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## HANDLING GLOBAL CHALLENGES

### MANAGING BIODIVERSITY/BIOSAFETY IN A GLOBAL WORLD EU, US, CALIFORNIA AND COMPARATIVE PERSPECTIVES

#### EXECUTIVE SUMMARY

A Joint Project By:  
Leuven Centre for Global Governance Studies (University of Leuven)  
LICOS Centre for Institutions and Economic Performance (University of Leuven)  
Centre on Institutions and Governance (UCBerkeley).



Funded by European Commission (DG External Relations) within the framework of the pilot-program on Transatlantic Methods for Handling Global Challenges





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Based on Edited Volume by

Jo Swinnen  
David Vogel  
Axel Marx  
Heddy Riss  
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Available at:

[www.globalgovernancestudies.eu](http://www.globalgovernancestudies.eu)  
[www.transatlantic.be](http://www.transatlantic.be)

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Edited Volume: Handling Global Challenges. Managing Biodiversity/Biosafety in a Global World EU, US, California and Comparative Perspectives.

Editors - Jo Swinnen, David Vogel, Axel Marx, Heddy Riss, Jan Wouters

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# HANDLING GLOBAL CHALLENGES

## MANAGING BIODIVERSITY/BIOSAFETY IN A GLOBAL WORLD

### EU, US, CALIFORNIA AND COMPARATIVE PERSPECTIVES

#### INTRODUCTION

The project 'Handling Global Challenges. Managing Biodiversity/Biosafety in a Global World – EU, US, California and Comparative Perspectives', funded by the European Commission (DG External Relations) within the framework of the pilot-program on Transatlantic Methods for Handling Global Challenges, was a joint effort by the Leuven Centre for Global Governance Studies (University of Leuven), LICOS Centre for Institutions and Economic Performance (University of Leuven) and Centre on Institutions and Governance (UCBerkeley).

The project created an interdisciplinary team of researchers that analyzed the regulatory policies of California, the United States and the European Union with regard to biodiversity/biosafety in a comparative fashion and explored possibilities to strengthen transatlantic cooperation. In total 39 academic experts contributed to 20 papers which were prepared for the project (see list of contributors, *infra*). These papers were discussed, during international workshops and conferences, with other academics, policy makers, policy analysts and stakeholder representatives from both sides of the Atlantic.

The project was based on the general recognition that the regulatory policies of economically important political jurisdictions, such as the United States and the European Union (EU), have extra-territorial policy impacts. California is chosen as a specific case, in the context of the United States, because it has emerged as a regulatory policy leader in the United States. Historically, California has been a regulatory first-mover at both the national and international levels. The EU has increasingly taken up this role at the global level. Hence, both the EU at the global level and California at the national level have emerged as regulatory policy leaders. More recently, the EU has become a global regulatory leader while California has become a vehicle for the dissemination of European regulatory policies within the US – first at the state level and possibly in the future at the federal level as well. In addition, as several authors indicate, the EU and California share many geographical similarities.

The central objectives of the project were twofold. On the one hand, the project aimed to generate original policy-relevant academic research on key issues with regard to handling global biodiversity/biosafety challenges and on transatlantic regulatory co-operation. To achieve this aim the project brought together an interdisciplinary transatlantic group of academics from *inter alia* economics, political science, law, sociology, geography, risk management, chemistry and environmental studies who developed in total 20 papers for this project. All authors were instructed to pay special attention to policy recommendations and suggestions for transatlantic regulatory learning. The executive summary, based on the edited volume which resulted from the project, summarizes the main insights and policy recommendations of these papers. A general discussion of policy recommendations is presented at the end of the executive summary. The edited volume is available on the project-website: [www.transatlantic.be](http://www.transatlantic.be)

On the other hand the project strived to promote additional opportunities for regulatory cooperation, learning, and emulation between California, the United States and the EU by fostering mechanisms by which their approaches to regulatory policy innovation could be more broadly disseminated. Accordingly, providing opportunities for interaction among academics, activists, business managers and policy-makers on both sides of the Atlantic represented a critical component of the project. This goal was achieved during the two workshops and two international conferences which were organised during the project. A full broadcast of the two conferences is available as a webcast on the project-website. The project website also contains the proceedings of the conferences.

The project team will continue to disseminate the results of this project through the project-website: [www.transatlantic.be](http://www.transatlantic.be)

## SUMMARY OF THE MAIN FINDINGS AND POLICY RECOMMENDATIONS

The twenty papers which were contributed to the project address several key issues with regard to handling the global challenges of managing biodiversity/biosafety, provide European Union, United States (including Californian) perspectives on biodiversity/biosafety governance and assesses the possibilities and constraints of transatlantic co-operation taking the many cross-cutting issues into account.

Six papers focus more in general on regulatory co-operation and potential policy emulation between the European Union, on the one hand, and the United States and/or California on the other hand. Anne Meuwese addresses the question of whether two global regulatory powers converge on how to assess regulatory impacts. Jacopo Torriti and Ragnar Löfsted focus on impact assessment which can play a key role in regulatory cooperation between the EU and US in the context of environmental governance. Katja Biedenkopf turns specifically to the issues of biodiversity/biosafety and analyzes how the US, California and the EU can enhance transatlantic cooperation to foster biodiversity protection and manage biosafety by focusing on policy diffusion. Ann Carlson analyzes different forms of environmental federalism and the concept of iterative federalism as a dynamic and innovative policy strategy to develop environmental policy in a multi-level governance structure. Two papers make a specific contribution with regard to regulatory co-operation between the EU and California. Christina Hioureas and Bruce Cain explore the use of an informal agreement mechanism - the Memorandum of Understanding - and suggest that it is the best possible avenue for cooperation between the EU and California on environmental policies. A draft MOU is included as an annex to the paper. The contribution by Daniel Farber takes a broader view and outlines the legal context to further develop collaboration between the EU and California including the use of Memoranda of Understanding.

Three papers focus on a new form of private global governance to manage problems related to biodiversity/biosafety. Frans van Waarden focuses on the emergence and proliferation of private forms of governance as an important tool for global biodiversity governance. Jan Wouters, Axel Marx and Nicholas Hachez focuses on the nexus between private standards, as an important global governance tool developed in the United States and Europe, and the multilateral trading system (WTO). David Winickoff and Kendra Klein analyze the development and harmonization of organic regulation in the EU and the United States as a case study of successful transatlantic and global convergence of standards which promote biodiversity/biosafety governance.

Turning specifically to issues of biosafety three papers focus on the governance of genetically modified organisms and the application of biotechnology. Gal Hochman, Gordon Rausser and David Zilberman comparatively analyzes EU and US biotechnology regulations and assess the implications for transatlantic relations. Alberto Alemanno further explores the differences between the EU and United States with regard to genetically modified organisms and discusses different proposals to get out of the transatlantic regulatory deadlock. Sabine Reinecke, Till Pistorius, Christine Schmitt, Jürgen Hauber and Georg Winkel discuss EU's role in another application of genetic technology namely genetically modified trees.

Pesticides and chemicals have detrimental effects on biodiversity and are key main drivers of biodiversity loss. Two papers address this issue and focus on the governance of pesticides and chemicals. Chris Ansell and Jörg Balsiger analyze Transatlantic Perspectives on Persistent Organic Pollutants and Endocrine Disrupting Chemicals and introduce the concept of circuits of regulation. Meg Schwarzman and Michael Wilson make the case for governance initiatives which promote 'green chemistry'.

Four papers, each focusing on different key-aspects, address the issue of the governance of wildlife biodiversity and natural resources. Gabrielle Bouleau and Matt Kondolf focus on river management as a case study to explore regulatory policy innovation between the EU and California. Heike Nitsch, Andrew Manale and Bernhard Osterburg analyze and compare environmental and agricultural policies for conserving the biodiversity of wild plants and animals on agricultural lands in the EU and the United States. Michael McGinnis addresses biodiversity loss in marine environments and argues for the

importance of coastal marine ecosystem-based regulatory policy in the Euro-Mediterranean, United States and California. Adam Smith analyzes recent developments in global marine biodiversity governance (conservation of large marine mammals) with a specific focus on the outpacing of biodiversity policy by complex biodiversity threats.

A very specific threat to biodiversity concerns climate change. Two papers address several regulatory options with regard to combating climate change. Michael Hanemann and Chris Busch in their paper discuss different strategies to combat climate change and develops several policy proposals with a specific focus on direct regulation. Larry Karp and Zhao explore another instrument to tackle climate change namely International Environmental Agreements (IEA's).

Each of these papers is summarized in the subsequent sections with a focus on policy recommendations. Full versions of the paper, brought together in an edited volume, are available on the projectwebsite: [www.transatlantic.be](http://www.transatlantic.be)

## EUROPEAN UNION AND UNITED STATES REGULATORY CO-OPERATION AND DIFFUSION OF INNOVATION

Four papers focus on regulatory co-operation and potential policy emulation between the European Union and the United States.

**Anne Meuwese** in her paper on *'EU-U.S. Horizontal Regulatory Cooperation: Two global regulatory powers converging on how to assess regulatory impacts?'* starts from the observation regulatory cooperation currently is being seen as a priority in many business round tables and dialogues. Transnational dialogues about regulatory standards deal with a range of issues such as environmental standards, more technical areas such as food safety and apparent tabloid material such as the acceptability of non-metric measurements. In these regulatory dialogues, the nation state is still the most powerful but by no means the only actor in global regulatory games as self-regulatory organizations increase their influence in the epistemic communities that frame debates of regulatory design. A supranational organization such as the EU can be seen as an instance *of* regulatory cooperation (heavily relying on one of the strongest modes of cooperation: harmonization), but it is also an actor *in* regulatory cooperation. Furthermore, next to increasing cooperation, regulatory governance has undergone a second transformation: a more strategic approach to regulation has resulted from the recognition that it has a major impact on economic and social well-being. As was already more common outside of the regulatory arena, performance-based regulatory management systems are being set up across the globe. Also, there is a clear tendency among regulators to think more reflexively about regulation and design 'horizontal' (i.e. non sector-specific) policies to help them regulate 'better'.

The paper by Meuwese investigates the intersection of these two trends. The main question addressed is to what extent the horizontal dialogue between the EU (European Commission) and the US (Office of Management and Budget - OMB) has indeed led to the emergence of shared norms for domestic standard-setting and/or for substantive regulatory cooperation. The paper identifies two different faces of the European Commission-OMB horizontal dialogue. First, the learning face, i.e. how is 'regulation regulated' on the two sides of the Atlantic and what 'best practices' can be used to improve the quality of domestic regulation? Second, the facilitative face, i.e. how can sector-specific regulatory cooperation run more smoothly and be put to the service of reducing trade obstacles? These faces correspond to the two distinct directions in which the transnational horizontal phenomenon can develop: 1) the emergence of transnational dialogues on how to better regulate (domestically) and 2) regulation of the very practice of regulatory cooperation. The analysis shows that the emphasis has come to be more on the former. In particular, the recent focus on impact assessment can be interpreted as a move away from the goal of convergence. Still, an important assumption in the horizontal dialogue is the claim that sector-specific regulatory convergence can be aided by convergence on the general way in which regulators approach standard-setting.

The author concludes that it is important for policy-makers to underline the limits of the horizontal dialogue and yet to be more ambitious in other respects. An important policy implication for transatlantic regulatory cooperation and learning is that the two faces of the horizontal dialogue should be retained as separate rationales. Currently, the conflict takes place in the sector-specific dialogues;

the horizontal dialogue is meant to appease, to counter the 'negotiation mode' of sector-specific dialogues and to gloss over fundamental differences by presenting regulatory policy as a nice set of best practices that can be transplanted. The reasoning that 'Better Regulation' is more trade-friendly regulation and therefore regulatory learning will automatically reinforce regulatory cooperation is too simplistic. Too much emphasis on 'exporting best practices' ignores the question of the comparability of the constitutional and legal systems of the US and the EU at the risk of achieving nothing but the illusion of convergence and raising unrealistic expectations among stakeholders. Concrete shared norms for standard-setting, certainly substantive ones, are one bridge too far for EU-U.S. regulatory cooperation.

Perhaps the OMB-EC dialogue could work more explicitly towards 'mutual recognition' of certain horizontal norms, meaning that a framework of general rules is in place within which different regulatory approaches can compete. Also, more attention should go out to the inclusion of the legislators' voice in this dialogue, as a specific mechanism to foster transatlantic learning and coordination in the area of horizontal regulatory policy.

The paper by **Jacopo Torriti and Ragnar Löfsted** on '*To compete or to cooperate? This is an impact assessment question*' considers two conflicting approaches on regulatory issues across the Atlantic, i.e. competition versus cooperation. Whilst US and EU increasingly collaborate on a range of specific regulatory areas in an effort to remove tariff barriers and thus facilitate trade flows of about 620 billion Euros per year, they also compete in order to improve their internal markets, attract a higher number of investors, increase safety for their citizens and maintaining acceptable environmental standards. The authors contend that, when measuring the temperature of regulatory competition and cooperation between US and the EU, a valid reading key is Impact Assessment (IA). IA is the main evidence-based policy-making instrument in place in both US and EU and can help understand the rationales and justifications for policy and regulatory interventions.

As such, the paper examines the level of regulatory cooperation and competition through an analysis of the existing IA systems in the two continents. It considers that, on the one hand IAs can play a crucial role in a cooperative agenda because they create the conditions for (i) settling common rules for trade; (ii) increasing data exchange; (iii) providing a common platform for tackling climate change and sharing the burdens associated with environmental regulation; (iv) strengthening partnership against other economic macro-regions; and (v) preventing trade conflicts. On the other hand, IAs may advance regulatory competition because they represent opportunities for attracting investors and fostering the internal market.

It is suggested in this paper that IAs can play a key role in regulatory cooperation between EU and US should they both aspire to maintain high standards of environmental and health regulation; exchange information on health and safety data; and ensure that trade continues despite lower economic growth. In this regard, both the Transatlantic Forum and the US Office of Management and Budget (OMB) – European Commission (EC) joint report on IAs are potentially important venues. It is also argued that EU and US are expected to compete to have the most attractive, investor-friendly and secure internal market. The US are likely to maintain their comparative advantage in the use of cost-benefit and risk-benefit analysis, whereas the EU will have to re-consider its approach for monetizing benefits, which has limited the level of quantification of IAs so far.

In their analysis, the authors intentionally do not take a position on whether the cooperative reasons shall prevail over competitive reasons or *vice versa*. They argue that it is extremely difficult to predict which approach the two continents will undertake in the nearest future, given the change in leadership in the US and the global economic downturn. Much will depend on factors which are out of IA control, such as the level of protectionism in internal markets and amount of priority given to climate change policies. What is more, the authors realise that IAs themselves are not likely to change the equilibrium. In fact, IAs rarely have much weight in decision-making and seldom change the policy output. Rather, they argue that IAs will be an instrument through which it will be possible to read the level of cooperation and competition across the Atlantic.

The paper concludes by providing four recommendations to policy-makers for enhancing cooperation on IA across the Atlantic. First, the EU and US should find common grounds to share as much as possible technical experience on *ex ante* assessments, more than it occurs at the moment within the Transatlantic Forum or the EC-OMB joint report on IA on trade and investment. Second, if US and EU are to cooperate in order to maintain high standards of environmental and health regulation,



exchange information on health and safety data, and ensure that trade and investments are not undermined by low economic growth, they will need to produce high-level IAs. The third recommendation is that on the one hand the EU should re-consider its stand on monetizing health and environmental benefits; on the other hand the US should not use their competitive advantage in the use of Value of Statistical Life techniques to convince their European counterparts that their approach is flooded. Fourth, the authors wish to recall the contextual differences and rationales between US and EU, which should be taken into consideration when comparing policy and regulatory approaches in Europe and North America.

The paper by **Katja Biedenkopf** on '*Policy Diffusion and Environmental Pioneership: Insights from Transatlantic Cooperation fostering Biodiversity and Biosafety*' analyzes how the US, California and the EU can enhance transatlantic cooperation to foster biodiversity protection and manage biosafety. Combining insights from policy diffusion literature and analytical considerations about the capacity of the US, California and the EU to introduce ambitious environmental policy, Biedenkopf proposes a set of considerations about opportunities and barriers for transatlantic cooperation. First, policy diffusion can be described as a set of informal channels through which policy can be transferred across the Atlantic and around the globe. This contrasts with formal channels of policy-making such as the negotiation of legally binding treaties and trade sanctions. From a detailed analysis of the different dynamics of policy diffusion it can be concluded that the US federal level and the EU are more powerful players in transatlantic cooperation relating to economic interdependence, symbolic emulation and norm-based activities. California is a player with strengths comparable to the US and the EU with regard to learning and partially policy competition. However, it should be noted that biodiversity and biosafety are different kinds of policy issues that are receptive to different channels of interaction across the Atlantic. These differences should be taken into account when designing methods for transatlantic cooperation. Policy competition plays an important role on both issues. Economic interdependence is not very relevant for biodiversity policy but highly influential for biosafety policy. Learning can play a very important role in cooperation on both biodiversity and biosafety issues. Symbolic emulation is not very relevant when discussing transatlantic cooperation because both the EU and the US are major players in global politics and are not very much receptive to the emulation reasoning. There are no commonly accepted norms on biosafety that could build a basis for transatlantic cooperation. On biodiversity, the US, California and the EU agree on a number of general norms. Hence, methods for transatlantic cooperation on biosafety policy should take into account the high degree of policy competition and economic interdependence between the US and the EU. Methods for transatlantic cooperation in biodiversity should take into account policy competition considerations and norms that have been commonly accepted. The design of effective learning processes appears highly relevant for both policy issues. Second, the paper considers that the capacity of the US, California and the EU to introduce ambitious biodiversity policy with converging aims and objectives seems high. On biodiversity the predominant policy paradigms in the EU, California and increasingly the US federal level appear to be favorable for meaningful transatlantic cooperation. Favorable advocacy coalition support can be observed in all three entities. Also, institutions, existing policy and resources display good conditions for cooperation and learning at the various levels of governance across the Atlantic. On the other hand, on biosafety the US and the EU differ significantly with regard to decision-makers' and other stakeholders' preferences and beliefs. Also institutions, procedures and existing policy differ. This makes it difficult to find a common ground for cooperation. Therefore, it should be considered focusing on areas where finding a common ground would be possible. These would most likely be areas that are not highly politicised such as practical and technical issues. Biedenkopf concludes that, if both sides of the Atlantic develop a strong cooperation on biodiversity and/or biosafety policy, they can have a significant impact on policy in other countries around the world. Joint transatlantic forces can trigger the diffusion of their policies to a large number of countries.

In her paper on '*California Motor Vehicle Standards and Federalism: Lessons for the European Union*' **Ann Carlson** analyzes different forms of environmental federalism and the concept of iterative federalism as a dynamic and innovative policy strategy to develop environmental policy in a multi-level governance structure. Under iterative federalism, the federal government singles out a state or a group of states for special regulatory power. The best known example of this arrangement is under the Clean

Air Act, which grants California the right to deviate from uniform national automobile emissions standards so long as its standards are more stringent than the federal standards. The aim of the paper is to analyze California's experience in regulating emissions from passenger cars as an example of iterative federalism and consider whether the EU might develop similar structural arrangements under which the EU sets minimum standards for its member states but authorizes one or more countries to exceed those standards. Since the EU faces tough political opposition to stringent environmental proposals it may be worth considering whether, on certain policy questions, deviation from uniform standards might pave the way for regulatory innovation and leadership by European countries with strong records of environmental leadership.

Iterative federalism occurs when federal policy explicitly singles out a particular state to take the regulatory lead on an environmental issue. This results in an interesting regulatory back and forth between the chosen state, *in casu* California, and the federal government. Typically this back and forth has meant that the chosen state leads, followed in whole or in part by the federal government adopting the more stringent standards. Carlson focuses on the setting of motor vehicle emissions standards and analyzes four important back and forth iterations. By focusing on these iterations Carlson makes several additional claims with regard to the super regulator status of California which have wider relevance for for example handling climate change.

With regard to the implications for the EU Carlson notes that the EU has sometimes had a form of iterative federalism in environmental policymaking without the explicit structural design built into the U.S. Clean Air Act. Carlson further explores whether the U.S. model of iterative federalism could be exported to the EU by focusing on what types of policies are candidates for super regulator status and which states might be likely super regulator designees. Chemical policy, pesticide regulation, appliance efficiency standards and fuel standards all seem appropriate areas to explore allowing a super regulator to out regulate the federal government. With respect to interstate pollution, air and water pollution seem the obvious candidates for providing affected states with super regulator power to act regionally, backed and prodded by the federal government. How to determine who should have super regulator power is a difficult question but several conditions seem worthy of consideration. In the case of national product markets, at a minimum a country in the EU needs sufficient market power to be able to impose more stringent standards without risking the abandonment of their market. By the same token, super regulator status should not be granted if there is a high likelihood that the status could be used for protectionist purposes for a domestic industry. With respect to automobile regulation for example, given that several EU members have robust domestic manufacturers it may be imprudent to award such status to any of them. Super regulator status is probably also appropriate only for those countries with a polity willing to impose more stringent regulation. Finally, super regulator status might be accorded at least initially to those members with the demonstrated regulatory capacity to make informed, scientifically sophisticated decisions that can be implemented effectively. The case of regional pollution obviously requires the involvement and commitment of those affected by it.

## EUROPEAN UNION AND CALIFORNIA REGULATORY COOPERATION

Two papers make a specific contribution with regard to regulatory co-operation between the EU and California. The paper by **Christina Hioureas** and **Bruce Cain** on '*Transatlantic Environmental Regulation-Making: Strengthening Cooperation between California and the European Union*' analyzes and explores an informal agreement mechanism that California has already used to further international environmental cooperation with several Canadian provinces, Great Britain, and Mexico – the Memoranda of Understanding ("MOU" or "MOUs") – and suggest that it is the best possible avenue for cooperation between the EU and California on environmental policies. The authors argue that several scholars have adopted the view that a non-legally binding agreement can be categorized as "soft law" or "a 'norm' expressed by the international community to which it is hoped, at least by the group of states articulating the 'norm,' that states will adhere, but to which there is no obligation of adherence."

The paper subsequently discusses the reasons why states engage in such voluntary agreements and identifies three main arguments: (1) public relations: signaling a message to other states and building reputation as a leader on environmental governance, (2) shifting behavior: pre-committing itself and restrain certain future actions and binding other states and promote international

cooperation, and (3) exchanging information. In addition an MOU can constitute a model for the U.S. federal government on policies that could be successful if carried out. Next, Hioureas and Cain examine the legal implications of such agreements. More specifically, they argue that although California does not have the authority to enter into formal agreements, binding or non-binding, relating to international matters that are directly in conflict with U.S. foreign policy, California can sign a non-binding promise with the EU to follow mutual aims. Along these lines, the authors discuss how the EU can ensure that the agreement will be treated as non-binding despite European Court of Justice decisions enforcing "soft law" instruments. Finally, the paper argues that there is a political and commercial value to such agreements. The aim of the paper is to encourage California and the EU to sign an MOU on environmental issues to promote cooperation and provide an example of successful environmental policies for the U.S. federal government and foreign states.

The authors conclude that apart from the commercial benefits of an agreement between the EU and California, an MOU might stimulate national action and instruct the national effort if and when it occurs in the future. California and EU are further along than most of the states and the federal government, and by creating a stronger alliance in this effort, might pave the way for future U.S. federal action.

The paper on '*Legal Guidelines for Cooperation Between the European Union and American State Governments*' by Daniel Farber takes a broader view and outlines the legal context to further develop collaboration between the EU and California. The paper starts from the recognition that neither California nor the EU are traditional sovereign states and explores the implications for transatlantic regulatory co-operation. California is a state within a sovereign federal system while the EU is a supra-national entity composed of sovereign states. This difference generates limitations for transatlantic regulatory co-operation between the EU and California which are discussed in the paper. However, Farber also argues that these limitations leave considerable room for innovative initiatives for regulatory co-operation.

Farber outlines the constitutional barriers for US states to engage in transatlantic regulatory co-operations and analyzes the EU's ability to cooperate as a unified entity. US states are subject to three constitutional restrictions that are relevant to environmental regulation. The first is called the dormant commerce clause doctrine which prohibits states from engaging in regulation that discriminates against interstate or foreign commerce or that unduly burdens such commerce. This doctrine is akin EU rules governing the free movement of goods and to WTO trade disciplines. Farber discusses several strands of this doctrine. Second, the preemption doctrine, under the Supremacy Clause of the U.S. Constitution, states that a state law that conflicts with a federal statute is invalid. Preemption law is currently unsettled, but its scope has been expanded by some recent Supreme Court decisions. Finally, under the doctrine of foreign policy preemption, a state action is invalid if it invades the core foreign-affairs domain that is exclusively reserved to the federal government. US states do not retain the power to engage in their own foreign policy, although their decisions inevitably have some impact on foreign entities. The line between permissible foreign impact and impermissible foreign policy is far from obvious under this doctrine and related ones discussed below. Besides these three doctrines Farber discusses some other doctrines that sometimes poses a threat to state efforts at regulating which include extraterritoriality and the compact clause. In a next section Farber goes on to discuss the limitation on the ability of the EU to implement co-operative policies focusing on the scope of the EU's regulatory jurisdiction, compliance and implementation by member states and the issue of shared competence.

Following the discussion of the limitations Farber concludes that California's efforts to pursue co-operation are on the strongest ground when the following conditions are met: (1) the California action treats in-state and out-of-state firms evenhandedly, (2) the local benefits of the state's action to California are demonstrable, (3) the action avoids any arguable conflict with federal statutes, treaties, or executive agreements, and (4) the agreement is akin to a memorandum of understanding, bestowing no regulatory authority on any transnational institution and avoiding any mechanism for direct legal enforcement between the parties. On the other side, the likelihood of actual European implementation is greatest when information production and disclosure is a key part of the agreement and the EU position represents a consensus view of Member States.

Given these limitations Farber discusses the implications for regulatory co-operation and highlights some possibilities for regulatory co-operation. First, information-sharing agreements seem

the least likely to implicate barriers on either side of the partnership, assuming both entities are legally permitted to share the information in question. Second, California may be able to take advantage of the market participation exception to the dormant commerce clause doctrine to partner with the EU at least with respect to its own procurement. Third, regulatory cooperation on a more significant scale – such as linking carbon markets – is still potentially viable if it remains necessary due to the absence of action by the federal government. Fourth, the regulatory area that seems the most fraught with challenges is also the one that seems the least desirable, at least at this specific moment in political history. It would seem unlikely that a partnership in which both sides agreed to binding emissions limits, say for water pollution, would prove fruitful. Farber concludes that if these limitations are kept in mind regulatory cooperation between the EU and American states can be further developed.

## HANDLING GLOBAL BIODIVERSITY/BIOSAFETY CHALLENGES AND PRIVATE GOVERNANCE

Frans van Waarden in his paper on '*Governing Global Commons: Public-Private-Protection of Fish and Forests*' focuses on the emergence and proliferation of private forms of governance as an important tool for global biodiversity governance. Van Waarden first provides an historical overview of private and public regulation of risks and common goods, *ie* rivalrous and non-excludable goods. He goes on to focus on the issue of biodiversity with a specific focus on the common pool resources of fish and forests. Forests and fish are in principle both renewable resources and their ecosystems are rather large, but reproduction takes time and hence overharvesting can deplete these 'commons'. Besides focusing on commonalities between fish and forests van Waarden also discusses important differences such non-locality and ownership. Van Waarden frames his discussion in the overall multilateral and nation-state based regulatory framework with regard to the governance of biodiversity (*ie* Convention on International Trade with Endangered Species of Wild Fauna and Flora' (CITES), the Convention on Biological Diversity (CBD), the UN Convention on the Law of the Sea (UNCLOS), the UN Fish Stocks Agreement and several supranational regional fisheries organizations). Van Waarden notes that notwithstanding the number of protective treaties that have been agreed upon, and the international fisheries organizations created, biodiversity remains being seriously threatened. Hence, governmental action does has its limitations due to the lack of enforcement mechanisms. Due to the ineffectiveness of state led regulation several market-based regulatory solutions have emerged, *ie* institutions created by political and/or economic actors with the intention to affect market transactions in such a way that these have less or no negative externalities for biodiversity. The aim is to use the allocation mechanism of the market better, to serve not only private but also public interests. Such institutions may regulate access to the market, structure interests of the transaction partners involved, steer the competitive structure of the market, affect the costs and benefits of certain choices, provide information to influence those choices, or provide otherwise incentives 'to do good'.

Van Waarden discusses several market-based regulatory solutions to the protection of forests and fishes including privatization, turning public property into private property, and certification which aim to influence consumer choices, thus using the market mechanism to steer demand for fish and forest products towards varieties that do not harm biodiversity, or do so less. The latter is done through information provision. Van Waarden discusses two certification schemes in depth, namely the Forest Stewardship Council and the Marine Stewardship Council which aim to fulfill three functions: standard setting, accreditation of independent certification bodies, and trademark assurance. The analysis discusses the emergence of the two certification schemes, provides a comparative analysis and discusses some problems such as the management of diversity, the problem of enforcement (limited audit resources) and issues containing the maintenance of certificate credibility and reputation including issues related to success of the schemes and the potential of shortage of supply, competition with other related certification schemes (certificate inflation) and fraud.

These problems point to shortcomings of certification mechanisms and call for solutions. Van Waarden emphasizes that there is a clearly a need to certify the certifiers which can be achieved through different means either private or public. Van Waarden builds on historical evidence to make the case for public recognition of private standards and identifies some initial current trends in which states join or make use of private arrangements with regard to the protection of forests and fishes. Van Waarden concludes his discussion with the observation that the result of these trends is the emergence of new economic governance regimes, combining elements of markets, associations, hierarchies, and

states. As a result, van Waarden recommends that more should be invested in developing a genuine Ecological Public-Private Partnership (EPPP), where private initiatives such as the FSC and MSC are publicly supported but also controlled. He proposes that California and North-Western Europe as the most environmentally concerned states take the lead in this. To further develop this partnership support might be needed in providing 'sticks', such as the recently enacted trade legislation. This legislation could occasion formal recognition of such private certificates in national legislation and perhaps also in international treaties. States could also provide recognition through their private role as buyer on markets (public procurement policies). Thirdly support could also be given in the form of financial support and especially with regard to funding the certification process. Currently there is a potential conflict of interest because recipients of certificate pay for it (they 'buy' a certificate). One way to reduce this dependency is to pay certification from public funds. These public funds might be created by a tax on all involved industries or even citizens. Van Waarden proposes considering a tax akin to a Tobin tax: a tax on all trade in fish and lumber across the globe. Finally, more specific to these new economic governance regimes van Waarden notes that little research is available on the effectiveness of these regimes and calls for more research in this respect.

The paper of Jan Wouters, Axel Marx and Nicholas Hachez on *'Private Standards, Global Governance and Transatlantic Co-operation. The case of Global Food Safety Governance'* focuses on the nexus between private standards, as an important global governance tool developed in the United States and Europe, and the multilateral trading system (WTO). The governance of food is taken as a case-study to explore this issue further since private standards in food governance directly relate to the key issues of biosafety and biodiversity and the governance of food, via the SPS Agreement, directly links private standards to the multilateral trading system. In other words, an analysis of food governance links the issues of international trade, biosafety and biodiversity and private standards. In a nutshell, the paper argues that private standards are institutionalized market governance instruments which can be used in innovative policy arrangements to address global challenges. In order to fulfill their potential as an integral part of new innovative policy arrangements the relationship with and their place in the multilateral (trade) regime needs to be clarified.

The authors first describe the emergence of private standards as a governance tool and argue that private standards are becoming an integral part of new policy arrangements for handling global challenges. The subsequent parts of the paper address the issue of the interactions of private food safety standards with the multilateral trading system. After a short presentation of the SPS Agreement, the paper presents the issues posed by private food safety standards in relation to the trade-liberalization agenda pursued by the SPS Agreement. It then examines the extent to which private standards may or may not be said to fall into the scope of the SPS Agreement, and whether the latter may have any traction on their potential trade-restrictive effects. The final part of the paper attempts to present a regulatory model under which private standards could find their place within the multilateral trade regime and to formulate recommendations to the relevant actors on ways to put that model into practice. In formulating such recommendations, special attention is given to the respective positions of the EU and the United States in the food safety / free trade nexus.

The authors conclude that private standards are increasingly becoming an important policy instrument in order to address global challenges. The paper argues for a multilateral and pluralistic view of global regulation, in which all leading actors such as the United States, the EU, the World Trade Organization, public and private standard-setters and major actors in the food chain have to bring part of the solution. None of the regulatory actors possesses all the capacities and competences to take on by themselves the challenges posed by the regulation of global issues. At the same time, in a global governance context which is characterized by the absence of institutionalized checks and balances, a conjunction of all regulatory forces allows for a reduction of the risk that a global issue involving the public good be captured by the particular interests encapsulated into intergovernmental horse-trading, business profit-seeking or NGO activism. The paper further argues that private standard-setters (most importantly large western retailer groups) have now come to dominate the food safety regulatory environment. As a result, private standards have become the prime determinants of access to most western food markets. In light of these evolutions, the logic behind the SPS Agreement appears somewhat flawed, and the latter is increasingly regarded as having lost its grip on the global food safety regulatory environment, which now largely develops independently from the rules of world trade. This disconnect has many negative consequences, most notably the erratic proliferation of different public

and private regulatory schemes and the potential exclusion of the weaker actors of the food chain from the lucrative western markets. Also, the legitimacy of private standards in regulating issues as important as food safety is questioned. In order to re-equilibrate the relationship between the objective of free trade and the food safety regulatory environment, several recommendations addressed to public and private regulators alike are proposed. These recommendations include first of all that public actors should, in light of the effectiveness of private standard-setters to deliver high levels of food safety, generally leave the substance of food safety regulation to private actors, while buttressing the quality of those regulatory initiatives with liability rules. Second, public and private actors should focus on reducing the exclusionary effects that private food safety standards may have on the weaker actors of the food chain, and reduce the discrepancies and contradictions between private standards. Practically, this may induce the creation of a global fund for technical and financial assistance in order to comply with private standards, information and capacity building programs via a private standards observatory, the design of mechanisms to harmonize and benchmark private standards, and the adoption of rules to solve conflicts between contradictory standards. Finally, public and private actors should ensure the legitimacy of private food standards by identifying the minimal features of legitimate standards and applying them to private standardization schemes. In all these instances, the EU and the United States, separately or in a joint effort, can play a pioneering role.

The paper by David Winickoff and Kendra Klein on '*Food Labeling as environmental regime: A comparison across California, The United States and the European Union*' focuses on the development and harmonization of organic regulation in the EU and the United States. A focus on organic regulation is for several reasons relevant to assessing transatlantic efforts to handle global challenges. First, organic is the earliest, most globally pervasive food label with an important environmental dimension and sustained high growth rates. Several environmental benefits of organic production have been documented including the protection of biodiversity. Secondly, organic regulation is also an interesting case to analyze the use of labels to govern markets. The rise of supply and demand for eco-labels is indicative of a more general shift away from traditional command and control forms of regulation toward market-based strategies. However, labeling systems are far from simple and raise important concerns for international regulatory harmonization. Thirdly organic proves to be an illuminating case in light of recent scholarship on the contested domain of food governance. Winickoff and Klein make the case that organic is interesting for theories of trans-Atlantic regulatory culture precisely because those cultures converged to recognize similar process-based and precaution-based standards. The paper focuses on how this convergence came into being.

The paper takes a comparative look at organic in the United States and the EU with particular attention to the rise of organic regulation in each jurisdiction, major points of divergence and convergence within the two jurisdictions, and prospects for greater cross-Atlantic harmonization. Compared to the polarization of food safety regulation in other domains, organic regulation stands out as a promising candidate for international harmonization. Despite "relative convergence" relatively small but intransigent differences have calcified across the two jurisdictions which result in some important differences between the US and EU standards, with three in particular creating obstacles to equivalency: the approach to the farm unit, the lists of prohibited and allowed inputs, and criteria for livestock operations. In sum, Winickoff and Klein argue that organic has achieved striking success as a global regulatory category. For this reason, along with its explicitly environmental dimensions and international reach, organic creates both a regulatory paradigm for the development of future eco-labels.

Winickoff and Klein emphasize that relative convergence was far from a pre-determined outcome; it depended critically on particular modes of engagement with movement actors and standards in each jurisdiction. The authors point to the importance of non-state actors and bottom up policy-making in this context. Relative convergence in organic stems from the historical roots and structure of the organic movement and the ability of a broad base of organic actors to influence regulation in both jurisdictions. For more than fifty years, the definition of organic co-evolved with practices of standardization and certification. Organic ideals and actor-networks formed simultaneously across different states and localities, laying the groundwork for a transnational social movement that actively developed common principles and standards. Striking differences in the articulated goals of organic food regulation as well as well-known differences in regulatory epistemology set organic regulation on different trajectories in the EU and the US. Polarization was averted due to the ability of

movement actors to influence both sets of regulations, albeit through different means. While a few important substantive criteria of the standards diverge across the US and EU, the two regulatory systems have converged around core organic standards.

Although regulatory polarization was averted, small but recalcitrant differences have inhibited the achievement of an efficient and market-promoting equivalency. Although the US and EU have great potential for harmonization, equivalency negotiations have foundered, as highlighted above, on issues related to the farm unit, the notion of negative versus positive approval on input lists, a number of specific inputs, and the criteria for livestock operations. The complexity of international accreditation that has emerged in lieu of equivalency across the two jurisdictions and elsewhere adversely affects the development of organic markets and trade. The result is an increasingly chaotic system for trade of organic products that erodes efficiency, proliferates “back door” tactics to move goods, and increases policy rents. The lack of US-EU equivalency has created important equity concerns across North and South as well. Lack of harmonization is especially costly for developing country producers who often lack technical or financial capacity to pursue multiple accreditations, certifications, and approvals for exportation.

The comparative analysis of organic in each jurisdiction, and of existing efforts at harmonization, give rise to a number of policy recommendations. These apply both to future organic harmonization efforts as well as to future co-operative efforts on other environmental labeling schemes. First, the EU and US should recommence equivalency negotiations with an eye toward underlying organic *principles*. Second, the EU and US equivalency negotiations must proceed alongside a continuing process to promote a globally harmonized system that integrates public and private institutions. A third recommendation focuses on legitimacy and the role of non-state actors. Governments should take seriously the involvement of movement and industry actors in the development and revision of organic standards. The organic social movement was a major factor in the “relative convergence” of the US and EU systems. Moreover, the high level of consumer buy-in maintained by organic labels stems from the fact that institutionalized organic standards have emerged from a bottom up process. Accordingly, public participation mechanisms should be formalized in the harmonization processes proposed above, and would be a vehicle for synthesizing private and public standards. The latter point about developing open and consensus-driven procedures applies more generally for emergent forms of voluntary eco-labeling related to biodiversity, carbon footprint, biosafety and other environmental issues. Winickof and Klein argue that the state should enter with extreme caution and only with deep participation of movement actors. Government’s role should primarily be in the area of consumer protection and preventing fraud. As labels develop, state oversight of labeling claims becomes important to prevent abuses, but also threatens to make standards less flexible and internationally mobile.

## THE GOVERNANCE OF GENETICALLY MODIFIED ORGANISMS

Three papers focus on the governance of genetically modified organisms and the application of biotechnology. The paper by Gal Hochman, Gordon Rausser and David Zilberman on ‘*US versus EU Biotechnology Regulations and Comparative Advantage: Implications for Future Conflicts and Trade*’ comparatively analyzes EU and US biotechnology regulations and assess the implications for transatlantic relations. Starting from the observation that nations regulate biotechnology applied to crop production very differently, ranging from promotional policies to preventive policies the paper sets out to discuss the implications of these regulatory differences for the utilization of biotechnology. Hochman et. al. argue, on the basis of existing studies, that the application of biotechnology results in several benefits. First, it leads to the creation of new and improved varieties of crops and improved agricultural production. Secondly, they argue that the transfer of genetic material and species among nations is central to the protection of natural resources and human health since they contribute to food provision and reduce chemical pest control. Thirdly, with regard to environmental protection the authors link the use of biotechnology to policies which address the blocking, control and management of the problem of invasive species.

Hochman et. al. then go on to analyze the development of the biotechnology industry in the United States and Europe and focus on the interrelated importance of the educational-industrial complex to produce innovations in biotechnology and regulation. Starting from the proposition that the

basis for regulation should be maximizing expected utility, given uncertainty and opportunity costs, the authors assess regulatory approaches and argue that the regulatory framework should be relative not absolute (decision rules which block the use of biotechnology) in order to make innovations in the science-based industry possible. The authors go on to compare the US and EU regulatory frameworks starting from the observation that in the United States, as in contrast to the EU, the introduction of genetically modified food did not generate opposition. This contrast between the EU and United States has resulted in the development of different regulatory frameworks which have an effect on the applications of biotechnology in the food sector and the development of the biotechnology sectors in the United States and EU. Hochman et. al. argue that regulatory frameworks should be developed which provide incentives for the biotechnology industry to develop. They go on to substantiate the argument concerning the interaction between regulatory frameworks and the development of the biotechnology sector empirically by analyzing several leading examples including Monsanto, Syngenta, Bayer and others and aggregated data on biotech traits. The analysis shows that the EU regulatory regime hampered progress in the biotech industry especially after 1998.

The authors conclude that regulation in the United States became permissive to biotech, whereas regulation in Europe became precautionary resulting in a more developed biotechnology industry in the United States measure by different indicators. The authors formulate policy recommendations. First of all, to mitigate the negative impact of regulation on adoption of biotechnology, the regulatory criterion should become relative not absolute, and should compare the benefits and risks from the new technology to those of existing technologies. Secondly, policy-makers could consider subsidizing R&D in the biotech industry and develop a release-and-monitor policy in which monitoring is subsidized. Thirdly the authors stress that policy-makers should not assess the risk from biotech in isolation but use a trade-off assessment framework in which risks of biotech are analyzed in the context of other risks related to food policy including food shortages, environmental degradation, market concentration, poverty, and political instability. Fourthly, with regard to regulating biotechnology it is proposed to regulate traits instead of varieties and make an assessment of the regulatory burden since over-regulation leads to concentration.

The paper by **Alberto Alemanno** on *How to get out of the transatlantic regulatory deadlock over GMO's? This is time for regulatory co-operation* further explores the differences between the EU and United States with regard to genetically modified organisms. Alemanno identifies and discusses some possible ways out of the current transatlantic deadlock over genetically modified organisms (GMOs), by focusing in particular on the regulatory cooperation option. Alemanno also starts from the observation that the EU and United States have developed two very different regulatory approaches vis-à-vis biotechnology. While the US boasts a welcoming regulatory framework, the EU has implemented a strict and scientifically demanding regulatory regime based on a pre-market approval system, which is largely inspired by the precautionary principle. Moreover, unlike the US regime, the EU regulatory system also provides for mandatory rules for traceability and labelling of GM products. As a result, the US biotech industry is flourishing whereas the European's is struggling. Secondly Alemanno observes the rise of new developing countries such as China, India and Brasil who are becoming major producers of GM products and who are also developing regulatory responses. Next, the paper of Alemanno sets the scene for the subsequent analysis by providing a detailed examination of the existing international trade law framework for GM products. Alemanno argues that the challenge for international trade law is to address the trade-off between on the one hand the demand for ensuring the free movement of GM products among countries and on the other hand the demand for trade restrictions on these products on the basis of non-economic grounds, such as public health or the environment. Since no agreement specifically addressing GM products exists in World Trade Organization law, domestic regulations on biotechnology are subject to the rules of the GATT, the SPS and the TBT Agreements.

The paper goes on to offer a brief account of the most important transatlantic regulatory initiatives undertaken to reconcile these diverging regulatory approaches. Although the cooperative efforts carried out so far have fallen short of providing clear answers to the fundamental differences between these two opposing regulatory policies, Alemanno examines whether transatlantic regulatory cooperation over GMOs may be a viable option to overcome the current stalemate. In particular, in the light of the newly found dynamism in transatlantic regulatory co-operation, following the launch of the Transatlantic Economic Council (TEC), the paper analyzes what kind of regulatory cooperation in GM



products can realistically be envisaged today. Alemanno discusses three possible ways out of the current regulatory deadlock. The first would be to leave the market play under the existing and incomplete regulatory framework offered by the WTO Agreements. This will inevitably bring about trade disputes and will produce the effect of shifting responsibility from the executive to the judicial. Courts will then have to find (uneasy) answers into the WTO legal texts in order to accommodate genetic engineering within their scope. This might be not the most effective way. In contrast, a second way, would be to try to engage into multilateral cooperation in order to agree upon an *ad hoc* regulation for biotechnology. A WTO Agreement on GMOs might inject some more certainty on the existing legal framework by providing clear answer to the growing demand for minimum standards to comply with when marketing GM products. However, the potential difficulties surrounding the negotiation of such an agreement make such an option not viable for the time being.

Given the potential problems of these two options and in the light of the newly found dynamism in transatlantic regulatory co-operation the paper further explores a third way to get out of the regulatory deadlock over GMOs: regulatory cooperation between the two sides of the Atlantic. The paper outlines several ways regulatory cooperation may occur and be improved which include supportive actions to promote mutual understanding. First, the focus of cooperation should be on mutual understanding since harmonisation of substantive standards for the approval of GM products is highly unlikely in the short term. Secondly, developing a structured dialogue on each component of risk analysis, notably risk assessment would be advantageous to promote mutual understanding and identify possible common ground. Alemanno proposes that the US and the EU rely on the recently launched Transatlantic Risk Assessment dialogue as their privileged institutional mechanism. This informal gathering of both scientific and non-scientific experts belonging to the relevant agencies and bodies represents an ideal framework for mutual understanding, collaboration and convergence on risk assessment methodologies. Thirdly Alemanno proposes to share and exchange information and best practices to improve mutual understanding. This might include exchange of documents and consultation on planned and on-going relevant activities. Fourth transatlantic co-operation might focus on the development of a common risk assessment methodology and the identification of a basic set of common transatlantic analysis principles. Alemanno ends with several recommendations on how to conduct an effective dialogue aimed at identifying divergence before trying to overcome them.

The paper by Sabine Reinecke, Till Pistorius, Christine Schmitt, Jürgen Hauber and Georg Winkel on *The Environmental Leader - Entangled in Institutional Chains? - An analysis of the EU's role in international forest biodiversity policy; the case of genetically modified trees* explore EU's role in another application of genetic technology namely genetically modified trees. The paper focuses on the EU as a leader in global biodiversity governance with a specific focus on the Convention on Biological Diversity. Regarding biodiversity policies, the EU is perceived the major driving force pushing for the international legal adoption of a relatively strict international regime on genetic modification technologies, namely the Cartagena Protocol on Biosafety.

The authors provide original data for the argument that on the one hand, the EU is seen as a leader concerning negotiations on such topics as the development of networks of protected areas or standards for the sustainable use of biomass production. On the other hand, it acts considerably more as a 'laggard' with respect to other topics, e.g., the financing of biodiversity conservation and the restriction of a proliferation and use of genetically modified trees. The authors specifically focus on biodiversity policies with regard to forests. Due to its illustrative character concerning the stated ambivalence of EU policies, the authors utilize the case of genetically modified trees (GM trees) to answer the following questions: (1) To what degree can the EU be considered a 'true leader' regarding the conservation of forest biodiversity? (2) Which factors impede or promote a strong EU leadership role regarding forest biodiversity policies? (3) How can the EU be strengthened as a leader in the field of forest biodiversity policy?

To answer these questions, the authors first introduce two perspectives within the theoretical debate concerning the question of whether or in which manner the EU could be characterized as a leader in international environmental policy. Second, using the case of GM trees, the authors reflect on the empirical observations that were made during the 13<sup>th</sup> meeting of the Subsidiary Body on Technical and Technological Advice (SBSTTA 13) and the ninth Conference of the Parties (COP9) of the CBD as compared to the introduced theoretical background. The paper concludes with general recommendations for policy makers concerning potentially strengthening the EU's role in biodiversity

governance. Finally, the authors also attempt to draw on implications for issue-specific transatlantic relations by reflecting on possibilities for transboundary learning and coordination at different governance levels. The paper ends with practical recommendations for strengthening the EU's leadership position in forest biodiversity and focuses on improving internal pre-coordination, the formation of delegations, and streamlining EU coordination during negotiations.

## THE GOVERNANCE OF PESTICIDES AND CHEMICALS

Pesticides and chemicals have detrimental effects on biodiversity and are key main drivers of biodiversity loss. Two papers address this issue and focus on the governance of pesticides and chemicals. The paper on *'The Circuits of Regulation: Transatlantic Perspectives on Persistent Organic Pollutants and Endocrine Disrupting Chemicals'* by Chris Ansell and Jörg Balsiger focuses on pesticide governance. In both Europe and the US, pesticide regulation has long been established as a legitimate field of public health and environmental protection. Many of the techniques and institutional frameworks of pesticide regulation are well established and shared on both sides of the Atlantic. Previous research by Ansell and Balsiger on pesticide regulation pointed to two classes of chemicals that raise special problems for pesticide regulation and raise serious concerns for the protection of biodiversity and biosafety—"persistent organic pollutants" (POPs) and "endocrine disrupting chemicals" (EDCs). POPs are highly toxic chemicals that persist in the natural environment, accumulate in the food chain, and can be transported long distances. EDCs are chemicals that disrupt animal and human endocrine (hormone) systems, often with serious development consequences.

Although many pesticides are neither POPs nor EDCs (and vice versa), the chemical and environmental properties of these two chemical classes challenge traditional pesticide regulation strategies. The traditional approach establishes maximum residue levels for food and other products that ensure safe consumption. But this approach is not entirely satisfactory for POPs, because small amounts can persist in the environment and bioaccumulate, or for EDCs, which may have serious effects at very low doses. There also remains considerable uncertainty about how POPs and EDCs move through the environment and interact with other environmental pollutants. Another challenge is that standards for pesticides and toxics are set using a dose response model that assumes a linear relationship between the amount of a pesticide and its toxicological or carcinogenic health effects. However, the dose response effects of POPs and EDCs are poorly understood. That POPs may be EDCs and vice versa is of special concern.

These properties of POPs and EDCs present thorny issues for regulators on both sides of the Atlantic. As an emerging field of regulation, POPs and EDCs therefore present both a challenge to cooperative transatlantic relations and an opportunity for considerable policy learning. As one might expect, the lines of debate between Europe and the U.S. revolve partly around the advantages and disadvantages of the precautionary principle. The possibilities for policy learning and cooperation, however, go considerably beyond this tension.

In this paper, the authors suggest that emerging POP and EDC regulation must be understood in terms of a complex multi-level architecture of separate but interlinked regulatory sites that constitute contested arenas of cooperation, norms diffusion, and policy learning. The contestation of normative and operational principles in one arena often spills over into other arenas, encouraging multilevel action. Regulatory developments follow "circuits of regulation"—the complex patterns of influence and feedback between interlinked regulatory arenas. As a consequence, one rarely observes a linear progress toward the precautionary principle or science-based approaches, but instead a constant renegotiation of boundaries between them as well as a degree of hybridization produced by policy learning inherent in regulatory cooperation.

The paper analyzes the multi-level frameworks of regulation of POPs and EDCs through a focus on federal relations within the EU and the US as well as in multilateral and bilateral cooperation at the international level. It concludes that the multi-level character of POPs and EDCs regulation has clearly created complex pathways of regulatory influence and interaction. The authors' survey of regulatory activity for these two classes of chemicals suggests that POPs regulation is more developed than EDCs regulation, particularly at the international level. The effects of EDCs also appear to be less well understood scientifically and to present especially difficult regulatory challenges. Nevertheless, when taken together, the increasing attention to POPs and EDCs suggests that perspectives on

chemical regulation in both the Europe and the US are shifting. Although the EU has more actively advanced the precautionary principle in chemicals management, the US has also taken significant steps towards regulating POPs and EDCs, even under an administration hostile to many environmental issues. In concluding this paper, the authors distinguish several areas of existing or possible regulatory cooperation on POPs and EDCs.

In the paper on '*Reshaping Chemicals Policy on Two Sides of the Atlantic. Ecosystem Impacts of Current Approaches and the promise of improved sustainability through international collaboration*' Megan Schwarzman and Michael Wilson make a case for governance developments which promote 'green chemistry'. Green chemistry describes the development of novel chemicals and manufacturing processes to improve their inherent safety and prevent—rather than reduce or remediate—the impacts of chemical exposures and environmental contamination. In essence, green chemistry aims to "design out" health and environmental hazards, while reducing the consumption of energy, water and non-renewable feed-stocks, and generating fewer hazardous byproducts and waste. Realization of these goals requires policies to identify, prioritize and take action on chemicals of concern, as well as to increase the value and speed the development of safer technologies.

In the first part of the paper the authors discuss the links between synthetic chemicals in the environment, the loss of global biodiversity, and the services ecosystems provide to society. They argue that the chemical industry is linked to some of the largest causes of biodiversity loss, including (1) pollution of soil, air, fresh water and oceans, (2) global climate change (3) urbanization and changing consumption patterns, (4) technological development, resource extraction and (5) chemical-intensive agricultural practices.

They trace the impacts of outdated U.S. chemicals policies and argue at length that current U.S. chemical regulations, notably the Toxics Substances Control Act, are grossly outdated and have failed to provide sufficient environmental protections or motivate meaningful investment in cleaner chemical technologies and safer alternatives. Schwarzman and Wilson identify and discuss three main gaps in US Chemicals Policy, *ie* the data gap, the safety gap and the technology gap. That argue further that given the scale of the chemical enterprise and increasing evidence of its impact on ecosystems a multi-pronged approach to U.S. chemicals policy is needed that enables: (1) immediate action to limit use and exposure to known hazardous substances, (2) further investigation of priority substances suspected of having ecotoxic effects, and (3) a precautionary approach that facilitates action to reduce potential risk, even where definitive evidence of cause and effect relationships is not yet established.

By contrast, in the last five years the EU (EU) has instituted sweeping policies governing chemicals and products. Most notable is the *Registration, Evaluation, Authorisation and Restriction of Chemicals* (REACH) regulation. REACH represents a fundamental paradigm shift in four key areas: (1) legal implementation of the precautionary principle, (2) shifting the burden of proof of safety to producers for chemicals of high concern, (3) requiring the use of safer substitutes in some cases, and (4) improving communication between chemical producers and downstream users. These changes, combined with an influx of chemical information, begin to address the lack of transparency and accountability in the chemicals market. As a result, REACH is expected to shift global markets in favor of cleaner technologies, including green chemistry. The new EU REACH regulation has the potential to accomplish these aims, and as such is the most comprehensive chemicals management regulation in the world. Its basis in the precautionary principle also makes it the most protective for health and ecosystems. In addition the EU has installed policies that take immediate action on chemicals of high concern and set up a framework for product stewardship and producer responsibility for the full life cycle of electronic and electrical equipment. These policies are expected to shift the market to favor investment in green chemistry and other cleaner technologies.

Transatlantic cooperation and learning between California and the EU, sharing information and best practices in the area of chemicals policy, could speed the development of similar policies in the U.S., beginning in California. Forging links with the EU will help California pursue substantive regulatory changes. Such links could also provide EU policymakers a footing for strengthening REACH in subsequent negotiations and in so doing, could contribute to international sustainability efforts. Schwarzman and Wilson identify several mechanisms to enhance transatlantic learning and exchange of information. These include inter-agency Memoranda of Understanding, research collaborations, biomonitoring and involving stakeholders. A second mechanism is to share best practices for example

with regard to developing chemical and product life-cycle assessment tools that minimize risk-shifting among environmental media while remaining efficient and widely applicable, developing methods of assessing alternatives to chemicals of concern, addressing the problems inherent in weighing relative hazards, performing cost-benefit analyses for regulations, providing reasonable protection for confidential business information, while ensuring that key information such as chemical identity and hazard traits remains public and building an appropriate information technology (IT) infrastructure for access to information on product ingredients, chemical use and hazard traits.

## THE GOVERNANCE OF WILDLIFE BIODIVERSITY AND NATURAL RESOURCES

Four papers, each focusing on different key-aspects, address the issue of the governance of wildlife biodiversity and natural resources. In their paper on *'Rivers of Diversity: Evolving Water Regulation in California and the European Union'* Gabrielle Bouleau and Matt Kondolf focus on river management as a case study to explore regulatory policy innovation between the EU and California. They stress that aquatic and riparian areas are often recognised as biodiversity 'hotspots' which are threatened by water quality degradation from pollution, morphological modifications and reduction in water quantity from diversions for human uses. Adequate flows in rivers are increasingly recognized as essential to maintain or restore aquatic ecosystems, and such ecosystem flows must be implemented in the context of water rights. With changes in runoff regimes anticipated from climate change, threats to aquatic biodiversity will be severe if water rights and regulations established in past eras cannot be modified to reflect emerging objectives of biodiversity and ecosystem health. The tackle this challenge regulatory innovation will be required.

The paper by Bouleau & Kondolf shows that the EU and California have experienced similar challenges in the politics of water that may account for their regulatory innovation and have developed significant pieces of law that are very demanding in terms of ecological standards. Bouleau and Kondolf highlight similarities between California and the EU. First California is comparably diverse in landscapes to Europe. In Europe, aquatic biodiversity is the highest around the Mediterranean Sea. It is also there that aquatic biodiversity is most threatened by water diversion. Similarly most Californian population settled in Mediterranean-climate coastal landscapes where biodiversity is high but seriously threatened by human activity. Second, both regions provide success stories of river restoration after a long period of degradation. Third, as they develop rules to protect aquatic biodiversity, the EU and the State of California similarly face powerful reluctant actors. Last, neither governmental body can rely on stable constituencies to forge nor enforce its law.

The authors go on to argue that the State of California and the EU experience very similar hurdles when they come to try to restore aquatic biodiversity of their rivers. Neither California nor the EU has its own corps of engineers to forge a unitary environmental management of rivers. Both governmental bodies experience strong internal opposition of irrigators in their attempt to secure more water for aquatic species. Neither can rely on social cohesion to promote environmental values, because social diversity leads to a diversity of environmental expectations. For all these reasons, the power of enforcement and persuasion of the EU and the State of California is similarly fragile. California and the EU have largely counted on law to put constraints on water rights, in the name of efficiency and to restore aquatic biodiversity.

The authors provide an in-depth historical analysis of the evolution of water regulation in California and EU. With regard to the overview of the EU the authors first focus on one Member state France to describe the development of early regulation and then turn to how the EU has challenged member states water sovereignty. Concerning the latter the authors discuss the development of the Water Framework Directive. Bouleau and Kondolf then turn to California and argue that California's water law is predicated upon water efficiency and show that competing definitions of efficiency arose as population grew and the relative importance of various economic sectors evolved. The result of this historical development may hamper adaptation to new challenges such as climate change. The paper concludes with a comparison of the two cases, arguing that diversities faced by the EU and California have had comparably stimulating effects on efficiency-seeking policy. Yet both regulations could learn from each other to better address climate-change and social acceptability.

In their discussion of mutual learning Bouleau and Kondolf focus on the importance of debating the nature of biodiversity protection and the relevance of disturbed versus undisturbed

conditions (pristine environments). This contributes to awareness raising which is signalled out as an important issue. In this respect, the authors argue that the EU has much to learn from the vitality of public debates in California. The EU provisions are highly technocratic, using complex language and expert criteria. On the other hand, California can learn from the EU with regard to empowering civil society. Through mandatory reporting, the EU provided citizens with much more information.

**Heike Nitsch, Andrew Manale and Bernhard Osterburg** in their paper on '*Agriculture and the conservation of wildlife biodiversity – comparative analysis of policies in the USA and the EU*' analyze and compare environmental and agricultural policies for conserving the biodiversity of wild plants and animals on agricultural lands in the EU and the United States. The discussion of strategies for conserving biodiversity at community level (EU-level and federal in the US) and the role of agriculture in this context provides the lead for subsequent sections on the implementation of different policy instruments. The authors pay special attention to the distribution of competences within the multi-level policy systems of the EU (regional, national, EU level) and US (state and federal), and discuss mechanisms for introducing and implementing new instruments. Finally, Nitsch et. al. compare both approaches and draw conclusions and lessons that support transatlantic learning.

The authors start with providing a comparative EU-US overview of the interlinkage between agriculture/farmland and biodiversity and stress that in the EU an estimated 50% of species rely on agricultural habitats. Hence, agriculture has a key role to play in protecting biodiversity by conserving genes, species and habitats. Modernization and intensification of European agriculture have significantly reduced biodiversity during the last few decades. On the other hand some marginal land has been under-utilized or abandoned. In contrast, there have been clear signs of progress in reducing threats to and enhancing the biological diversity of Europe's forests.

In a subsequent part the authors document and discuss the biodiversity-oriented policies in the EU discussing several relevant directives, the EU-wide Natura 2000 network and recent communications on a European Biodiversity Strategy. The Strategy defines a framework for the actions necessary to fulfill the legal obligations concerning conservation and sustainable use of biological diversity and states how it will integrate environmental concerns into other sector policies. However, the Biodiversity Strategy and the related sectoral Biodiversity Action Plans (e.g. for fisheries or agriculture) do not have legislative status. The authors also focus on the integration of biodiversity issues into Common Agricultural Policy (CAP) with a specific focus on Natura 2000 and the importance of cross compliance, the linking of the full receipt of direct support payments to compliance with minimum farming standards. Key characteristics of the EU approach are that in Europe agricultural land is seen as an integral feature of the landscape and has high importance for biodiversity. Modernization and intensification on the one hand and at the same time marginalization and under-utilization of agricultural land have resulted in significant biodiversity loss during the last decades. The EU's objective to halt the loss of biodiversity by 2010 requires addressing agricultural practices. Objectives and actions have been recorded in strategies and action plans and have to be translated into concrete policy measures. Environmental aspects have increasingly been considered within the CAP. A key objective regarding biodiversity protection in the EU is the creation of a EU-wide network of Natura 2000 areas that encompass agricultural land.

In a next section the authors discuss the biodiversity-oriented policies in the United States and stress that United States policy on the conservation of wildlife and plant biodiversity on agricultural lands reflects piecemeal enactment and implementation of federal statutes on species and wildlife protection. Rather than a seamless, comprehensive policy to protect or manage biological natural resources on private, agricultural lands, a collection of laws, regulations, internal policies of individual agencies, and interpretations of laws by individual agencies separately address different game, wildlife, and biodiversity objectives of natural resource management. This collage reveals both the state and the evolution in the science of wildlife management and biodiversity and the conflicting political views of not just how best to manage but also what entity - federal, state, or private/non-profit organization - is best equipped to manage what is inherently a public good that resides on private lands. Fundamental to United States policy on the conservation of wildlife and biodiversity is the principle established in the

Public Trust Doctrine that wildlife is a public good that must be protected for public benefit. The biodiversity brought to biological systems is an indirect consequence of wildlife protection.

The authors discuss biodiversity policy-making on different levels and the different mandatory programs protecting wildlife and habitats. The section on US policies also pays special attention to cross compliance regulations. Besides programs to protect wildlife and habitats the US also has federal programs which restore wildlife habitat on agricultural lands.

Comparing the EU and the United States Nitsch et. al. conclude that both have shown a commitment to protecting and enhancing nature conservation on agricultural land through a series of mandatory, quasi-mandatory and voluntary measures. In conclusion the authors argue that managing the "commons", a dilemma that conserving biodiversity represents, poses a policy challenge that evolves just as society and its institutions change. Flexibility in policy allows for identification of approaches that improve effectiveness and the efficiency of measures. This evolution includes the identification of suitable vertical levels for their implementation, a better coordination between measures and accounting for further environmental issues beyond biodiversity. The authors stress that in the field of nature conservation and agricultural land uses common challenges for the EU and the US can be identified, where mutual learning processes and an exchange of experiences on "good practice" in policy design and in monitoring and evaluation could be beneficial.

The challenge is to develop a land use policy that takes into account multiple objectives (such as the production of food and raw materials as well as climate, water and biodiversity protection) and where and how these are most effectively reached. Both approaches, integrating biodiversity protection into agricultural management on the one hand and converting land to nature area in the long term on the other, have to be discussed under this context. Greater collaboration between the EU and the US could help in developing the monitoring and assessment tools to understand these differences, to share scientific information practices and management experience and to improve overall effectiveness and accountability of public funds.

**Michael McGinnis** in his paper on '*Addressing Biodiversity Loss in a Changing Climate: The importance of coastal marine ecosystem-based regulatory policy in the Euro-Mediterranean, United States and California*' focuses on the development of coastal marine ecosystem-based planning activities in the Euro-Mediterranean, the United States, and California in order to address the cumulative impacts of the multiple-use of coastal marine resources and to mitigate the expected impacts from climate change. McGinnis stresses that the issue of biodiversity loss may seem an "ephemeral" issue in today's climate change debate, the consequences of biodiversity loss will have dramatic consequences of various peoples and places.

To begin to address the multi-scale pressures on coastal marine biodiversity, California, the US and EU have turned toward the development of coastal marine ecosystem-based approaches to planning and policymaking. McGinnis's paper focuses on two primary policy tools that support coastal marine ecosystem-based *regulatory* policy -- the designation of marine protected areas (MPAs) in California and Mediterranean Basin, and the development of Integrated Coastal Zone Management (ICZM) plans in the EU. In his paper McGinnis focuses on Mediterranean-type ecosystems (MTEs) which contain 20 percent of vascular plant species and are identified as some of the world's hot spots for threatened biodiversity. They include all of California excluding desert and steppe and the Mediterranean region which covers all or part of thirty countries. MTEs share many problems related to their climate, including sensitivity to climate disturbance, desertification, air and water pollution, overdraw of groundwater, degradation of fresh water ecosystems, coastal marine habitat loss, overfishing, and urbanization. The expected impacts from climate change on coastal marine biodiversity are likely to be dramatic. In his paper McGinnis provides an overview of the expected impacts and documents the coastal marine ecosystem based regulatory policies in the US and the EU.

McGinnis ends with a discussion on the implications for transatlantic learning and coordination. He argues that to address biodiversity loss in an age of climate change, institutions will have to address and resolve conflicts across political, economic and administrative jurisdictions. McGinnis emphasizes that regulatory policies should link regional, national and international efforts in a comprehensive, ecosystem-based approach to protect coastal marine biodiversity. McGinnis identifies several obstacles which need to be overcome for such an approach. First on the local level (municipal) authorities lack the institutional capacity or institutional preference to carry out or implement ecosystem-based policy. In addition, conservation of coastal marine biodiversity is made more complicated by the privatization of

resources in coastal marine ecosystems that are essentially or commons areas. Overcoming these obstacles requires a combination of broad-based political support at international and national levels, and policy innovation at the regional level with regard to the creation and implementation of ecosystem-based plans that can match the changing character of coastal marine ecosystems. The emphasis should be on science-based descriptive models that organize socio-economic and ecological information into spatial models of processes, including identification of cumulative pressures. This would constitute an important first step toward a more integrated approach to coastal marine ecosystem-based regulatory policy.

Policy recommendations put forward by McGinnis include streamlining exchange of information and information coordination. This exchange could be facilitated by developing an international network of coastal marine ecosystem-based policymaking which could perform the following functions: (1) develop, maintain, and evaluate relationships and communication vehicles necessary for a successful learning network, (2) identify and lead progress toward an international, long-term, collective vision for the development and implementation of coastal marine ecosystem-based regulatory policy, (3) ensure effective communication of principles and progress across MTE areas to all parties involved, (4) scope common issues (restoration, biodiversity conservation, sediment management, water quality, etc) and needs (information and information delivery, methodologies, training, etc) in order to pursue policy responses to the cumulative pressures that are impacting coastal marine ecosystems, (5) coordinate targeted trainings or workshops for practitioners to further progress in coastal marine ecosystem-based regulatory policy development, (6) identify lessons learned and experiences in using the training, tools and information and (7) design performance measures of the overall effort as a learning network and annually assess the network's usefulness and long-term need. In sum, McGinnis argues for new social alliances and partnerships that combine scientists, policymakers and non-governmental organizations that cut across MTE areas are needed to address coastal marine biodiversity loss in an age of climate change.

In his paper *'International biodiversity governance and the outpacing of policy by threats: how can conservation regimes address global climate changes'* Adam Smith address recent developments in global marine biodiversity governance with a specific focus on the outpacing of biodiversity policy by complex biodiversity threats. This outpacing occurs in two ways. First, prolonged negotiations forestall addressing threats in a timely fashion and often lead to time lags that make correction all the more costly and less likely. Second, the split between legal primacy over a threat (recognized ability to enact and enforce regulation) and competency over a threat (mandate to address a threat) requires policies to cooperate. Smith illustrates these issues with a series of policy case studies relevant to the conservation of large marine mammals (whales, seals, polar bears, and sirenians) over the past 100 years. The characteristics of these policies reflect on general trends in international biodiversity governance and illustrate the outpacing of policy by threats. Threats to biodiversity have often outpaced policy development on two fronts. First, prolonged negotiations exacerbate the time required for biological systems to recover once effective policy is finally put into place. Second, threats act synergistically across multiple sectors, meaning that biodiversity treaties must contend with problems outside their sphere of primacy such as for example global warming or ozone depletion. Unfortunately, global change only promises to exacerbate the outpacing of policy by threats.

The central argument of Smith is that international environmental governance must be structured so that policies can accurately "see" and respond to complex threats. First he introduces the importance of 'etiology' (time) lags between identifying and solving (policy implementation) the problem and the response lags between policy implementation and recovery of the biological community or ecological processes. Etiology lags arise most commonly when 1) there is a lack of technical and scientific understanding necessary to define the problem and provide solutions, 2) actors do not share a common understanding of the issue, 3) actors do share a common viewpoint but are otherwise intransigent, and 4) there are intervening distractions that push the issue lower on the diplomatic list of priorities. Smith shows that etiology lags can extend decades. Response lags are inherent properties of biological systems and arise because most ecological processes do not occur instantaneously. Although they are an intrinsic part of any biological system, response lags can be extended by etiology lags, making recovery all the more costly and delayed. Hence, the crux of the argument is that time lags (combination of etiology and response lags) in negotiations can elongate time lags in biological

recovery. Smith goes on to develop the concept of the “threat matrix”. A threat matrix is the set of threats, and interactions between threats, that endanger biodiversity. Threats can directly or indirectly affect biodiversity, and they can interact amongst themselves, ameliorating or exacerbating their net effect. It is important to distinguish the threat matrix seen from a policy perspective and a threat matrix seen from a natural sciences perspective. When these align, one should expect that the potential exists for implementing adequate policy. When they do not align (i.e., when a threat is outside the mandate of a particular policy) policy instruments need to cooperate. If they do not, a threat-policy gap exists and the threat goes unaddressed.

The concept of a threat matrix presented in the paper of Smith is based on a threat-focused approach to conservation management. Through time threat matrices have become increasingly complex and pose severe challenges to policy-makers. As a case study to substantiate the argument Smith focuses on regimes pertinent to large marine mammals (LMMs). This case study is meaningful for a number of reasons which the authors discuss. Smith proposes several specific policy recommendations with regard to the protection of LLM's. Smith concludes that threats to marine biodiversity act simultaneously and synergistically, but international marine governance is fragmented among many different regimes. Conservation biologists now understand that in many cases coincident threats can affect biodiversity more than just the sum of their effects separately. In many cases, the threat that is most predominant when a species is rare is different from the one that brought it to the point of rarity in the first place, meaning that the etiology of threat and appropriate policy response is that much more complicated. Most marine environmental regimes focus on single issues (pollution, harvest, invasive species), but conservation efforts must address threats as they impinge upon biodiversity (i.e., synergistic).

## THE GOVERNANCE OF CLIMATE CHANGE

A very specific threat to biodiversity concerns climate change. Two papers address several regulatory options with regard to combating climate change.

**Michael Hanemann and Chris Busch** in their paper on *'Climate Change Policy in California: Balancing Markets versus regulation. An Emerging consensus for direct regulation and why it makes sense'* discuss different strategies to combat climate change and develop several policy proposals.

The first part of the paper focuses on climate policy in California, which has been at the forefront in the North American effort to fight global warming, and the rationale for the approach taken in California. The second part of the paper explores the economic, psychological, and institutional factors that support policies to address climate change. Climate change is an example – perhaps the most far-reaching example – of an economic externality: a person decides to engage in an action involving, say, the combustion of fossil fuels based on a calculation of the benefits and costs of this action to himself, but disregards the adverse consequences ultimately imposed on others because of the increased accumulation of greenhouse gasses (GHGs) in the atmosphere. Because the actor does not bear all of the (ultimate) costs, too much of the action is likely to be undertaken from the larger viewpoint of society. Hence, some correction is needed in order to protect the public interest.

Hanemann and Busch develop the thesis that, although there is almost 40 years of experience in dealing with pollution control policy, climate change presents some unusual challenges, both conceptual and practical, for economists and policy makers alike. At the practical level, climate change poses an institutional challenge because of the breadth of its reach across the entire economy. At a conceptual level it involves a different mix of issues than has generally arisen in most existing pollution control policy, including a different balance between source-control versus end-of-pipe treatment, quite distinct long-term and short-term policy goals, and a pressing need to regulate before all the technologies exist that will be needed to meet the long-term policy goal and even, perhaps, some of the short-term policy goals. As a result, according to Hanemann and Busch climate change policy will require a different architecture from the existing structures used for conventional air and water pollution.

Hanemann and Busch discuss several policy options with special attention to emissions trading and the cap-and-trade system proposals. In this mechanism there is a cap on emissions – both a cap on overall emissions of all firms, and caps on the emissions of individual firms. But, firms are permitted to buy and sell emission permits, thus allowing their individual discharges to become different



from the cap they were originally assigned. The aggregate level of emissions by all firms, however, always stays within the aggregate cap set by the government. The system therefore combines the features of a limit on the total quantity of emissions together with those of a price mechanism (emissions tax) which leaves individual firms free to determine their preferred level of emissions subject to the market incentive of a price associated with increased emissions. It has the efficiency property that it achieves the aggregate level of emissions set by the government at the lowest current aggregate cost.

This system has been, with success, applied to several air pollutants including the SO<sub>2</sub> and NO<sub>x</sub>. Given the conceptual advantages of emission trading as seen from the perspective of economic theory and the practical success with emission trading in dealing with SO<sub>2</sub> and NO<sub>x</sub> since 1995, how can there be any doubting its role as a centerpiece of GHG control policy? Hanemann and Busch put forward several arguments why emission trading is not straightforward for GHG emissions. In short, with SO<sub>2</sub> and NO<sub>x</sub>, the policy approach was to reduce emissions by modifying the functioning of the existing coal-fired fleet, and emission trading by power plant owners quickly attained this objective. The same strategy is unlikely to work for CO<sub>2</sub> because the existing power plants cannot do much to reduce their emissions. Compared to SO<sub>2</sub>, dealing with CO<sub>2</sub> emissions calls for an entirely different strategy for electricity generation. The generating technologies that matter are *not* mature, namely: high thermal efficiency coal combustion, carbon capture and sequestration, and renewable energy technologies such as solar, wind, wave, and geothermal. Furthermore, while a strategy targeted narrowly at power plant owners worked very well for SO<sub>2</sub> and NO<sub>x</sub>, it cannot be similarly effective for CO<sub>2</sub>. This is because, while electricity generation accounted for about two thirds of all SO<sub>2</sub> and NO<sub>x</sub> emissions, it accounts for a much smaller fraction of CO<sub>2</sub> emissions. Hence, an emission control strategy targeted at electric power plants alone will be grossly inadequate.

Hanemann and Busch build on this and summarize lessons learned from previous policies and suggest design requirements for effective climate change policy. They argue that a price on GHG emissions, as proposed in the cap-and-trade system, is an important step, but plays only a supporting role. The key is a robust collection of direct regulation as the foundation of the effort since the need to control almost every sector of the economy drastically changes the regulatory problem. They conclude that California is on the right track. Moreover, when they compare climate policy thinking in California to that in the EU and that embodied by the new climate policy initiatives in Washington, DC, they see evidence of an emerging consensus on best practice for climate policy that involves a broad set of direct regulation in particular key sectors like electricity generation and transportation but also across most sectors of the economy with a broad carbon pricing overlay to sweep up the last increment of economy-wide reduction needed. The final section of the paper further develops climate change policies with a focus on the objectives to be achieved, a variety of policy instruments, the importance of promoting technological innovation. They conclude by stating that critical to effective climate policies will be the extent to which they induce (1) technological innovation, and (2) behavioral change by virtually every economic agent. The required changes are more profound than can be achieved through an emission trading system alone, although emission trading certainly needs to be part of the portfolio of policy instruments. In addition to the need for a strong regulatory component, climate policy needs to be seen as a phased sequence of policies that play out over time, not as one policy set at a single point in time.

In their paper on *'Regional and International Environmental Agreements: Emissions trade, safety valves and escape clauses'* Larry Karp and Jinhua Zhao explore another instrument to tackle climate change namely International Environmental Agreements (IEA's) note that California and the EU are considering ways that they might cooperate to reduce aggregate emissions of greenhouse gasses and combat climate change. An agreement between these two regions would have many of the characteristics and face many of the obstacles of International Environmental Agreements (IEAs) amongst nations.

The paper explains how the structure of multi-national or multi-regional environmental agreements affect their chance of success. Environmental agreements involving different countries or regions confront three types of challenges: encouraging participation, achieving abatement efficiently, and creating incentives for compliance. The single most important point by Karp and Zhao is that a design feature that addresses one of these challenges can make other challenges more difficult to meet. For example international trade of emissions permits contributes to efficient abatement, but it

may be inimical to participation, and do nothing to encourage compliance. Trade in emissions permits has ambiguous and in some cases surprising effects on both the equilibrium level of abatement, and on the ability to persuade nations or regions to participate in environmental agreements. An escape clause policy and a safety valve policy (*infra*) have essentially the same properties when membership in environmental agreement is pre-determined, but they create markedly different effects on the incentives to join such an agreement. The two policies lead to a qualitative difference in the leverage that a potential member of the agreement exercises on other members.

The paper begins by discussing the broad issue of using trade policy to achieve environmental outcomes. Contrary to the "orthodox" position in trade economics, the authors think that trade policy, if used carefully, can help to achieve environmental objectives without undermining the international trade system. The authors discuss the relative merits of carbon taxes and a cap and trade scheme and explain the effects of allowing international trade in emissions permits. They consider two types of situations, namely situations where regions across which the trade occurs do not harmonize their policies and situations in which different regions do harmonize their policies.

The authors then discuss two types of policy proposals in the case were countries' abatement costs are random, namely an escape clause and a safety valve. Under the escape clause, a signatory to an IEA has the option to pay a fine rather than meet its abatement target, but there is no trade in permits. Under the safety valve, IEA members are allowed to trade permits. The IEA defends a price ceiling by distributing enough emissions permits to maintain the equilibrium price at a level no greater than the price ceiling. When the number of IEA members is pre-determined, these two policies can achieve the same distribution of environmental outcomes (abatement) and of aggregate welfare. In this respect, the two policies are (essentially) equivalent. However, the escape clause and the safety valve have different effects on countries' incentives to join an IEA. The authors go on to explain this difference and argue that the two policy proposals, the escape clause and the safety valve, have fundamentally different effects on the equilibrium size of the IEA. The safety valve does not promote membership in the IEA, and can even reduce it. A well-designed but extremely simple escape clause can increase equilibrium membership. However, trade in permits enable countries to take advantage of low cost abatement opportunities, a feature absent under the escape clause. The safety valve that is considered in the paper uses a monetary fine to encourage signatories to meet their abatement target. Trade sanctions provide an alternative to the fine.

Karp and Zhao emphasize the strategic elements involved in the formation of IEAs and formulate several recommendations. First they recommend the idea of using an escape clause, which relieves a country of the responsibility to abate if it incurs some other cost that benefits signatories, e.g. pays a fine or agrees to the withdrawal of WTO-mandated trade concessions. This alternative can promote participation and provide insurance against high costs, although it does not help in achieving efficient abatement. An IEA that combines trade in permits and an escape clause may help in creating a successful IEA. The second important recommendation is that it is reasonable to use carefully circumscribed trade restrictions, such as border tax adjustments, as part of an IEA. These restrictions will help to undercut a politically attractive argument for staying outside an agreement: the concern that carbon leakage will dilute most of the global gains from the agreement, while eroding participants' ability to compete in carbon intensive sectors. The adoption of rules will also decrease the ability of pressure groups to demand protection once a country has joined the agreement. Thirdly, multilateral rules will mitigate the problem of carbon leakage, to the extent – currently difficult to determine – that this leakage has the potential to be a genuine problem. Finally with regard to EU California co-operation the authors state that the EU and California have in place regulatory apparatus that can actually enforce environmental laws. This experience and institutional infrastructure provide a basis for thinking that Europe and California, by working together, can advance the prospects of an effective international climate agreement. A concrete step is to link carbon markets in the EU and in the embryonic Western Climate Initiative involving California. Of course, a successful agreement requires participation by the US, not just several US states. Closer ties between the EU and California can help nudge US policy in the direction of participating in such an agreement.

## GENERAL POLICY RECOMMENDATIONS

The 20 papers which contributed to the project generated several policy recommendations some of which are detailed and specific, and elaborated in the paper. Across the 20 papers one can identify some general policy recommendations which are briefly outlined below.

First of all, many authors develop specific proposals with regard to **information exchange**. Megan Schwarman and Michael Wilson for example make a strong case for information exchange both with regard to data as well as with regard to policy tools in the context of 'green chemistry'. Michael McGinnis identifies several possibilities for information exchange in the context of marine ecosystem governance and Jacopo Torriti and Ragnar Löfsted make a plea for the exchange of health and safety data. The main mechanism which would enable exchange of information are Memoranda of Understanding, as outlined by Hioureas and Cain, either between agencies or political entities. Dan Farber singles information exchange agreements out as one of the of the possible agreements which seem the least likely to implicate barriers on either side of the partnership, assuming that the parties involved are legally permitted to share the information.

Secondly, in order to promote **mutual learning** some authors suggest to install a structured dialogue and promote the exchange and networking of researchers and policy-makers to discuss policy innovation. The **structured dialogue** can take the form of **formal meetings** as is proposed by Alberto Alemanno in the context of genetically modified products (Transatlantic Risk Assessment Dialogue) or **informal meetings** of international networks or working groups of academics, policy-makers and stakeholders as is proposed by Michael McGinnis in the context of coastal marine governance. The importance of policy experimentation to address new challenges and learning from policy experimentation and innovation is also an important aspect of mutual learning. The importance of policy experimentation and the potential for mutual learning was highlighted in the paper by Carlson on the idea of iterative federalism and in the papers by Larry Karp and Jinhua Zhao and Michael Hanemann and Chris Busch on climate change

Thirdly, several authors stress the importance of **involving stakeholders** and stakeholder initiatives in new global governance initiatives. This point is made in the papers by Frans van Waarden, Jan Wouters et. al. and Winickoff and Klein who focus on the use of **private standards** and certification schemes as a means to govern supply chains and take into account biodiversity and biosafety issues. These private governance initiatives are seen as interesting mechanisms and tools to pursue public goals. In order to streamline their potential for public policy authors develop several arguments for (inter)governmental involvement. Van Waarden develops this argument most forcefully and argues for governmental involvement in order to certify the certifiers. Winickoff and Klein differ on this point and argue that government's role should primarily be in the area of preventing fraud. They also argue that as labels become more important state oversight is required to prevent abuses. However, this threatens to make private standards less flexible and dynamic. Some papers also point out that one area in which these private standards can be used by governmental bodies to pursue biodiversity objectives is **public procurement**. Several authors also argue that stakeholders can also be involved in **implementing policies and monitoring** as is highlighted in the contributions by Heike Nitsch et. al. and Schwarzman and Wilson. Finally, with regard to stakeholder involvement Gabrielle Bouleau and Matt Kondolf make the point that stakeholder involvement is a crucial component in **awareness raising** and that awareness raising is a crucial component to generate support for policy initiatives. Forging transatlantic cooperation in the context of awareness raising is another option which can be further pursued.

Fourth, the project also highlighted the importance of applying the **policy-integration principle** to the governance of biodiversity and biosafety. Several papers point out to the interrelation between biodiversity/biosafety governance and several established policy areas such as for example agricultural policy, food policy and chemical policy. In agricultural policy the concept of cross-compliance links environmental protection to agricultural policy as is discussed in the paper by Nitsch et. al. The integration of biodiversity objectives in existing policies deserves further scholarly attention, especially with regard to make this more operational.



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