



Future Challenges to the Stockholm Convention on Persistent Organic Pollutants

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Abstract

This paper aims to identify challenges that the Stockholm Convention on Persistent Organic might face in the future. The research was carried out in the form of a review of existing literature on the Stockholm Convention and other relevant environmental agreements as well as performing primary research of original data and political documents.

This study shows that the Stockholm Convention will face a multitude of challenges, ranging from the issues connected to the implementation of the regime on a domestic and local scale, to the possible effects of climate change. The challenges have been categorized as: *Scientific and Technological Issues*, *Trade-related Issues*, *Implementation*, *Compliance and Financing Issues*, *Chemical Management Issues* and ultimately *Synergies & SAICM Issues*.

Through the synergies process currently undertaken within the chemicals and waste regime, other multilateral environmental agreements have reason to be interested in the outcome of challenges to the Stockholm Convention. Hopefully the results of this paper might serve as a brief summary of potential challenges of the future and thus be of value to a range of actors including those directly engaged in the political process of the Stockholm Convention, Convention Secretariats, government officials, non-governmental Organizations and scholars in the field of global environmental governance.

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Terms and Abbreviations

AMAP	Arctic Monitoring and Assessment Programme
BAT	Best Available Technology
BEP	Best Environmental Practice
CBD	Convention on Biological Diversity
CLRTAP	Convention on Long-range Transboundary Air Pollution
COP	Conference of the Parties
DDT	Dichlorodiphenyltrichloroethane
ENB	Earth Negotiations Bulletin
EU	European Union
G-77	Group of 77
GATT	General Agreements on Tariffs and Trade
GEF	Global Environment Facility
INC	The Intergovernmental Negotiating Committee
MEAs	Multilateral Environmental Agreements
NGO	Non-Governmental Organization
NIP	National Implementation Plan
PCB	Polychlorinated biphenyl
PFOS	Perfluorooctanesulfonic acid
POPRC	Persistent Organic Pollutants Review Committee
POPs	Persistent Organic Pollutants
SAICM	Strategic Approach to International Chemicals Management
SC	Stockholm Convention
WTO	The World Trade Organization
UN	United Nations
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Introduction

Rachel Carson published her famous work *Silent Spring* in 1962. Despite this, chemicals in our nature and bodies are not a problem of the past. In fact, unified international actions on the most persistent of these substances known as Persistent Organic Pollutants (POPs), were not initiated until the 1980s and first reached a global scale in the early 2000s.

Through the Stockholm Convention on Persistent Organic Pollutants signed in 2001, mankind has set out to restrict and minimize the consequences of the most destructive of these substances known as POPs. Singled out for their persistence and ability to be transported long distances, they can affect communities far away from their original emission source (Dewailly, E and Furgal, C, 2003). As the Stockholm Convention (SC) develops, it can be expected to encounter increasing challenges due to a number of factors.

This paper aims to identify potential future challenges to the SC. This has been done through a review of existing literature on the SC and other relevant multilateral agreements as well as performing primary research of original data and political documents. The review was carried out with the following research question: “*What challenges might the Stockholm Convention on Persistent Organic Pollutants face in the future?*”

Hopefully the results of this paper might serve as a brief summary of potential challenges of the future and thus be of value to a range of actors including those directly engaged in the political process of the Stockholm Convention, Convention Secretariats, government officials, non-governmental organizations (NGOs) and scholars in the field of global environmental governance. The challenges identified have been categorized as: *Scientific and Technological Issues, Trade-related Issues, Implementation, Compliance and Financing Issues, Chemical Management Issues* and ultimately *Synergies & Strategic Approach to International Chemicals Management (SAICM) issues*.

Relevance to the field of Environmental Science

As a multilateral environmental agreement (MEA), the future development of the Stockholm Convention has great relevance to the field of environmental science. With the Convention on Long-range Transboundary Air Pollution (CLRTAP) being of a regional rather than global nature, the Stockholm Convention stands as the only global environmental agreement on POPs.

Through the Convention's contemporary development of synergy cooperation with the Basel- & Rotterdam conventions targeting chemicals and wastes in international trade, the outcome of future challenges may not only affect the chemical and waste regime itself, but could also have larger implications on the field of global environmental governance as a whole. Although much attention within environmental science focus on Climate Change, the chemical and waste regime also play an important role within the studies of environmental science as an arena for the negotiation of the precautionary principle and trade relations etc.

Method

The research for this paper was carried out in the form of a review of existing literature on the Stockholm Convention and other environmental agreements relevant to the Stockholm Convention, e.g., The Basel Convention, the Rotterdam Convention and the biodiversity conventions. Selection of literature relevant to the study took place through an initial consultation of scholars active in the field of global environmental governance, but also through literature searches in databases and political journals.

Apart from this literary review, primary research of original data and political documents such as Earth Negotiations Bulletin (ENB) allowed analysis of the political meetings of the Intergovernmental Negotiating Committee (INC) and the Stockholm Convention's Conferences of the Parties (COPs).

Background

The harm posed by chemicals and pesticides to humans and the environment have long been well-known e.g., egg thinning in some avian species and carcinogenic effects to humans (Dewailly, E and Furgal, C, 2003). In the 1960s, the first warnings of potential dangers posed by the increasing use of pesticides began to appear. Until then, chemicals and pesticides in particular, were mainly described with a sense of enthusiasm to rid mankind of annoyances such as mosquitos and crop pests (Downie et al. 2005; Forskning & Framsteg, 2011).

In 1968, international concern about industrial chemicals increased significantly when a great number of people in Yosho, Japan, were poisoned after eating rice contaminated with PCB from a leaking heat exchanger. Followed by an almost identical incident in Taiwan, the immunotoxic properties to laboratory animals and humans are thus better known by the late 1980s (Dewailly, E and Furgal, C, 2003; Downie et al. 2005).

Although the work of Carson and similar writers have been influential, the use of pesticides and chemicals in agriculture and industry continue to increase. Since the 1970s, global sales in chemicals grew almost ninefold to account for 9% of all international trade, and by 1998 the industry employed as many as 10 million people (Downie et al. 2005). Out of these chemicals, a certain category known as POPs attracted global attention due to evidence indicating the long-term risk posed by these chemicals (ENB, 2005).

What are Persistent Organic Pollutants (POPS)?

POPs are organic compounds that resist chemical, biological and photolytic degradation due to their inherent characteristics. Their low water solubility and high lipid solubility facilitate their bioaccumulation in fatty tissues of living organisms. Many are also semi-volatile, which enable them to be transported long distances through the atmosphere. Combined with their overall persistence, POPs are today present all over the world, found in every major climatic zone and geographic sector, including deserts, the Arctic and the Antarctic where no major local POPs sources exist (Ritter et al. 1995).

There exists several different forms of POPs, natural as well as anthropogenic. Those noted for their persistence and ability to bioaccumulate include many of the first generation organochlorine insecticides e.g., Dieldrin and DDT, as well as industrial products or byproducts such as PCBs and dioxins. Due to their persistence and ability to accumulate and biomagnify in living tissues, they can cause harm in the environment for an extensive amount of time (Ritter et al. 1995).

In the middle of the 1980s, a public health research unit in Canada implements a large survey in the province of Quebec to monitor for breast milk contamination by POPs. Initially the northernmost regions are excluded due to practical and budgetary reasons, since these sites are thought to be in a pristine environment far away from any potential emission sources. However, in 1986 a midwife from the region offers to collect samples and the region is included into the survey as the thought of a 'blank' group would be of value to the investigations. As the first gas chromatograph results were reviewed, the chemists were stunned and initially regarded the results as faulty. However, after further analysis they confirm the breast milk of the women in this supposedly pristine environment to be highly contaminated by organochlorines, including a high number of different chemicals with levels 5-10 times higher than concentrations found for women in southern Canada (Dewailly, E and Furgal, C, 2003). Since then, the Inuit communities' diet constituting of marine mammal fats, i.e. Narwal & walrus blubber and beluga oil has been found to be the main source of pollution (Kuhnlein, H.V et al, 2000).

Exposure to POPs can coarsely be divided into acute and chronic exposure, with ingestion through diet and environmental exposure (indoor and outdoor) being common sources of chronic exposure, and occupational accidents providing examples of acute exposure. Such exposure can be associated with a wide range of adverse health effects, including illness or death, endocrine disruption, reproductive and immune system dysfunction, neurobehavioral disorders and cancer (Ritter et al. 1995). The ones that are thought most vulnerable are fetuses, newborn, children and women of reproductive age (Chang et al. 1981; Dewailly, E and Furgal, C, 2003; AMAP and UNEP, 2011). Unfortunately, POPs poisoning events still occur, with one incident taking place in the village of Gandamal situated in northern India. 23 school children age 5-12 years died in July 2013 by eating school food containing toxic levels of Monocrotophos, an organophosphate insecticides and POP banned in a number of other countries (Singh Indrajit, 2013; Reuters, 2013). As of May 2014, the SC does not restrict the use of Monocrotophos (IISD, 2010).

The Birth of the Stockholm Convention

Chemical management at an international scale had already been addressed in the form of soft law by the 1992 Rio UN Conference on Environment and Development and Agenda 21. However, POPs began to be framed as an issue in the 1980s when Sweden and especially Canada pushed the topic onto the international agenda (Fenge, T, 2003; Kohler, P and Ashton, M, 2010; Selin, H, 2010).

In Canada, this development took place due to a combination of new scientific information, and a heightened sensitivity to the concerns of its northern indigenous populations (Eckley Selin, N and Selin, H, 2006). At first, international organizations turned down the Canadian efforts to seek international action as the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) all shared a limited interest in chemical control at the time (Eckley Selin, N and Selin, H, 2006). Consequently, Canadian officials instead approached the United Nation Economic Commission for Europe and the Convention on Long-Range Transboundary Air Pollution (CLRTAP) that entered into force in 1983. Although regional rather than global, the fact that the Convention covered most of the northern hemisphere made it a feasible forum (Eckley Selin, N and Selin, H, 2006). Ultimately, the CLRTAP convention integrated POPs into its agenda, creating a CLRTAP POPs agreement that covers many of the initial 'dirty dozen' regulated under the SC.

By 1995, the UNEP Governing Council initiate an assessment process regarding a list of twelve POPs subject to future regulation (ENB, 2005). An Ad Hoc Working Group on POPs convened to develop a

plan for assessing information on the chemistry, environmental dispersion, toxicity, sources and socioeconomic impacts of a list of twelve chemicals called the ‘dirty dozen’ (ENB, 2005). One year later, the working group concluded that sufficient information existed to promote the need for global action, including the establishment of a global, legally binding instrument.

From June 1998 to July 2003 a total of seven meetings by the INC laid the foundation to the Convention. Five of these meetings preceded, and the remainder succeeded the 2001 Conference of Plenipotentiaries in Stockholm, Sweden, when 91 countries and the EU signed the Convention.

Most, if not all new political conventions face challenges during their establishment and subsequent era of activity. Even the Montreal Protocol faced challenges, despite its history of being depicted as the most successful global environmental protocol in the realm of chemical regulation. The success of the regime created to protect stratospheric ozone can be found in the juxtaposition of factors endogenous and exogenous to the regime, ranging from the regime’s ability to deal with cases of noncompliance, to latter factors such as involved nation states and decisive leadership figures (Young, Oran R, 2010).

Alongside nation states, other notable actors in the SC include indigenous NGOs, as well as the chemistry industry representatives. The Arctic indigenous organizations were widely involved in the development of the Stockholm Convention. Not limiting their participation to the scientific and assessment process, they also played an active role during the formalization of the global treaty on POPs. Their efforts to push the negotiations forward took place at two different levels as they were not only successful in influencing their own country’s delegation, but also by presenting a coordinated presence at the INC meetings from 1998 to 2003 (Kohler, P and Ashton, M, 2010).

The initial negotiation meetings of the SC managed to avoid several hurdles thanks to the substantial work that had taken place before INC-1, including the work done through the CLRTAP Convention. As a result, although several issues needed to be overcome, the general debate remained noticeably free from the North-South polarization that has plagued several other processes (Selin, H and Eckley, N, 2003; Chasek et al. 2013). A possible explanation to this lack of polarization has been ascribed to the production and use of POPs substances also present in developing countries, creating the need to integrate developing nations as a part of the solution (ENB, 2003).

Although much of the initial INC negotiations were conducted with relative simplicity, the Convention's relationship to DDT has often, and perhaps unjustly, been depicted as one of its main controversies (Forskning & Framsteg, 2011). DDT has been discussed repeatedly, but mainly dealt with in a sense of mutual understanding between the interest to eliminate the use of POPs, and a need to

control the Malaria disease vector. As a result, an exception within the convention has been created that allows for a continued use of this well-known pesticide in areas of great need if appropriate alternatives are unavailable (ENB, 1998; ENB, 1999a; ENB, 1999b; ENB, 2000a; ENB, 2000b; ENB, 2002; ENB, 2003).

The Stockholm Convention Today

The Convention entered into force on May 17th 2004, 90 days after the receipt of the 50th instrument of ratification. As of May 2014, the Convention has 179 parties and 152 signatories, with notable non-parties including among others; Malaysia, Israel, Italy and the United States (ENB, 2003; ENB, 2005; Stockholm Convention, 2014a).

The convention has already accomplished and overcome a number of significant hurdles, including the establishment of a tool for listing additional chemicals beyond the original ‘dirty dozen’, choosing a financial mechanism and initiating synergy cooperation with the Basel and Rotterdam Conventions. The goal to achieve synergies between the different chemicals conventions has long been discussed within the chemicals and waste regime (ENB, 2013). In 2013, the second simultaneous extraordinary meetings of the Conference of the Parties (COPs) to the Basel-, Stockholm and Rotterdam conventions were held in Geneva, Switzerland, further adding to the lessons learned on convention synergies. To the SC, cooperation with these regimes provides obstacles as well as opportunities and are further discussed in this paper under “Synergies and SAICM Issues”.

Future Challenges to the Stockholm Convention

Overall the Stockholm Convention’s abilities to face future challenges are relatively good, with challenges identified in this paper not necessarily threatening to derail or stop the Convention’s work. Instead, challenges are rather threats to the efficiency and might slow down the convention’s future development. Identified challenges to the Stockholm Convention have been divided into the following categories: *Scientific and Technological Issues*, likely to affect the Convention e.g., through the relationship between science and politics. *Trade-related Issues*, exemplified through the regime’s relation to the World Trade Organization (WTO). *Implementation, Compliance and Financing Issues*, such as the problem related to the implementation of Convention policy in party states. *Chemical Management Issues*, related to the management of the specific chemicals and selection of additional

substances for regulation. And finally, *Synergies & SAICM Issues* are discussed to provide thoughts on the development of synergies within the chemicals and waste regime and how this could influence the field of global environmental governance.

Scientific and Technical Issues

According to academic literature, there are two main different approaches to the relationship between science and politics. The first, earlier conceptualization depicts a bipolar relationship between science and politics. Science and politics are here separate domains with different and distinct functions, dynamics, purposes and means, with the role of scientists being to "speak truth to power", while policy-makers are to formulate appropriate strategies based on scientific results (Price, D. K, 1965; Selin, H and Eckley, N, 2003). However, today an increasing number of studies are demonstrating that this bipolar image and separation of scientific consensus formation from policy-making lack empirical support. E.g., Scientific information does not only reflect nature, but also display a complex social construction encompassing discourses, beliefs, practices and goals that all affect how scientists interact with other societal actors (Jasanoff, S and Wynne, B, 1998; Selin, H and Eckley, N, 2003). Today, scholars stress that many of our contemporary environmental issues are characterized by a strong research dependency (Lidskog, R and Sundqvist, G, 2002).

Unfortunately, scientific uncertainty plagues the realm of chemical management with little information of the chemicals and substances in question. Through a more precautionary approach, conventions can agree to not let uncertainty hinder the goal of protecting the environment. This poses a substantial issue to the SC through the need to gather the necessary scientific data in the field of chemical management, from data on specific chemicals to broader issues such as POPs relationship to climate change so that proper measure are taken.

As highlighted by Georg Karlaganis et al. as well as the Convention Secretariat itself, the SC has to overcome a number of hurdles of scientific and technical character in order to reduce and prevent the inputs of POPs into the environment (Karlaganis, G et al. 2001; AMAP and UNEP, 2011). This presents a substantial issue as the Convention relies heavily on scientific information in the midst of a matrix of various actors with different goals and ambitions of how the Convention should develop. The scientific and socio-economic assessment of POPs within CLRTAP being one example. The 'dirty dozen' initially regulated under the SC had largely been based on the then ongoing screening scheme in CLRTAP (Selin, H and Eckley, N, 2003). This acceptance seems to have been a combination of political influences of

the CLRTAP countries and that these substances were politically safe for several key countries as they were all well-known, banned or severely restricted in many countries (Selin, H and Eckley, N, 2003).

Parties to the Stockholm Convention are to strengthen the national capabilities for the management of chemicals of developing countries and countries with economies in transition, including through the transfer of technology (Secretariat of the Stockholm Convention, 2010). Article 5 of the Convention focuses on measures to reduce or eliminate releases from unintentional production through inter alia, the application of best available techniques and best environmental practices (Secretariat of the Stockholm Convention, 2010).

The ENB highlighted during INC-6 that some countries might try to use the Persistent Organic Pollutants Review Committee (POPRC) to ensure that they are not unnecessarily burdened by amendments to the POPs annexes (ENB, 2002). The POPRC (further discussed in Chemical Management Issues) established during COP-1, consists of 31 experts nominated by parties from the five UN regional groups. The committee reviews nominated chemicals through a process heavily influenced by the POPs assessments developed by CLRTAP (Selin, H and Eckley, N, 2003).

To ensure the Convention's success on the issue of scientific and technological issues, finding a balance between socio-economic considerations and the risk posed to humans and the environment will be crucial. Consequently, whether the Convention should include a direct reference to the precautionary approach or a rivaling strong risk analysis approached proved to be an intense topic of discussion (ENB, 1998). The final solution within the SC addresses this issue with different amendment procedures for different parts of the Convention, including the mention of a 'precautionary manner', stating that any scientific uncertainty should not prevent proceeding (Secretariat of the Stockholm Convention, 2010).

The POPs issue may not be the first that comes to mind when discussing consequences of a changing environment through climate change e.g., global warming. Despite this, the effect of climate change upon POPs has increasingly been highlighted as a problem to the SC and AMAP and UNEP published the first global monitoring report in 2009 (AMAP and UNEP, 2011).

There are many reasons explaining the current development within the SC in terms of Scientific and Technical Issues. The distinction between the POPRC and the COP should not be described as a separation between science and policy since such a bipolar conceptualization might lack empirical support. As mentioned above, scientific uncertainty plagues the field of chemical management, from the micro scale with little information on chemicals in question, to macro scale climatic variations and how they affect POPs. These factors, combined with the challenge of providing appropriate BAT and BEP to

parties in need, will be substantial challenges to the convention, and are in many ways intrinsically linked to other issues e.g., financing and non-compliance.

Trade-related Issues

The relationship between MEAs and international trade has often been depicted as a cumbersome issue, e.g., Karlaganis et al. (2001). Some scholars depict a relationship with the WTO described in terms of size and teeth as a large tiger, and the MEAs as a ragged collection of small cats. Ironically the one area where some MEAs do possess effective sanctions such as trade restrictions, they are also the most vulnerable to legal challenges by the WTO (Eckersley, R, 2004). Recent studies suggests that environmental treaties are affected by trade regimes even if no official challenge has occurred, often described as a "Chilling Effect" preventing states from creating robust environmental treaties (Conca, K, 2000; Eckersley, 2004; Axelrod, M, 2011).

These theories have been studied by several scholars, e.g., Mark Axelrod who compared MEAs to non-environmental treaties negotiated under similar conditions. In one of Axelrod's studies, he show that environmental negotiators more often take into account other existing international agreements outside their own policy field. He also shows that more than one third of all multilateral treaties explicitly defer to international law, e.g., through the use of savings clauses (Axelrod, M, 2011).

There are environmental exceptions in the WTO General Agreement on Tariffs and Trade (GATT)-rules. Article XX (20) sets out the conditions for restricting international trade in the interest of human, animal, or plant life or health. These restrictions are allowed if performed in a non-discriminating manner with no less trade-intrusive alternatives available, as environmental concern could otherwise be used as disguised protectionism (Jaspers, N and Falkner, R, 2013).

In the field of environment & trade law, a number of well-known cases exist where environmental interests have been challenged by trade interests. One of these is the *'Tuna-Dolphin'* case between the United States and Mexico. Following the 1972 Marine Mammal Protection Act, US fishermen were required to use dolphin-safe fishing methods. Twelve years later, the US Congress imposed import bans on tuna from countries that did not use dolphin-safe fishing methods, which subsequently led to Mexico filing a complaint arguing that these trade measures were illegal (Jaspers, N and Falkner, R, 2013). The GATT panel ultimately decided in Mexico's favor, and has ever since been a major bone of contention to many environmental NGOs criticizing the WTO (Eckersley, R, 2004). However, the *Tuna-Dolphin* case might have been handled differently today, and some observers have pointed out that restrictions

or bans under the SC could be permitted under WTO law since they would fall under the exception to protect human-, animal- & plant life or health (Brack, D and Gray, K, 2003).

The Stockholm and Rotterdam Conventions were both negotiated against a background of increasing awareness of the trade-environment interaction. Consequently, the preamble to the SC recognizes that the Convention and other international agreements in the field of the environment and trade are mutually supportive (Brack, D and Gray, K, 2003). Within the SC, actors particularly voiced concerns of a conflict with WTO during initial INC discussions. Examples range from smaller requests of defining terms in order to more clearly delineate relations with WTO agreements, to Australia's expressed concern over the inclusion of import and export measures into the SC and the potential for inconsistency with the WTO (ENB, 1999a; ENB, 1999b). The Convention's relation to the WTO also continued to be discussed during the Conference of Plenipotentiaries in 2001 when Magde Aelvoet, Minister of Consumer Protection, Public Health and Environment in Belgium, successfully commended the removal of a savings clause that would subordinate the Convention to WTO agreements (ENB, 2001).

As of May 2014, no conflict between the SC and the WTO has yet taken place. However, as more 'live' chemicals are added, the risk of possible conflicts with global trade agreements will increase.

Axelrod concludes his study of the chilling affect that environmental advocates should be aware of them and search for solutions that allow for the continued development of international environmental law while addressing very real concerns about existing treaties (Axelrod, M, 2011).

Implementation, Compliance and Financing Issues

To encourage implementation, a number of mechanisms have been integrated into the convention, including the rendering of financial and technical assistance to developing countries and parties with economies in transition.

In order to be effective, a regime must achieve its governance objectives (Faure, M and Lefevre, J, 2005; O'Neill, K, 2009). Ultimately, this effectiveness depends on the ability of regime participants to develop and implement suitable management and policy structures within and across global, regional, national, and local governance scales (Eckley Selin, N and Selin, H, 2006). In the area of chemical management, analysts and policy makers have noted the importance of closer vertical and horizontal coordination across the many organizations and instruments addressing hazardous chemicals e.g., POPs. Unfortunately, efforts to improve these structures of multilevel governance and support regional and local management capabilities are afflicted by political disagreements and practical difficulties (Eckley

Selin, N and Selin, H, 2006). For the SC, this has led to provision of financial- & technical assistance as well as transfer of technology through 16 regional and subregional centers (Secretariat of the Stockholm Convention, 2010; Stockholm Convention, 2014b).

The negative externalities of using POPs are not always directly affecting the initial consumer. Continued use of POPs such as DDT can therefore be of lowest financial cost to the original consumer, establishing a risk of additional cost to switch to more environmentally sound alternatives. As a result, much of the discussions of the Convention have revolved around the acquisition of proper funding and technology to facilitate such a transition (ENB, 2005).

Ever since the negotiation of the 1990 London Amendment to the Montreal Protocol, it has often been expected that MEAs include some kind of mechanism to provide technical and financial assistance to help certain states with their obligations (Downie, David L and Templeton, J, 2013).

What institution were to function as the financial mechanism of the Stockholm Convention proved to be a difficult issue to solve. Developing party states such as the G-77/China coalition argued for a separate financial mechanism, drawing from experiences of the Montreal Protocol. Major industrialized countries opposed such a proposal and preferred to work with already existing institutions. The final agreement became a compromise with the Global Environment Facility (GEF) officially established as the Convention's interim financial mechanism, with provisions to review its effectiveness at regular intervals (Downie, David L, 2003; Downie, David L and Templeton, J, 2013).

As the largest international funder of projects that address global environmental issues, the GEF provide grants to developing countries and countries with economies in transition. Apart from being the financial mechanism for the SC, GEF functions as the financial mechanism for inter alia, the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNFCCC) (Chasek et al. 2013).

Since the decision to establish the GEF as the interim financial mechanism to the Convention, POPs has been established as a new focal area for funding. Although not specifying the amount of financial assets to be provided, the 5th GEF replenishment included a 25% increase in funding for the new POPs focal area and a total of \$425 million dedicated to the chemicals focal area (Chasek et al. 2013; Downie, David L and Templeton, J, 2013). The next 6th replenishment period of the GEF will begin in July 2014.

The initial step for countries to meet their obligations includes the establishment of national implementation plans (NIPs). As of today, over 150 parties have developed and submitted such plans and the GEF has provided aid to more than 100 developing country parties to facilitate this crucial step

(Downie, David L and Templeton, J, 2013; Stockholm Convention, 2014c). However, Pia Kohler and Melanie Ashton (2010) stress that *“Issues of capacity to access financing are as prevalent as the availability of adequate financing”*.

The SC does not include any differentiated timetables or targets for developing and developed countries. Instead, developed and developing parties are required to take immediate action and comply with the same commitments (Downie, David L and Templeton, J, 2013). Some countries have voiced concerns over the GEF’s emphasis on additionality as well as the COP’s need to successfully convey its priorities to the GEF (Downie, David L and Templeton, J, 2013). As of April 2014, the GEF list a total of 297 approved National Projects and 58 Regional & Global projects under the POPs focal area (Global Environment Facility, 2014).

Developing states, developing country Parties, developing small island states and countries with economies in transition are frequently mentioned as subjects to technical and financial assistance. Despite this, the Convention does not define which these countries are. Since the World Bank and indirectly the UN founded the GEF, a similar approach to developing countries as that of the UN could be used by the SC. However, no established convention exist for the designation of “developed” and “developing” countries or areas within the United Nations system, making the selection of states qualified for financial and technical support somewhat unclear (UNSD, 2013).

Technical assistance, a non-compliance mechanism and a method to evaluate the effectiveness of the convention have been described as the three legs of the Convention to ensure, much like a tripod, a solidity and balance needed to establish a successful regime (ENB, 2007). Although non-compliance mechanisms are rare in international environmental regimes, Article 17 of the Convention states: *“The COP shall, as soon as practicable, develop and approve procedures and institutional mechanisms for determining non-compliance with the provisions of the Convention and for the treatment of Parties found to be in non-compliance.”* (Secretariat of the Stockholm Convention, 2010).

During COP-1, parties and non-parties were invited to submit to the Secretariat their views and proposals for a non-compliance mechanism (Bigi, G, 2009). As to the first issue of the draft non-compliance mechanism, delegates agreed that the non-compliance procedure should have the objective to *“...assist Parties to comply with their obligations under the Convention and to facilitate, promote, monitor, assist in, advise on and aim to secure the implementation of and compliance with the obligations under the Convention”* (Bigi, G, 2009). The latest COP (COP-6 in 2013) discussed and

ultimately rejected a compromise package for Secretariat action leading to a party-trigger and a provision for assistance to those in non-compliance, thus forwarding the question to COP-7 in 2015 (ENB, 2013).

Apart from endogenous challenges to implementation, the Convention also faces exogenous factors that have already challenged other Conventions. As a result of the commitments undertaken under the Montreal Protocol, an illegal trade in regulated substances occurred. As many substances already regulated under the SC are ‘dead’ chemicals, such a trade may not yet be as prominent but could increase as more economically viable substances are added. In accordance to Article 3, parties shall prohibit its imports and exports of chemicals listed in Annex A. Furthermore, it shall only import or export chemicals listed in Annex A and Annex B for the purpose of environmentally sound disposal (Secretariat of the Stockholm Convention, 2010). Stockpiles of already produced substances could especially be the object of illegal trade, with actors trading substances illegally rather than enabling their environmentally sound disposal. Organizations and processes such as SAICM, Interpol and UNEP are part of the effort to combat this illegal trade, with initiatives such as Green Customs (UNEP, 2005).

As of May 2014, implementation, compliance and financing issues continue to be important questions within the SC. A non-compliance mechanism remains to be established, while the implementation, technical- & financial mechanisms are already in place. Ultimately, the effectiveness of the convention requires a combination of all these factors.

Chemical Management Issues

For the purpose of this paper, chemical management will be defined as the specific management and administration of the specific chemicals regulated under the Convention and the POPRC process including criteria for selecting new substances for regulation.

The discussion of ‘dead’ vs. ‘live’ chemicals has been described by a number of authors, e.g., Kohler and Chasek. No clear definition exists of how these categories would be separated, but ‘live’ chemicals are often interpreted as those that are still used in many parts of the world (Chasek et al. 2013).

The SC contains seven annexes. Annex A to C function as the Annexes for listed chemicals, and the latter four contain information on the review criteria, information for the process of adding new chemicals and procedures for settlements of disputes. Those listed under Annex A are subject to elimination, while Annex B lists chemicals with restrictions, and Annex C contains chemicals such as dioxins that are unintentionally produced as byproducts etc., but still in need of reductions.

So far, the SC has mainly used a negative list approach where a ban applies to selected substances,

with exception to a few agreed upon and listed uses. Such a negative list approach can be compared to a positive list approach which would only ban uses of substances in products and processes that are explicitly agreed upon and listed (Czaika, E, 2013).

When adopting the Convention, decisions were taken to establish a procedure to identify additional POPs and the criteria to be considered throughout this process, resulting in the creation of the POPRC (ENB, 2005). Initially, the committee analyzes whether a nominated substance fulfills the requirements to be deemed as a POP and its potential for long-range environmental transport and toxicity (Annex D). If the Committee decides that the screening criteria has been fulfilled, the assessment continues to evaluate the chemical by drafting of a risk profile according to Annex E. Finally, if the POPRC finds that the chemical warrant action, they develop a risk management evaluation according to Annex F, including socioeconomic considerations associated with possible control measures. Based on the information developed, the POPRC ultimately decides whether to recommend that the COP lists the substance under one or more of the annexes to the Convention.

Although the POPRC has assessed and led to the listing of eleven additional chemicals since the Convention entered into force in 2004, the POPRC and the overall process of the Convention has received criticism as being too slow and accommodating to commercial interests. The listing of HBCD at COP-6 caused disagreement on the establishment of exempted uses. Some states, including Norway, the Philippines and Nigeria spoke in favor of listing HBCD to Annex A without any exemptions. They noted that a five year exemption for continued production and use that constitute for 80-90% of global demand would make the listing somewhat toothless. This opinion had also been supported by a number of NGOs, including the Alaska Community Action on Toxics, with the Global Indigenous Peoples Caucus highlighting the “severe and lasting impacts” of POPs on indigenous and northern communities. The International POPs Elimination Network (IPEN) also highlighted that exemptions for recycling of POPs are “dangerous” and “violate” the Stockholm Convention (ENB, 2013; IPEN, 2013). Other countries took a more pragmatic approach by noting that alternatives may not be available in sufficient quantities, and the EU and Canada supported the listing of HBCD in Annex A with specific five-year exemptions and a need to identify wastes containing HBCD. The reason to establish a five-year exemption had mainly been championed by the HBCD industry in order to facilitate a transition to alternatives. Possibly due to the POPRC recommendation, the COP decided to list HBCD, but with the specific five-year exemptions that thus exclude 70-90% of the current production and use during this

period (ENB, 2013). Through the listing of HBCD at COP-6, the number of chemicals covered by the Stockholm Convention today numbers a total of 23 chemicals, listed in Appendix I.

Representatives from chemical industries were not particularly involved during the initial negotiations, but have ever since participated more actively (Kohler, P and Ashton, M, 2010). The question remains of how the Convention will manage to tackle the challenge of listing new substances of greater economic value. Ultimately, parties to the convention have agreed to the need for global action on POPs, but like most other environmental agreements, parties are participating on a voluntary basis. Failure to avoid environmental and/or human harm by POPs could have a severe effect to the Convention's legitimacy. So far, the listings give hope to the efficiency of the process, but emphasizes the importance of commitment within the individual nation states, as too many exemptions and reservations from accepting additional amendments would quickly erode and render the Convention powerless (ENB, 2009; ENB, 2011).

Although POPs have acquired extensive attention due to their persistence and ability of long-range transport, only a small minority of chemicals can be categorized as POPs. Solving the issues caused by these chemicals through the SC will not eliminate the dangers posed by hazardous chemicals. In fact, only a few of the chemicals suspected to be hazardous are currently targeted by the major MEAs (Downie et al. 2005).

Synergies and SAICM Issues

Relevant to environmental governance, the Oxford Dictionaries define a synergy as an interaction or cooperation of two or more organizations (e.g., MEAs) that produce an effect greater than the sum of their individual effects (Oxford Dictionaries, 2014). In the field of global environmental governance, UNEP has functioned as a notable actor encouraging synergies between conventions, and the phenomenon has been increasingly studied by a range of scholars and organizations (Cooney, R, 2001; UNEP WCMC, 2004).

Most MEAs have engaged in some kind of synergetic activity with other agreements with notable examples including the five biodiversity conventions and the chemicals and waste regime (UNEP WCMC, 2004). Typically, issue-specific regimes such as the SC display a range of complex linkages to other institutional arrangements (e.g., UNEP and the Rotterdam Convention), with the resulting interactions affecting the operation of each of the regimes. The amount of such diverse linkages that can range from synergetic to neutral/indeterminate or disruptive, are bound to be larger as the number of

international regimes increase (Young, Oran R, 1996; Oberthür, S and Gehring, T, 2006). Synergetic linkages can promote policy-making and implementation, improve use of available resources, facilitate enforcement and technical assistance, while disruptive effects of linkages could hinder policy developments and cause stalemate in other fora that otherwise would not have been affected (UNDESA, 2011; Selin, H, 2013). MEAs are often assumed to be mutually supportive and complementary, but in reality conventions might at times promote actions disruptive to other conventions, e.g., the Montreal Protocol supported use of fluorinated GHGs that are regulated under the Kyoto Protocol (Cooney, R, 2001; Oberthür, S and Gehring, T, 2006).

The fragmented nature of the chemicals regime has led to a relatively long-standing cooperation between conventions to increase policy coordination across different agreements and management efforts. Two major initiatives are today affecting the chemicals & waste regime: the synergies initiative led by UNEP to improve cooperation and coordination between the Basel, Rotterdam and Stockholm Conventions, and SAICM (Downie, David L and Templeton, J, 2013).

Compared to the synergies effort, SAICM represents a broader initiative functioning as an umbrella mechanism to promote the sound management of chemicals by year 2020. As such, it does not only address environmental concerns, but also functions as a sustainable development action. As a volunteer based program rather than a framework convention, SAICM does not contain legally binding agreements requiring ratification (Xaver Perrez, F, 2006; Downie, David L and Templeton, J, 2013; Selin, H, 2013).

The synergies initiative focuses on areas where the Basel, Rotterdam and Stockholm Conventions complement or overlap each other. Goals include the opportunity to reduce administrative costs, improve implementation through joint activities and facilitate reporting requirements (Downie, David L and Templeton, J, 2013).

The *Basel Convention*, designed to address the generation and transboundary transportation of hazardous wastes, entered into force in May 1992. As of May 2014, 181 countries are parties (Basel Convention, 2014). As mentioned above the trade in chemicals have increased sharply since the 1960s, and so have the levels of hazardous wastes that are mainly traded between industrialized countries (O'Neill, K, 2000; Selin, H, 2013). The growing trade in wastes between developed and developing countries functioned as one of the prime factors that founded the Basel Convention, including various well-known incidents of illegal dumping of hazardous wastes e.g., *Khian Sea* (Kummer, K, 1999; Selin, H, 2013).

The *Rotterdam Convention*, or informally ‘the PIC convention’, aims to reduce harm from trade in hazardous chemicals and pesticides. The convention entered into force in February 2004 and as of May 2014, 154 countries are parties (Rotterdam Convention, 2014). Much like the Basel Convention, the unregulated waste trade between developed and developing countries created much of the momentum that founded the Rotterdam Convention. The convention allows countries to refuse imports of hazardous chemicals that they cannot manage safely, and imposes labeling requirements on exports of these substances (Downie et al. 2005; Sands, P and Peel, J, 2005). To the SC, cooperation with both the Basel- & Rotterdam Conventions will be of utmost importance, especially in regard to the latter as the restriction of transboundary movement of regulated chemicals are a part of the SC (Article 3). Many of the POPs listed under the SC are also regulated through the Rotterdam Convention.

So far, two simultaneous extraordinary meetings of the COPs to the Basel, Rotterdam and Stockholm Conventions have been held. The first simultaneous extraordinary Conferences of Parties (ExCOPs) to the Basel, Rotterdam and Stockholm Conventions were held in February 2010 (ENB, 2010). During the meeting, delegates adopted decisions on how to further synergies between the conventions, including joint services and activities as well as a synchronization of budget cycles (ENB, 2010).

Although not without obstacles, the two ExCOPs ideate almost five years of work on synergies in the chemicals and waste regime and provided plenty of lessons learned. Despite that only two ExCOPs were held, uncertainties exist when the next one might take place. Due to a combination of factors including lack of time and exhaustion, decisions were made during ExCOP-2 that that the next round of COPs would instead be held back-to-back, without an ExCOP or a high-level segment (ENB, 2013). One reason includes how the synergies process could steal time and mask the heterogeneity of conventions in favor of another, something that became particularly apparent at the expense of the Basel Convention during ExCOP-2 (ENB, 2013).

A perhaps more discernible decision taken at the ExCOPs would be the formation of a joint head position that will oversee the work of all three Secretariats (ENB, 2010). According to some, the completion of the ExCOPs in 2010 heralded a new era of global politics, as such a feat had never before taken place (ENB, 2010). Through the synergies process UNEP has proved not only that synergies are possible, but also that it can handle them (ENB, 2010). The need for synergies as conventions grow both in number and size has long been emphasized (Young, Oran R, 1996). Apart from the five biodiversity-related conventions often proposed for future synergies attempts, more conventions might follow in the footsteps of the chemicals and waste regimes (ENB, 2010).

The promise of synergies to influence and ‘pull’ conventions toward the best parts of the others has often been used as an argument in favor of the process (ENB, 2013). During ExCOP-2, a proposal to amend rules for admission of observers caused slight controversy in the SC, as the new rules were thought unnecessarily excluding. However, after further discussions each COP agreed to adopt universal rules closely aligned to the transparency of the SC (ENB, 2013). Although an appropriate field for experimenting with synergies, the chemicals and waste regimes are affected by their structural compositions. Out of the three, only the Stockholm Convention contains a financial mechanism, the Basel Convention has a compliance mechanism and the Rotterdam convention has neither (ENB, 2013).

Concerning POPs, the GEF might in the future require parties to ratify all three conventions in order to be eligible for funding (UNEP WCMC, 2004). Most countries of the world are parties to all three conventions, with notable non-parties such as the United States that has signed all three conventions, but ratified neither. With the issue of funding particularly important in developing party states and countries with economies in transition, these countries will be the most affected by this GEF requirement. As of May 2014, developing countries and countries with economies in transition that are member to the SC but not all three conventions include inter alia: Algeria, Angola, Azerbaijan, Bahamas, Bangladesh, Belarus, the Central African Republic, Egypt, Fiji, Myanmar, Papua New Guinea, Sierra Leone, the Solomon Islands, Tajikistan, Tunisia, Turkey, and Vanuatu (Stockholm Convention, 2014a; Basel Convention, 2014; Rotterdam Convention, 2014). The GEF requirement might encourage states to ratify all three conventions, but proper attention should be aimed to prevent a stalemate of implementation in these countries during such a period.

Concluding Analysis

This paper has aimed to identify potential challenges that the Stockholm Convention might face in the future. On the topic of Scientific and Technological Issues, the move from ‘dead’ to ‘live’ chemicals will test the Convention’s ability to handle POPs still in widespread use. It will also show which actors e.g., Nation states and organizations that are truly concerned with the proper management of POPs, and not only interested in targeting chemicals of little socio-economic value. On top of this, the effects of climate change on POPs are not yet fully understood.

In regard to trade, trade-related conventions and the WTO are bound to encounter increasing challenges from the MEAs as environmental conventions grow and their issue topics rise on the political

agenda over time. This cannot be resolved by either the WTO or the MEAs singlehandedly, but need to be a product of a consensual process between the trade and environmental regimes if the environmental conventions are to avoid the “Chilling Effect” and accomplish the work they were set out to perform.

Like many other conventions, the SC faces the challenges related to Implementation, Compliance and Financing. Although not exclusively an economical issue, implementing the convention build upon the conditionality of access to sufficient funding and capacity building in developing party states and parties with economies in transition. So far, no mechanism has been established to tackle the issue of non-compliance. As all countries face the same commitments when chemicals are added, a non-compliance mechanism might prove crucial to aid states with their commitments.

In conclusion, some proposed measures include: The Convention and the POPRC should remain attentive to the effects of climate change on POPs and encourage further research to prevent such climatic events from undermining the Convention’s success. They must also continue to balance the environmental- & socio-economic considerations and be attentive to needs of indigenous communities as the value of proposed chemicals increase.

The SC should engage in a dialogue with the WTO to develop appropriate measures to implement the SC since its work might well be in line with the WTO GATT rules. While doing so, it should also develop efficient vertical and horizontal governance structures to facilitate the implementation on local, national and regional levels and provide adequate funding and secure the availability of funding to parties in need of such financing.

The Convention must continue its work to prohibit the illegal trade in hazardous chemicals that otherwise could prevent or slow implementation and overall Convention success.

Delegates should establish a non-compliance mechanism as soon as possible while also working to prevent the creation of too many exemptions to listed chemicals, as such a development would rapidly undermine the strength of the Convention.

Following new GEF funding requirements, the Convention should aid the ratification of all three Conventions to ensure that developing countries and countries with economies in transition can continue their process of implementation during the time it takes to fulfill such new requirements.

Although unlikely to be the most well-known to the general public, the synergies process has provided the regime a rare possibility to influence other segments of global environmental governance. The opportunities of convention synergies should not be exaggerated, and even in seemingly logical subjects to interconnection such as the Basel, Rotterdam and Stockholm conventions, differences between the

conventions will and do cause issues. The ability of conventions to influence each other for the better does hold promise, but the risk of catering to the lowest common denominator must be taken seriously. Otherwise, the result might be a number of conventions as opaque and stagnated as its most complicated counterpart.

Synergies will be an opportunity to other regimes if they properly address the negative consequences to the synergies process, inter alia, time theft, decreased transparency and obstruction of the flow of financial- & technical assistance to developing countries. Apart from the biodiversity conventions often proposed as a possible object of increased interaction, the maritime conventions could also be an opportunity for future cooperation.

If extrapolating the effects of synergies to identify other consequences of the synergies process, it could be speculated that the synergies process can create as well as unlock political stalemate of political conventions. If more research would show that such cases occur, an increased cooperation between the UNFCCC and other conventions could be the very thing needed to unlock the stalemate of the negotiations, or at least prevent conventions to form legislation in direct conflict with each other.

In a world where the development of global environmental governance can at best be depicted as gloomy, those involved in the development of the SC on a political-, scholarly- or NGO level have reason to smile. As intimidating as any challenge may be, the chemical and waste regime has been granted a rare opportunity. If successful, it can provide a well-needed positive example, showing other MEAs as well as the general public a way forward through the complicated maze of global environmental governance and into the 21st century.

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Appendix I

Table 1: Chemicals listed under the Stockholm Convention on Persistent Organic Pollutants as of May 2014.

Annex	Name	CAS-nr ^{1 2}	Exemptions ¹	Added ¹
A	Aldrin	309-00-2	Production: None Use: As a local ectoparasiticide and insecticide	COP-1
A	Chlordane	57-74-9	Production: As allowed for the Parties listed in the Register Use: As a local ectoparasiticide, insecticide, termiticide (incl. In buildings, dams & roads), and as an additive in plywood adhesives	COP-1
A	Chlordecone	143-50-0	None	COP-4
A	Dieldrin	60-57-1	Production: None Use: In agricultural operations	COP-1
A	Endosulfan	115-29-7, 959-8, 33213-65-9	Production: As allowed for the Parties listed in the Register Use: Crop-pest complexes as listed in accordance with the provisions of Part VI of Annex A	COP-5
A	Endrin	72-20-8	Production: None Use: None	COP-1
A	Heptachlor	76-44-8	Production: None Use: As a termiticide (incl. In the structures of houses and underground), for wood treatment and in underground cable boxes.	COP-1
A	Hexabromo-biphenyl	36355-01-8	None	COP-4
A	Hexabromocyclodecane (HBCD)	Various	Production: As allowed for the Parties listed in the Register in accordance with the provisions of Part VII of Annex A Use: Expanded polysterene and extruded polystyrene	COP-6

¹ (Secretariat of the Stockholm Convention, 2010)

² (Secretariat of the Stockholm Convention, 2011)

			in buildings in accordance with the provisions of Part VII of Annex A ³	
A	Hexabromo-diphenyl ether and heptabromo-diphenyl ether	Various	Production: None Use: Articles in accordance with the provisions of Part IV of Annex A. (Recycling and reuse of articles containing these compounds)	COP-4
A	Hexachloro-benzen	118-74-1	Production: As allowed for the Parties listed in the Register Use: As a chemical intermediate and a solvent for pesticides	COP-1
A	α -Hexachloro-cyclohexane	319-84-6	None	COP-4
A	β -Hexachloro-cyclohexane	319-85-7	None	COP-4
A	Lindane	58-89-9	Production: None Use: Human health pharmaceutical for control of head lice and scabies as second line treatment	COP-4
A	Mirex	2385-85-5	Production: As allowed for the Parties listed in the Register Use: As a termiticide	COP-1
A & C	Pentachloro-benzen	608-93-5	None	COP-4
A & C	Polychlorinated biphenyls (PCBs)	Various	Production: None Use: Articles in use in accordance with the provisions of Part II of Annex A.	COP-1
A	Tetrabromodi-phenyl ether and pentabromo-diphenyl ether	Various	Production: None Use: Articles in accordance with the provisions of Part V of Annex A.	COP-4
A	Toxaphene	8001-35-2	None	COP-1

³ (Secretariat of the Stockholm Convention, 2013)

B	DDT	50-29-3	Production & Use: Disease vector control in accordance with part II of Annex B. Production and use as an intermediate in the production of dicofol and other compounds.	COP-1
B	PFOS and PFOF	Various	Production & Use: In accordance with Part III of Annex B, production of other chemicals to be used solely for the uses below. Production for uses listed below. Specific exemption as allowed for Parties listed in the Register.	COP-4
C	Hexachlor-benzene	118-74-1	-	COP-1
C	Dioxins and polychlorinated dibenzofurans	Various	-	COP-1



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