoc advice on situations involving environmental law was highlighted by the secretariat for the

convention on environmental impact assessment in a transboundary context project (ESPOO). The European regional office of UNEP mentioned a clear need for coordination among secretariats as well as the need to assist all the MEA secretariats concerning enforcement, compliance and dispute settlement. A forum where training for environmental negotiations was as well requested by the secretariat all falling in line with the findings of the UNEP *Colombo Process*. The Convention on International Trade of Endangered Species of Wild Flora and Fauna (CITES) expressively emphasised the strong need for training of civil servants in the implementation of state parties and the need of a legal facility to assess cross-cutting issues, especially environmental law-enforcement and monitoring.

Regarding updated analyses on environmental law enforcement UNEP convened a meeting with the Permanent Court of Arbitration in The Hague to discuss recent developments regarding environmental dispute avoidance and settlement. The Advisory body recommended UNEP to develop guidelines on increasing access to environmental justice, the use of preliminary remedies in environmental disputes and the use of expertise in dispute settlement concerning environmental issues. Among the adopted serious of conclusions the UNEP/ Permanent Court of Arbitration Advisory Group Meeting on Environmental Disputes stated:

- Dispute avoidance and dispute settlement are linked at the national, regional and global levels. For instance, the inclusion of a binding dispute settlement clause in an environmental agreement might encourage the parties to that agreement to implement it. This linkage should be explored and elaborated.
- increase access to the public to information
- ensure that information provided is in a form and manner that make it both accessible and comprehensible to the public bringing environmental hazards to the attention of competent authorities and other stakeholders
- commenting on proposed environmental agreements, laws and regulations
- providing input to environmental impact assessments
- Monitoring and assessing the implementation of environmental agreements, laws and regulations, bearing in mind the expanding set of actors involved in the international legal system

4. Conclusions international environmental law

This chapter defined and described the complex and varying process of compliance under international environmental law. It summed up the key findings and recommendations by the MEA Secretariats, the UNEP Department of Environmental Law under the Montevideo Programme, the UNEP/PCA advisory body and especially the results of the Colombo Process for enforcement and compliance. The outcomes comprise following constrains and challenges for more effective environmental regimes:

A multitasked third party mission for monitoring and verification of the MEAs is needed, as well as better coordination among non-compliance procedures (NCPs) of MEAs to have a more effective response to non-compliance. This concerns the trigger of NCPs as well as capacity building measures to tackle recurrent non-compliance of a Party under various MEAs. Compliance mostly rely on effective MEA coordination on national level, which are at a very early stage of development.
The UNEP/DELC Colombo Process for compliance and enforcement identified capacity building for personnel and officials (such as parliamentarians, judges, prosecutors, customs officials, police officers, teachers, etc.), the inclusion of objective verification of the national reporting in the MEA regimes, the need for a periodic review assessing and reporting on the effectiveness and performance of MEAs and addressing factors at the local level as essential tools.
MEA secretariats themselves mentioned the need to assist all the MEA secretariats concerning enforcement, compliance and dispute settlement, and the strong need for training of civil servants in the implementation of state parties and the need of a legal facility to assess cross-cutting issues, especially environmental law-enforcement and monitoring.

5. International private sector regulation

After having had a look at the governmental and intergovernmental activities for better implementation, compliance and enforcement, we are scrutinising the development of international regulation from the private sector side. The global private sector regulation was mainly driven by soft law applications of the multilateral organisations of the World Bank group, especially the International financial corporations' (IFC) *Policy and Performance Standards on Social and Environmental Sustainability and Policy on Disclosure of Information* leading to the adoption of the equator principles for today 68 financial institutions, including all multilateral development banks, funding public and private projects.
These Principles are intended to serve as a common baseline and framework for the implementation by each Equator Principle Financial Institute (EPFI) of its own internal social and environmental policies, procedures and standards related to its project financing activities. The EPFIs commit themselves to not provide loans to projects where the borrower will not or is unable to comply with our respective social and environmental policies and procedures that implement the Equator Principles. The principles are voluntary standards and remain closely linked to the development of the IFC performance standards and apply for project finance deals over 10 million in size, Another major initiative has been the comprehensive *OECD Guidelines for multinational companies* to re-establish their legitimacy of responsible international development. The UN driven initiative global compact comprises ten principles for the private sector, and today have more than 4000 companies as signatories, but has been under continuous critique for "bluewashing" the images of companies with the serious UN label as it has no binding framework and weak non-compliance procedures.

5.2. Performance standards and equator principles for international financial institutions

The IFC performance standards introduction in 2006 led to increasing transparency and awareness of stakeholders regarding IFC investments and advisory service projects. They expressly address environmental issues under performance standard I on Social and Environmental Assessment and Management Systems, performance standard III on pollution and abatement and VI on biodiversity conservation and sustainable natural resource management. Under the standards the IFC expects that each client will employ methods best suited to its business to meet the requirements of the Performance Standards. In assisting the client to meet them, the IFC takes into account variables such as host country context, the scale and complexity of project impacts, and the associated cost-benefit considerations, as well as those of project performance beyond the level required in the Performance Standards. As the standards are updated every three years to address urgent gaps, they are currently under their first review procedure.
The IFC *Policy and Performance Standards on Social and Environmental Sustainability and Policy on Disclosure of Information* review and update progress report on phase I consultations were focused on soliciting views on the three main areas of:

1. Clarity of language

2. Implementation Effectiveness: provide suggestions on how to improve the Sustainability Framework implementation, especially from those who have implemented the Performance Standards on projects, or from those who have been directly impacted by projects that implemented the Performance Standards.

3. Gaps in Current Coverage: help identify areas that are not currently addressed in the Sustainability Framework and provide accompanying guidance on ways to implement new requirements on the ground.

These categories crystallised through the report *first three years of application* of the IFC, especially in the lessons learned and challenges from policy and operational perspectives, which are as follows

- Management of cross-sectoral global environmental issues such as climate change and biodiversity protection.
- Social development issues such as consultation with affected communities, broad community support, project level disclosure, resettlement, labour issues and retrenchment policies, and human rights.
- Process challenges such as managing financial intermediary risks and differing stakeholder views on how IFC categorizes projects.
- Management of supply chain issues, especially in the agribusiness sector where E&S risks continue to grow in complexity.
- Project categorization, especially for new financial products.

The review and update will be finished by December 2010 and a new version will be presented to the board, envisaged to be implemented in the beginning of 2011.

However, in divergence to their mandate they carry out a review of all multilateral financial institutions by US Senator Lugar 2010 concludes:

The IFIs suffer from a lack of transparency regarding loan decisions, environmental impact, inspection panels, project assessment, etc., which hurt both public perceptions and their effectiveness. The most recently issued public disclosure policies of the World Bank and the European Bank for Reconstruction and Development (EBRD), for instance, improved somewhat on the previous versions but fell far short of what was optimal. The report makes a number of recommendations for improved public disclosure of policies and decisions, at both the board and management level, and for more parliamentary consultation in borrowing countries. Nearly all the IFIs suffer from a "pressure-to-lend" culture that places more emphasis on signing project agreements and getting loans out the door than on actually improving the development level of the borrowing country. There must be a systemic re-orientation to focus on outcomes instead of outputs. That will require putting in new incentive structures within the banks and new evaluation mechanisms. The banks should focus more clearly on the effort to "put themselves out of business" by graduating countries from their "soft loan" windows and, eventually, out of borrowing completely. When the World Bank reaches the milestone of being in a country for fifty years, it should not be a cause for celebration.
Specifically, the executive boards of the development banks should require presentation of projects and programs at their completion to put an emphasis on results and to incentivize development bank professionals to focus on the results of projects rather than the amounts. Currently, board review of projects and programs is only done at the approval stage. In addition, the development banks need to install meaningful staff evaluation systems so that professionals are rewarded for good project design and implementation rather than for promoting large projects in important countries. To that end, the banks should develop a common evaluations framework so that results of the different development banks can be compared across the board and within countries. Projects should be designed with clear indicators so that results can be measured, and the indicators should be published so civil society can track the projects' progress. Also, the development banks should sell advisory services to interested countries rather than requiring that countries borrow in order to receive advice from the development banks. Regarding lending to resource-rich developing countries, which has been of particular interest to the SFRC, banks should focus on Extractive Industry Transparency Initiative (EITI) principles of revenue transparency and fighting corruption, with an emphasis on acting before resource revenues start flowing in large amounts. Relatively small amounts of aid money could thus help channel large amounts of countries' own funds toward poverty reduction. Because corruption has been shown to be a decisive factor in hobbling development, all the banks should embed oversight funds into project and program financing so that an adequate percentage of the funds can be used by borrowing countries to support monitoring, investigations, prosecutions, and technical assistance for oversight.

Among the fifty recommendations given by the committee staff the development banks were recommended to revamp their inspection panels and other inspection mechanisms so that

people and communities negatively affected by development bank projects have clear access to redress. He concluded that the current mechanisms allow complaints to be made about failures to follow development bank policy but the only beneficiary is the bank itself, which learns of its mistakes. The affected people simply remain affected and are rarely compensated or made whole.

5.2. Non-compliance mechanisms of multilateral financial institutions

An integral part of regulation is effectively addressing non-compliance to legal frameworks. In the case of soft law regimes like the IFC performance standards, equator principles and the OECD guidelines this plays a crucial role to protect the legitimacy of these institutions.
The World Bank group has two mechanisms for the private (IFC and MIGA) and public (IBRD and IDA) sector to investigate on compliance of their projects to the standards and policies. The inspection panel for IBRD and IDA was established in 1993 and provides a forum for people to reach the highest decision making level as quick as possible, if they think they could be adversely affected by bank-financed operations. The panel then starts their investigation on the projects coherence with their policies and standards.
IFC and MIGA have an independent audit mechanism, which is the compliance advisor ombudsman (CAO), who is directly assigned to the president of the World Bank group. The CAO takes action on any request by potentially affected parties to financed private projects. In 2008 the CAO published a guide to designing and implementing grievance mechanisms for development projects, integrating the lessons and experiences of investigating and mediating conflicts between companies and communities.
All multilateral financial institutions have similar mechanisms to ensure adherence of the bank operations to the equator principles and social and environmental policies. Following the respective organisations and accountability mechanisms:

- African Development Bank (AfDB) Compliance review & mediation unit
- Asian Development Bank (ADB) Accountability Mechanism
- European Bank for reconstruction & development (EBRD) Independent Recourse Mechanism
- European investment Bank (EIB) Office of the Inspector General Complaints Office
- Inter-American Development Bank (IADB) Independent Consultation and Investigation Mechanism
- Japan Bank of Regional Cooperation (JBIC) Office of Examiner for Environmental Guidelines
- Overseas Private Investment Corporation (OPIC) Office of Accountability

5.3. The OECD Guidelines

The OECD Guidelines were introduced in 1976 and apply to all multinational companies that have their headquarters in the 42 signatory states. The members oblige themselves to constitute a national contact point, which is responsible for the Guidelines implementation, dissemination of information and to handle complaints.
If a company is breaching the guidelines the national contact point can be informed by any actor. It will then start their investigations and a mediation process; if this is not working out the contact point has to file a final statement. Further steps are not taken as there are no sanctioning mechanisms. That is one part of the deficits mentioned, besides that the guidelines only apply for signatory states, leaving out several important international enterprises. Another critique is that they have no revision mechanism in case of a failing complaint procedure and there relative low recognition internationally.
The OECD Guidelines specifically refer to the environment in guideline five. In the eight comprehensive points the guideline demand inter alia a specific environmental management system controlling positive impact on the direct affected communities, life cycle assessments for services and products, crisis plans and disclosure of respective information.

Both standards are being reviewed at the moment through multi-stakeholder consultations to improve their effectiveness. Update procedures for the OECD Guidelines will take place at the annual meeting of the national contact points in June 2010. The discussions will focus around the topics of supply chains, human rights and the environment, especially climate change.

The OECD national contact points as mentioned constitute the accountability mechanisms for the countries the operating is acting in or originating from. The member countries oblige themselves to set up the contact bodies to increase the application of the guidelines, answer questions regarding the interpretation and in case of non-compliance start investigations.
Most of the complaints to the contact points came in actions taken by NGOs working together with indigenous communities to protect them from unlawful operations by multinationals without prior informed consent. The national contact points are coordinated by the OECD investment committee Paris, which is responsible for the interpretation of the guidelines and supervision of the national branches.

6. Conclusions international private sector regulation

This chapter identified the international environmental regulation of the private sector. The performance standards, equator principles and OECD guidelines are tools to increase the accountability of multinational financial institutions and companies. Their success depends on the one hand of the public awareness that is created and that leads to actual utilisation of these tools; on the other hand on the effectiveness of their non-compliance mechanisms.
The inspection panels of most of the multinational financial institutions proved to be successful in detecting non-compliance to their policies and standards and monitoring in the aftermath, but in most cases are missing actual provision of redress.
The OECD national contact points has been useful in investigating and bringing cases of non-compliance of multinational companies to public attention and in some cases successfully mediate between involved parties. However, their weak mandate leaves ongoing non-compliance of companies as a potential option, like in the case of Vedanta Mining vs. the indigenous community of the Dongria Kondh in Orissa, India.

7. Satellite monitoring for the enforcement and compliance of international environmental law

Satellite monitoring, not only since Google Earth, received a lot of attention in the last years considering the dramatic increasing technical potential of earth observation (EO). Even more did the multilateral environmental agreements (MEAs), namely the Kyoto Protocol of the UNFCCC in Copenhagen and the Convention on Biodiversity, which the international political agenda dedicated the whole year of 2010. Both agreements are playing key roles in the effective mitigation and adaptation to climate change. Despite the legally binding obligations member states still struggle with the successful implementation mostly due to economic activities and weak political institutions.
The combination of the two different tracks of technical and legal development was considered broadly latest since the Johannesburg Summit on Sustainable Development 2002, where the Committee on Earth Observation Satellites (CEOS) achieved the inclusion of a large number of specific references to space in the final Johannesburg Political Declaration and its supporting Plan of Implementation. Established in 1984 under the auspices of the Group of Seven (G7—today's G8, this forum now is mostly extended to G20), the CEOS co-ordinates earth observation programmes at the international level. Its membership comprises all government agencies which are developing or operating earth observation satellites or which are major users of earth observation data.
Examples for an application are satellite capabilities which have sensors focused on the Earth's land, oceans, and atmosphere. Data products can be generated for monitoring habitat of

migrating animals, for detecting change in forests, crops, deserts and urban areas, or for monitoring pollution in rivers and deltas. Atmospheric measurements are made of carbon dioxide, ozone, methane and aerosols, including smoke and ash from fires and volcanic activity. Only a few MEAs have external monitoring functions explicitly written into the agreements, and fewer still incorporate or depend on Earth observation data to verify effectiveness or monitor compliance. MEAs mostly use as monitoring mechanisms either nation-level self-monitoring techniques such as registering inventories in a central repository or database, or an internal state census of various biological species, rather than external bodies or observations.

Successful monitoring of international commitments depends on the availability of data. Overall, national reports, which are the main source of these data, are becoming more complete, but the accuracy and comparability of data remain low in most cases. Environmental data, including EO data in these reports, would improve their quality significantly and provide the ability to quantitatively measure progress from one report to the next. The reliability problems of self-reporting are compounded by the fact that in most treaties the international body to which the information is submitted very rarely can take any independent action to confirm the national reports. There is no provision that authorizes objective verification of the data contained in national reports. Nor are there any automatic sanctions if reports are inadequate in content, are presented late, or are not presented at all.

While the advantages of using space techniques for these agreements are clear, the challenges remain the same as those for the Kyoto Protocol, namely, to convert space-derived data into the required parameters and to introduce the tool as an internationally accepted method of verifying treaties.

Here, the challenges of science end and the challenges of politics begin. Institutional and political obstacles are certainly among the more difficult ones to overcome. While the merit of using space technology is in many cases acknowledged, the main difficulty is the introduction of a new observation technology into an existing, often decades- or centuries-old, political and institutional structure. Changes may require the abolition or modification of current techniques, such as ground-based observation, the reorientation of budget and staff resources in government organisations, or the creation of a new legislative framework. To help overcome these obstacles, several governments have initiated programmes to move space technology from a predominantly research-oriented tool to a more user-driven one. Among the most prominent is the European Global Monitoring of Environment and Security (GMES) initiative, which aims to develop a global monitoring capability in support of European environment and security policies, including implementation of the Kyoto Protocol.

7.2. Satellite imagery for verification and enforcement of environmental treaties

One other question mark is put behind the legal framework for public and private actors to use earth observation on a global scale. In her book *Satellite imagery for Verification and Enforcement of Public International Law* HETTLING (2008) clearly describes that the existing legal framework for satellite monitoring for treaty enforcement is allowing the relevant actors to make use of all space assets without having to question infringements of national sovereignty or other international space law.

The international legal framework of satellite remote sensing, meaning merely the rules that govern the collection, distribution and protection of remotely sensed data, leave considerable freedom to the satellite operators as well as to those acquiring imagery.

Challenging questions from users or potential monitored parties mostly involve privacy issues. These are addressed in the 1986 UN Principles on Remote Sensing, in which Principle III expresses that remote sensing activities shall be conducted in accordance with international law.

> *At the international level, the right to privacy is contained in Article 12 of the 1948 Universal Declaration of Human Rights, in Article 17 of the 1966 International Covenant on Civil and Political rights, in Article 8 of the 1950 European Convention on Human Rights, in Article 11 of the 1969 American convention on*

human Rights in Article XII of the 1981 Universal Islamic Declaration of Human Rights and in Article 17 of the 1994 Arab Charter on Human Rights. Besides this, most national constitutions protect the right to privacy, e.g. the First Amendment to the US Constitution and Article 2, paragraph 1 of the German Constitution.

However, HETTLING concludes that privacy rights can only be infringed when personal features can be detected by commercial or public satellites. As this depends on the licences given out by governments and has high national security implications, regarding terrorists or enemy states, there will be no conflict between legally protected privacy rights and commercial high resolution data in the foreseeable future.

On Satellite Images for Verification missions for MEAs she concludes that due to the rising public awareness and necessity to monitor natural resources satellite information has to be exploited as much as possible to preserve the environment.
The verification regimes of environmental treaties cannot be compared to those of the modern disarmament and arms control agreements. In environmental agreements, verification is largely based on self-reporting by parties, which means that it relies on NTM (national technical means of verification) instead of impartial and independent ITM (International technical means). This, however, might be subject to change in the coming years, for instance through initiatives as GMES by the European Commission.
Another weak point of verification in environmental agreement is that self-reporting under the Conventions has often been late and incomplete. This can be explained with the extreme reluctance of many governments to accept that environmental treaties can establish legally binding rules. In this respect, it is also of special importance to recognize remote sensing data as a tool that provides legally binding information in the implementation of environmental treaties.For example, this applies to the Kyoto Protocol, which commits in particular the rich countries to a precise reduction of emissions.
In general, one can clearly observe the difference in depth and intrusiveness of the verification regimes when comparing disarmament and environmental treaties. Whereas in disarmament treaties the verification regime serves mainly as an instrument of controlling compliance, in environmental treaties it is still more of a scientific asset which does observe and research rather than control.

Enforcement of international public law is related to judgements and dispute settlements in cases of non-compliance to obligations of the member states to an agreement. HETTLING provides several cases of international and national jurisdiction in which satellite images has been used as proof for different parties and courts at all levels. An analysis of these cases drew the conclusion that it is obvious that some fundamental issues have to be addressed when dealing with satellite imagery in judicial proceedings.
Courts have been slow to build doctrines governing the admissibility of imagery coming from digital technology. Guidelines in the rules of procedure which set a clear framework for the application of satellite data are very desirable. On the one hand, authenticity of the data is a major issue, which applies in equal measure to all kinds of digital data. For international legal proceedings, uniform rules should be developed which allow the Court to verify authenticity through independent experts. It also needs to be ensured that an image is in accordance with the best available remote sensing technology. To ensure this, common standards for pre-processing, processing and product generation procedure should be developed by the international scientific community.
Talking about satellite data and expert opinion specifically, the parties should nominate an independent expert for satellite imagery and it should always be the court which decides about the expert. Secondly the verification of authenticity is an issue which has the inherent risk of manipulation. To ensure the authenticity the court should order its own images wherever possible. Following this procedure there are a number of technical means to prevent manipulation:

- A certified WORM (write once read many times) data carrier can guarantee that data gathered by satellite were retained in a way which makes manipulation of such data impossible.
- There is also a possibility to add digital signatures or watermarks to the data directly after the downlink to the ground station

- All persons who participate in the processing and enhancement, and also those who have access to the system in general, need to be identified and provide explicit authorization for their involvement.
- Upon request of the court the raw or pre-processed data should be made available to the Court. Also, all further scientific processing steps need to be traceable in order to allow the reproduction of imagery by an independent expert.

In the past, satellite images used for enforcement purposes have been considered more as an additional inquiry tool that needs to be confirmed by other supporting evidence than a complete system of proof by itself. In order to be able to strengthen the enforcement of international environmental law, satellite imagery has to be integrated in existing rules of procedure of international courts and tribunals. The integration should follow the standards mentioned above. Subsequently the imagery could support an efficient taking of evidence and thereby enhance the probability to find the truth.
The fact that current jurisdiction powers of the ICJ and other international courts are very limited, cannot be changed by the admission of satellite imagery, of course. Yet, the further elaboration of rules of procedure and extension of the courts' powers with regard to the taking of evidence also strengthens the courts' authority ad thereby the authoritative expression of the judgement. It is also possible that non-governmental organisations and private entities may have an increasing interest to use the commercialisation of the remote sensing business to pursue their own goals in legal proceedings and law enforcement.

The final conclusions of the needs and applicability of *satellite imagery for verification and enforcement of public international law* give very precise recommendations.
Main results that can be drawn from the analysis is that satellite imagery can support the development of public international law through its consequent and clearly defined use as NTM and ITM in verification systems and subsequently as evidence in international legal proceedings.
Weak verification provisions and a lack of enforcement powers constitute two main weaknesses in the system of public international law. Remote sensing satellite images can help to overcome those weaknesses by verifying and enforcing international obligations through a display of facts which may be decisive in the judgement of compliance or non-compliance. Satellite images can provide for a visualisation and transparency of misconduct. If states voluntary choose to commit themselves by acceding to an international treaty, then they have to comply with their established obligations and bear definite consequences in case of non-compliance.
The international community needs tailor-made agreements with precise provisions for the use of satellite imagery in the verification process. Treaty regimes need to be designed, which explicitly contain the use of satellite data as a monitoring technique. Furthermore, verification regimes should not exclusively rely on NTM but provide for ITM as well and allow international verification institutions to order satellite imagery from commercial operators.
Verification bodies must be backed up by enforcement. The verification authority is verifying compliance with agreement in question, but must be supported by enforcement mechanisms established by the parties or even by the UN Security Council. ITM should become an automatism that violations of international obligations will be followed by remedies and adequate consequences.
In order to facilitate the enforcement process, satellite imagery should be introduced as formal evidence in judicial proceedings, preferably as a tool expert witness in the rules of procedure. Courts should have the opportunity to independently nominate technical experts, who assess the validity and authenticity of the delivered imagery.
The fact that public international law does not considerably limit or restrict the activity of satellite remote sensing should be used for the benefit of the international community. Governments, international organisations and civil society efforts should make use of recent trends of commercialisation and privatisation and regard satellite images as a powerful tool for revealing the truth and pursuing their legal rights and individual objectives.

Concluded on the workshop for satellite images for the enforcement/compliance of international environmental law by the Institute for Environmental Security and the T.M.C. Asser Institute the participants concluded that a facility in The Hague could effectively contribute to the enhancement of the use of remote sensing data.

7.3. Latest research and development in environmental law and satellite applications

In the next part the up to date research on the practical application from the University College London, the GMES project of the European Commission and the European Space Agency is presented. It has to be mentioned that this pioneering research and development is still not embedded in the international legal discourse and practice of environmental law. This provides one of the opportunities for the comparative advantage of The Hague with its various international courts and organisations of the satellite and legal community.

The Hague Environmental Law Facility could possibly provide the independent ITM to the conventions mentioned by HETTLING (2008) and through that improve the verification, enforcement and compliance with International Environmental Law. This conclusion is also drawn by the conclusion of PURDY (2010) international research pioneer from the University College London.

> *It should be emphasised that the actual application of EO in terms of environmental compliance is currently more theoretical than applied. Its use in this area has been limited to date, in part, because its development has been technology-led, with a noticeable lack of legal co-operation and input on technology design and applications. There has been a poor level of its use relative to its potential in this area, because those working in the environmental law sector have had little or no awareness of what these new EO technologies can do. Before they can be utilised in an environmental compliance context, better understanding and communication is needed regarding whether they can achieve desired enforcement and monitoring outcomes.*

One of the most prohibitive factors in the wide range use is the cost of acquiring the data. However, the increase in numbers of operational satellites means that there is greater access to more timely, accurate and cost-effective data. Costs depend on the provider the data comes from, resolution size, and what level of processing the buyer requests for the data product. Data cost has, however, generally decreased in recent years, particularly for archived data, making it a more affordable option for those wishing to use it. Whilst some high-resolution imagery can still be expensive, the actual cost must be considered against monitoring needs and its value to the user. In some circumstances, it might provide evidence that is not available by other means, or result in financial savings in the long-term when compared to other forms of ground-based monitoring and inspections.
Not only remote sensing from space but also closer applications seems to have a high potential to improve regulation effectiveness. A further EO technology that could be relevant to environmental compliance in the future is unmanned aerial vehicles (UAVs). These can monitor activities on the ground from an altitude higher than that of an aeroplane taking aerial photographs, but lower than that of a satellite. At a development cost of approximately 15,000 upwards, they can be a cheaper option than low-orbit satellites. They are also more flexible and responsive than satellites in monitoring smaller sites and can send even higher quality resolution images back in near real-time to ground stations. At the current time, UAVs are mainly being used for military reconnaissance, but their potential for other aspects of legal control has been already recognised by some police forces. Their potential for coastal and environmental monitoring has also been recognised, but actual applications are mainly at an early planning stage.
EO technologies have already been used systematically to monitor legislation as part of a targeted enforcement strategy. The core example of using EO data in this way is from Australia, where it has been used in an attempt to curb illegal deforestation associated with farming activities. In the last decade, Australian States have incorporated satellite surveillance of tree clearing within the policing strategies of their relevant legislation. This appears to be the only sustained international example where satellites have been used to monitor and enforce an environmental law in this way.
Looking at the increase of national and international environmental legislation and the accompanied monitoring and inspection tasks, an application of EO monitoring especially at high-risk sides seems an appropriate option.

Regulatory bodies are being forced to react to shifting dynamics in the development of environmental laws. Conventional inspection and enforcement approaches are increasingly unlikely to meet contemporary policy requirements, which can be more physically extensive in area, as is the case with habitat or forestry protection. The issues being regulated are not only increasingly complicated, but also are applicable to a greater number of businesses. An example of this is that millions of farms across Europe now fall under the remit of EU waste legislation. We are also seeing the adoption of new regulatory techniques such as emissions trading. As we move from handling more familiar environmental pressures, to modern questions of resource and energy use, we will need to devise new regulatory responses. The monitoring and enforcement opportunities presented by EO technologies could become increasingly important and appropriate.
What is key to their future deployment is clear thinking as to whether they are actually needed in this context, or if they are a potentially expensive solution looking for a problem. Their stock might grow in this regard when one considers both current and future regulatory challenges in the environmental sector.
The 2006 MacRory Review and the UK legislation adopting these principles, the Regulatory Enforcement and Sanctions Act 2008, contain interesting parallels with how the use of EO technologies may fit in with changing agendas of public participation and regulatory justice. The temporal basis of EO might provide historical data as to what damage was caused, when it was caused, what needs to be done to restore a site to how it was before the non-compliance occurred, and to identify any profits made from non-compliance. Publishing EO data could be a novel method of visually communicating to the public the magnitude of the offence and sanction, and could also be an effective way of promoting the principles of restorative justice, through displaying the outcomes of clean-up operations.

Having this in mind The Hague could become the centre of the legal-technical interface delivering services for effective environmental monitoring and enforcement on a global scale and through that improve the compliance with IEL. The two proposed functions of access to justice and capacity building are supported by the latest findings of MACRORY (2006) and PURDY (2010) and would contribute to build effective regulation models for international example. In his latest article he concludes,

> *Precedents will be needed as further evidence of effectiveness, reliability and cost. Models of cooperation, towards sharing information and experiences with EO data should, therefore, be established between national regulatory bodies and other environmental enforcement networks worldwide. Environmental governance is increasingly seen as adaptive to modern challenges, and a sea change in approaches to compliance is already under way. At the same time, new technologies like EO are improving quickly, and, as this article has demonstrated, we are seeing dynamic changes in what they can now offer regulators and environmental lawyers. It might not be too long, therefore, before we see a more widespread adoption of EO technologies into legal and regulatory strategies in the environmental sector.*

After having a look at the latest legal perspective on EO from the environmental law sector, we will have an insight into actual technical application from the GMES programme of the EU and the latest activities from its Treaty Enforcement Services using Earth Observation (TESEO) from the European Space Agency.

Under GMES there are three down stream services which can be applied for law enforcement, namely Land and Sea Integrated Monitoring for European Security (LIMES), the service for Management of Operations, Situation Awareness and Intelligence for regional Crisis (G-MOSAIC) and the European Maritime Security Services (MARISS).
Especially G-MOSAIC operates in areas of illegal logging and illicit crop monitoring and supported the illegal mining sites for the Kimberley-process under the GMOSS network for monitoring of security and stability. MARISS is active in the regulation of coastal and high-seas activities e.g. in the enforcement of the Law of the Seas by using integrated ship detection services and by using SAR-data for near real time ship detection. All this feed into the overall objectives of GMES to make users exploit the growing wealth of satellite monitoring data. However, the programme is still not in its operational mode and the different initiatives are trying

to build relations to the most suitable partners also including the legal sphere. To make consistent use for treaty monitoring and verification of the provided EO data the GMES coordinators advice to use open-source data, to base very high resolution (VHR) imaging on applicable law (e.g. introduce them into the MEAs), clarify the use of VHR imaging in courts and prevent misuse. Here again, as already mentioned above, The Hague Environmental Law Facility could deliver the cutting edge for a functioning GMES for law enforcement.

The TESEO programme of the European Space Agency is focused on the considered most important MEAs, which are the Kyoto protocol to the UNFCCC, the Convention to Combat Desertification (UNCCD), The Wetlands Convention (Ramsar), the Marpol convention and directives relating to maritime pollution and joined later in the programme the Convention on Biological Diversity (UNCBD). The objective of the programme, which started in 2001, is to improve the implementation of the different environmental regimes, particularly those in Europe. Therefore it concluded all those actors on local, national and international scale working on law enforcement and trying to make their work more effective.
The delivered programmes GlobCarbon, DesertWatch, GlobWetland and Diversity work closely with the convention secretariats to develop measurable parameters for the different regulative frameworks on all levels.
For the Convention of Biological Diversity these services are:

- Global EO-derived biodiversity indicators to support the CBD 2010 Biodiversity Target
- Regional Information service to support the planning and monitoring of the Mesoamerican Biological Corridor
- Information service for inventorying, monitoring and assessment of the Mesoamerican Coral Reef System
- Precise habitat mapping: Mangroves
- Information service for surveying wildlife migrations from Galapagos Islands to Isla de Cocos.

The main objective of DesertWatch to develop an information system, mainly based on EO data to support desertification monitoring at various scales, suitable for the reporting obligations with resect to the convention, and also to aid policy making at local level DesertWatch intended to leverage the results of research projects mainly conducted under the EU and national programs of desertification, building an integrated tool which could be easy to use, as automated and standardised as possible and would allow to operate geographic indicators in a cost effective manner.
Because the pilot projects in Italy, Portugal and Turkey were very successful, the mandate of ESA for the UNCCD was extended working on an application for Brazil and Mozambique with Desertwatch-2. This project will be conducted to:

- To demonstrate the applicability of the methods over more heterogeneous areas.
- To test the capability of the system to produce results also in areas where little ancillary data are available.
- To further adhere to the 10 Year Strategic Plan objectives set forth in the last COP.
- To improve the quality of the DW products, taking advantage of the last technological achievements in terms of both EO data and processing resources.

In their AHRC-study 2008 the University College London clearly identified all potential satellite applications for international and European environmental law. The study showed that in most of the legislation on land use, climate change, water, waste and dangerous substances earth observation could contribute to a better regulation. However, only very few of these laws address expressly the use of satellite imagery. Exceptions are the EU legislation for the monitoring of agricultural subsidies under the common agriculture policy and the monitoring of fishing vessels via GPS. The results for the respective laws are attached in the appendix.

8. Conclusions Satellite monitoring for the enforcement of and compliance with international environmental law

This chapter identified the actual research and practical work that is done on remote sensing for enforcement and Implementation of environmental law. It clearly shows that there are no constraints from the legal privacy perspective for the use of earth observation technologies in the foreseeable future.
To ensure its practical impact on legal proceedings common standards for the processing and product generation of data has to be assured by the technical side. An independent expert that courts can decide on should be nominated to ensure neutrality and the court should order own images whenever possible. Further there are a number of technical possibilities to avoid manipulation of the image processing which has to be included in the acquisition process, additionally raw and pre-processed data should be made available to the court. The use of satellite imagery has to be integrated into the existing rules of the tribunals and international courts through that it can support efficiently the taking of evidence and strengthen the courts authority and judgement. Also non-governmental actors and private entities might seek the utilisation of these techniques and are looking for expertise in the legal use of earth observation data for enforcement and compliance.

As weak verification provisions and lack of enforcement powers constitute the two main weaknesses in international law the use of satellite imagery can play a crucial role in overcoming those weaknesses. Through a display of facts and increased transparency remote sensing can clearly detect non-compliance; however this has to be integrated with tailor made provisions in the legal framework of the international environmental agreements and has to be accompanied with clearly defined and coordinated multilateral non-compliance procedures. It is recommended that verification regimes should as well provide for international verification institutions. These verification bodies have to be supported by enforcement mechanisms leading to adequate remedies and consequences. Here the status of The Hague as a legal capital would provide an adequate environment for an international verification institute.
Examples from deforestation in Australia have shown that remote sensing images can play decisive roles if it is incorporated in policing strategies and legal procedures for law monitoring. Especially for high risk sides EO monitoring is an appropriate option especially in the increasing regulatory efforts in national and international environmental law. Key in the future deployment is the clear idea if earth observation is actually needed in the context of the regulatory challenge.
The GMES services of LIMES, G-MOSAIC and MARISS are delivering envisaged downstream open source data, which offer future opportunities for monitoring for legal compliance and enforcement. MARISS is already active in the regulation of coastal and high-seas activities by e.g. using SAR-data with integrated ship detection services for near real time ship detection. G-MOSAIC operates in areas of illegal logging and illicit crop monitoring and supported the illegal mining sites for the Kimberley-process under the GMOSS network for monitoring of security and stability. Again it is emphasised that very high resolution (VHR) imaging has to be introduced into MEAs and the use in courts has to be clarified. The programme is still not in its operational mode and the different initiatives are trying to build relations to the most suitable partners also including the legal sphere. The Treaty Enforcement Services using Earth Observation (TESEO) Programme from the European Space Agency (ESA) is focused on delivering measurable indicators for the biodiversity convention, the convention to combat desertification (UNCCD) and the Ramsar convention on securing wetlands. The use of earth observation data is until date more focused to measure the degradation process and identify areas that need increased attention and conserving efforts, which could be merely one aspect of the legal monitoring use.
The Hague Environmental Law Facility could deliver the respective networks and build the legal capacity for a coordinated and functioning GMES service for law enforcement by offering workshops for judges and prosecutors on the topic and link them to respective data sets.

9. Conclusions and recommendations

“Natural systems that support economies, lives and livelihoods across the planet are at risk of rapid degradation and collapse, unless there is swift, radical and creative action to conserve and sustainably use the variety of life on Earth.” (Conclusion Global Biodiversity Outlook 2010, Convention of Biodiversity)

In the analysis on better compliance and enforcement of international environmental law three kinds of dimensions became obvious: a lack of cross-sector involvement in the implementation, compliance and enforcement, insufficient coordination among various MEA actions on national level and the gap between local affected communities and the negotiating process.
All this short-comings are calling for a body that connects private sector regulation mechanisms, public non-compliance procedures and relevant intergovernmental and non-governmental organisations to focus efforts and resources on specific topics. Affected communities need appropriate access to legal resources, grievance mechanisms and capacity-building measures to tackle the on-going natural degradation. However these actions cannot be detached from the international political process inside the conventions, but must be linked to the appropriate non-compliance procedures of the MEAs. The secretariats are calling on advice and support for more coordinated compliance and enforcement actions.
Further the technical development of earth observation programmes, most prominently the Global monitoring for Environment and Security of the European Commission, provides valuable tools to support regulation and enforcement, that have to be further exploited to strengthen the monitoring and verification regimes of the multilateral environmental agreements. These opportunities rely on the specific topic and region and therefore have to be assessed respectively. A number of studies and projects confirm the high potential of satellite imagery and GPS application and call for scaling up and implementation in other areas. As stated, an interface between the legal proceedings and technical providers is needed to improve the coordination and build the necessary links and capacity of legal actors.
Looking at these results, the mandate of the Institute for Global Justice and the potential of The Hague with its academic, judicial, technological, governmental and non-governmental organisations related to compliance and enforcement of international law, it is recommended that The Hague make use of these assets and take over the responsibility it envisages as being the capital of peace and justice. Integrating environment and natural resources into peace building is no longer an option – it is a security imperative.

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