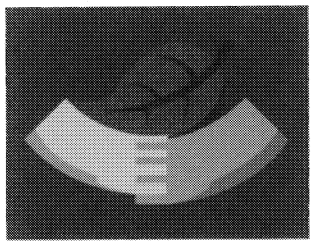
ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Combine or Combust! Co-operating on Chemicals and Hazardous Substances Management

Asia-Europe Environment Forum 4th Roundtable

Brussels, Belgium
30 November to 1 December 2006



ASIA-EUROPE ENVIRONMENT FORUM

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"Combine or Combust! Co-operating on Chemicals and Hazardous Substances Management"

The views expressed in this publication are strictly those of the authors, and do not necessarily reflect those of the Asia-Europe Foundation, Hanns Seidel Foundation, the Institute for Global Environment Strategies, the Swedish Environmental Secretariat for Asia and United Nations Environment Programme.

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ACKNOWLEDGMENTS

The Asia-Europe Environment Forum (ENVforum) sets forth on its second phase of development by organising the 4th Roundtable "Combine or Combust!: Co-operating on Chemicals and Hazardous Substances Management". This roundtable was held in Brussels, Belgium, from 28-30 November 2006. Following up on the rich discussions held, selected proceedings and papers have been compiled in this volume.

The co-organisers, namely, the Asia-Europe Foundation (ASEF), the Hanns Seidel Stiftung (HSF-Indonesia), the Institute for Global Environmental Strategies (IGES-Japan), the Swedish Environmental Secretariat for Asia (Sida-SENSA) and the United Nations Environment Programme (UNEP) would like to thank the following people who have contributed towards making the meeting, and subsequently, this publication a success.

We would like to thank the editors; Mr Atul Bagai (UNEP) Mr Peter Ryan (ASEF) and for going through the papers and providing much direction in which this publication took.

We thank the speakers who contributed directly towards realising this publication. We also would like to express our thanks to the participants of the roundtable whose input have made this roundtable one of great quality, particularly those experts who have taken time out from following the REACH developments at the European Parliament.

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Singapore, 2007

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Chapter 1

Introduction

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INTRODUCTION FROM THE EDITORS

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The global chemicals industry over the past 30 years has experienced steady growth in production, consumption and trade, with the value of chemicals shipments rising from USD 171 billion in 1970 to USD 1.5 trillion in 2005. Organisation for Economic Co-operation and Development (OECD) countries reportedly accounted for 83% of world output in 1970. This domination was marginally reduced towards the end of the 1990s and is expected to be further reduced as per projections up to 2020 due to significant growth expected in non-OECD member countries. The trend over the last ten years also indicates that manufacturing both bulk chemicals as well as high value chemicals would continue to increase in developing countries, particularly in the Asian region.

This change assumes significance in the context of total impact of emissions from these chemicals on the environment and the capacity of developing countries in the Asian region in adopting environmentally-friendly manufacturing technologies. What is equally significant is the need to reconcile policy measures and the reality of the growing chemicals production industry in developing countries. There is a need to clearly communicate the implications of policy measures – national as well as regional – to various stakeholders. For example, the Registration, Evaluation and Authorisation of Chemicals (REACH) regulation has an immediate impact on the European chemicals industry and yet, it also implicates chemicals industries elsewhere in the world.

It is essential for establishing a platform where assistance can be made available to industries in developing countries on understanding the international trends relating to environmentally-responsible chemicals management and information on environmentally-friendly technical options available. This is particularly relevant for small and medium enterprises (SMEs) and tiny enterprises. Supportive policy measures and monitoring and reporting mechanisms would also form elements of this platform to maintain momentum of this initiative. Given the industry structure in the Asian region, particularly the presence of a large number of SMEs in chemicals manufacturing and processing, efforts are required to ensure sustainable implementation of environmentally-friendly technologies. This necessitates a systematic approach with a global perspective, which includes sustained information exchange on technical and policy aspects for environmentally-responsible chemical management.

In order to contribute to the current global policy dialogue on chemicals management through promotion of transparency, capacity-building and knowledge transfer, the Asia-Europe Environment Forum (ENVforum) organised a two-day roundtable discussion involving over thirty participants and twenty observers from the government, industry, civil society and research sectors.

The roundtable was timely given the fact that the European Parliament (EP) was entering into its second and crucial reading of the REACH proposal, which has now entered into force since June 2007. Additionally, the regional consultation of the Strategic Agreement on International Chemicals Management (SAICM) in Asia took place in May 2007. Participants were drawn from various partner countries of the Asia-Europe Meeting (ASEM) process, highly specialised in their various fields; each works on various aspects of chemicals management from evaluation to policymaking, from different fields such as pesticides to electrical waste. This compendium presents views expressed during the meeting by leading policy makers and technical specialists on two areas namely; 1) Common global approaches in chemicals and hazardous substances management for Asia and Europe; and, 2) overarching policy regime issues in chemicals and hazardous substances management in both regions.

It is imperative that common global approaches are adopted in chemicals and hazardous substances management. While in the past, the approach has been more specific issue-based with clearly outlined boundary conditions (e.g., Montreal Protocol on Ozone Depletion, Stockholm Convention on Persistent Organic Pollutants), the current approach entails a globalised strategic integrated view.

Terence Koh of the Singapore Chemical Industry Council (SCIC) presents a paper on the chemical cluster development experience in Singapore which is a real life

case on managing chemical cluster growth in a strategic and environmentally-responsible fasion. In his paper, he presents an overview of the preparedness of the Singapore chemical cluster to integrate cleaner production in designing supply chain management options, signifying a preventive environmental approach. He attributes this preparedness to the recognition of the need to sustain industrial production without compromising on the imperatives of compliance and environmental protection. Interestingly, the SCIC appears to interact regularly with the National Environment Agency (NEA) regarding the development of standards and mechanisms for effective implementation of initiatives to fulfill commitments. A policy strategy, duly integrating governments at the local level and prevention of trans-boundary movement of chemicals, will also be in place and initiatives have been launched in conjunction with the Global Plan of Action (GPA). He also defines a roadmap for further consolidation of these efforts.

Yong Hwa Kim of the Korea Institute of Toxicology presents the perspective of the head of a major capacity-building initiative in Korea and insists on the need to strengthen capabilities to carry out risk assessments and suggest alternatives for mitigation and avoiding negative impacts. The fact that most of the developing countries import chemicals and do not appear to allocate adequate resources for building on capabilities to produce chemicals by themselves, appears to be the reason for not really focusing on risk assessments. The dependence on expertise to assess and mitigate risks from overseas appears to be significant. Elaborate procedures for assessing risks could be an impediment and this has to be overcome through concerted efforts between technical institutions and regulators of both importing and exporting countries. This is particularly critical when chemicals are imported and the receiving country does not have adequate capabilities to assess risks or potential impacts. In his view, Korea appears to have addressed this challenge through systematic institutional mechanisms conferring a high level of technical capabilities. Dr. Kim also recommends that training institutions at regional level for risk assessors and the establishment of regional risk assessment centres will help in efficient training of officials in developing countries and equipping the countries with testing and assessment facilities.

Next, policy issues in chemicals and hazardous substances management in Asia and Europe need to be addressed through systematic research on emerging international scenarios on chemicals management and designing and implementing an institutional framework for management and adopting good practices based on experiences from developing as well as developed countries. These would need constant dialogue and consultations with the industry including on policy issues, reporting needs and voluntary initiatives on demonstrating environmentally responsible behaviour in managing chemicals.

Ella Antonio of the Earth Council, Asia-Pacific provides an overview of co-operation at the regional level through several government and industry-related networks. The role of the United Nations Institute for Training and Research (UNITAR) and the International Labor Organization (ILO) has also been highlighted in addition to recent initiatives on the Globally Harmonized Systems (GHS). That the Association of Southeast Asian Nations (ASEAN) has a clear vision for evolving an environmentally-sound community of nations appears to be a major achievement and several sub-regional programmes substantiate this across several sectors. Antonio further points out that the focus on chemicals is not as elaborate as in other environment-related sectors and this paves way for effectively strengthening programmes focused on the management of chemicals. Some initiatives driven predominantly by representatives of the civil society addressed issues related to pesticides and some hazardous chemicals; albeit few and far between. She lists six important areas and urges immediate action to help overcome implementation barriers so that countries in the region will be better prepared to adopt preventive strategies and tackle contingencies more effectively.

A discussion about chemicals management is not complete without two of the most recent and important initiatives in the area, namely, SAICM and REACH. While SAICM is extensively discussed in many of the other papers in this publication, Natalie Pauwels of the Environment Directorate-General of the European Commission (EC) discusses REACH as the centerpiece of chemicals policy in Europe. As argued elsewhere in the publication, given the importance of the EU's trade relationship with Asia, and the share of trade in chemicals and related products in total trade between the two regions, REACH is understandably of interest to Asian countries. The paper goes into much detail of how the new legislation works, its cost and benefits for all stakeholders and most importantly for Asia, how it will eventually integrate the major concerns of third countries.

Daniel Verbist of the European Chemicals Industry Council (Cefic) raises very important questions regarding the extent to which industry receives due recognition for its proactive initiatives and suggest ways and means by which such action can be encouraged. The role of the International Council of Chemicals Associations (ICCA) as a forum for communicating preparedness of industry and initiatives such as the Global Product Strategy and the Long-range Research Initiative followed by the special framework to deal with high-production volume chemicals have been duly highlighted in his paper. Verbist argues that these have to be viewed as positive indicators of industry's willingness to enable transitions to sustainable production and consumption as part of its larger process of repositioning itself and be seen as a solution provider.

Kim Myung Ja's paper provides the perspective of a specialist in public policy development and implementation as a Member of the National Assembly in Korea and as part of a regional initiative represented by the APFED. APFED has been actively disseminating information regarding the options for effective management of hazardous chemicals as part of its initiatives to promote concerted action through development of national policies and duly highlighting significance of 'green chemistry' and voluntary initiatives by chemical industry. She has highlighted the significance of these initiatives in the context of chemical accidents and hence, the need to provide appropriate information regarding the chemicals, their properties, management skills, preventive action and mitigation measures. She defines the opportunity for becoming cleaner as a business imperative, using some case examples of initiatives of the private sector. He also emphasizes the need for a concerted regional cooperation effort.

Gabriele Schöning of the European Environment Agency argues that it is essential to create a critical mass of initiatives including well-defined institution mechanisms represented by focal points within various governments particularly for tackling issues related to chemicals, facilitating a substantive role for the civil society and a process for interaction with the industry to understand their specific needs and opportunities for improvement on a continual basis. The challenges of networking have been discussed using the experiences of the EEA as a case example.

Ethel Fosberg of the Swedish Chemicals Agency (KemI) highlights the fact that economic development need not be compromised when industry adopts holistic measures for effective management of chemicals. She further states that it is essential to initiate and strengthen interactions amongst stakeholders to sustain the momentum of integration, as indicated by some programmes of KemI including the PRIO, the Future Trade Dialogue and the BASTA initiatives. A systematic response to the challenges posed by inadequate information with stakeholders and their technical preparedness to integrate state-of-art tools and techniques should be part of national development plans with measures for reducing economic losses. She concludes by highlighting the opportunity of using REACH as a tool in SAICM implementation.

In conclusion, this diverse though coherent collection of papers in fact revealed the crucial character of chemicals management: that chemicals are so heterogeneous in properties and functions that they require a wide knowledge expertise and, more importantly, a need for close co-operation between practitioners. Given the atmosphere and setting of the roundtable, there is now a greater sense of urgency amongst participants of the need to address the need for closer co-

operation between the two regions. There is also recognition of the work of the ENVforum in bringing chemicals management to the forefront of environmental dialogue between Asia and Europe.

SUMMARY AND SYNTHESIS OF DISCUSSIONS

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Introduction

Rapid industrialisation around the world is fuelled and accompanied by an equally extensive development and use of synthetic chemicals to control diseases, increase food production and for regular use in day-to-day products. Clearly, the use of chemicals is prevalent in many aspects of life and therefore, the role of chemicals is undeniably important. Some chemicals are known to be toxic to human health, some pose unknown health risks and some have made their way into our bodies and into the environment. There are concerns that information on the uses, releases and impacts of chemicals on health and the environment is scarce and incomplete.

Given the heterogeneous level of industrialisation in Europe and Asia, and indeed the world, it is not surprising that legal frameworks and infrastructure for research, management, monitoring, measuring and prevention of impacts on human health and environment resulting from chemical production and uses, are not set up properly in several countries and can often be considered inadequate, if not, inexistent.

Sound management of chemicals is essential if we aim to protect health and the environment from damages caused by chemicals throughout their life cycles. Achieving sustainable development and protecting the rights of future generations imply minimising health risks in that food, water, soil and air should not contain chemical pollutants that have the potential to cause harm to human health and the environment.

Policymakers and their partners should take into consideration:

1. Multiple aspects of chemicals management;
2. challenges in policy application and enforcement; and,
3. the need for exchange and dissemination of relevant information (best practices, private sector participation in policy design, good governance, etc.)

Understanding Chemicals Risk Assessment and Management

Even before attempting to manage chemicals, there is a crucial need to evaluate and assess the use and effects of chemicals. Given the extensive and diverse use, application and effects of chemicals, chemicals risk assessment requires knowledge in a variety of skills and discipline, from toxicology to biology to environmental science to computer modelling, these being non-exhaustive examples. A high level of technology and skills are required for adequate and sustainable levels of chemicals risk assessment. A chemical has to be assessed and its known/unknown effects carefully monitored.

Risk assessment of chemicals factor in variables such as exposure and toxicity. This means that even with the highest toxicity, a chemical could still be used, provided that its exposure to the environment and man is regulated within reason. On the other hand, there is also the debate on 'substitution', whereby it is argues whether the use of a toxic chemical should be allowed when safer alternatives can be available. Installing a competent system of chemical risk management becomes more complicated as the toxicity of a chemical increases. A sufficient and sustainable pool of experts needs to be trained in handling scientific data and in understanding the various concepts and implications of chemical risk management. Secondly, there is a need for adequate financial resources in order to provide for both human and material resources that are essential for chemicals risk assessment and management.

Beyond this scientific demand, there is also an overwhelming imperative to factor in the socio-economic aspect of a particular country. Given that risk is measured by toxicity and exposure, whereby the former is evaluated on the solid principles

of science and technology, the latter (exposure) requires an adequate evaluation of the socio-economic realities of a country. Therefore, while international standards are important, domestic chemicals risk management should take into consideration the prevailing standards and common practices of a country.

The disparity of capacities and capabilities in chemicals risk assessment and management has to be dealt with decisively. Training and facilities should be made available either through partnerships or investment. The challenge here is ensuring adequate financial support to research, education and infrastructure.

Policymakers and their partners should take into consideration:
1. The complexity and sophistication of the level of expertise in risk assessment and management;
2. socio-economic conditions of a particular country; and
3. the need for training and technical assistance.

International and Regional Efforts

International

Several international treaties regulate various aspects of chemicals management. The Rotterdam Convention concerns the movement of hazardous chemicals, the Stockholm Convention relates to Persistent Organic Pesticides (POPs), the Basel Convention touches on issues relating to hazardous wastes while the Montreal Protocol effectively manages the use of ozone depleting chemicals and substances. Yet, holistically, the international framework of chemicals management requires further and greater coherence.

SAICM

Though the Strategic Approach to International Chemicals Management (SAICM) is welcomed by the stakeholders, there is a point of contention amongst them as to its eventual effectiveness since it is a non-legally binding policy framework. Its implications on trade are also important and need to be monitored closely by states and the business sector.

However, there was consensus that SAICM will be able to provide the much needed framework to bridge the divide between countries and regions. Its objectives of risk reduction and knowledge and information based on sound principles of governance, capacity building and technical co-operation will be important in shaping the future of the management of chemicals throughout their life cycle.

National and non-government organisation (NGO) focal points play an important role in the first phase of SAICM. In leading up to the Asia-Pacific dialogue session that was held in Bangkok, Thailand, 2007, a common view is that chemicals management should be highlighted and brought to the forefront of both environment and industry policy since the success of SAICM depends fundamentally on the active participation by all stakeholders in its implementation.

With regards to the Registration, Evaluation, Authorisation and Restriction of Chemical substances (REACH), it was noted that although there exists, with SAICM, a significant overlap in chemicals labelled as 'very high concern', some participants suggested that SAICM's definition could be broader in order to be more holistic.

Industry

The industry has played an important role in its commitment to sound chemicals management through its voluntary actions such as Responsible Care®[1]. The industry also contributes regularly to the dialogue on Global Product Strategy. Through the International Chemicals Council Association (ICCA), the industry forms part of the multi-stakeholder group in the SAICM consultations.

The points of contention between the industry and other stakeholders are the issues of substitution and precaution. The industry also welcomes a clearer interpretation of terms such as 'dangerous levels' and 'unhealthy levels', underscoring the significance of methodology in chemicals and risk management.

NGOS

In certain Asian countries, trade of illegal chemicals is still rampant. Through considerable work of NGOs to raise awareness of increasing illegal trade and movement of chemicals, the roundtable unanimously agreed to bring up this issue to their relevant authorities A point that was also important is the need to address factors that lead to the import and export of such chemicals and how to improve compliance to rules on these two fronts.Yet, an issue that is striking for Asian NGOs is human resource constraints as it is often the case that there is too few full time staff in Asian NGOs and insufficient manpower.

[1] *Responsible Care® is the chemicals industry's global voluntary initiative to improve health, safety, and environmental performance and to communicate with stakeholders about their products and services. Please see www.responsiblecare.org*

A solution offered was forming a coalition of NGOs through mechanisms such as the Tokyo Declaration for a Toxic Free Earth which aims to raise awareness through publications and the media.

Regional

THE EU AND REACH

The richness and the long debate over REACH suggest the different approaches to chemicals management. Designed for the registration of chemicals, REACH would imply the shifting of burden to the industry. Industry experts on the other hand are very much concerned with additional layers of registration and its impact on business and the economy.

To answer questions whether REACH would result in multiple approaches to chemicals management, it should be noted that REACH uses an approach that is comparable with the Organisation for Economic Co-operation and Development (OECD)'s techniques and has a strong link to SAICM. As such, it seeks to reinforce existing and future approaches to chemicals management.

The different stakeholders have been contributing greatly to the discussion on REACH. If approaches and motives differ, these were reflected in the continuous lobbying and debate over this new legislation. However, what is agreed upon by all stakeholders is that the commitment to chemicals management is strong amongst all.

East Asia

In East Asia, without a similar institutional framework, chemicals management lies along national lines. There are big disparities within Asia, generally between Northeast Asian countries such as China, Korea and Japan on the one hand, and Southeast Asian countries on the other. National policies on chemicals management have developed in Northeast Asian countries over the last few decades in particular, though the fact remains that chemicals policies in these countries are still fragmented. On the other hand, chemicals policy has not been high on the list of priority agenda in other countries. Asian countries have different levels and characteristics of economic development, and so chemicals management systems are vastly different. Collaboration between Asia and Europe should therefore be diverse to elaborate this fact.

At the regional level, if any coherent trends are to be mapped out, they would lie along those related to international ones with close co-operation with

international bodies such as the International Forum on Chemicals Safety (IFCS), the United Nations Environment Programme (UNEP), the United Nations Training and Research (UNITAR) as well as dozens of aid agencies and NGOs.

The East Asian region hosts several important chemicals industries. The range of economic development across the region therefore means that the industries in the different countries may have different priorities and focus. Awareness and knowledge are not at a homogenous level here. However, East Asian countries are committed to the importance of the international conventions on chemicals management as reflected by the number of signatories to the relevant conventions.

There is, however, a point of contention with regards to the level of co-operation between the countries in chemicals management. A claim is made, during the roundtable, as to the weak level of co-operation that exists between the countries. Yet, looking at the industry sector, it is possible to find a close degree of collaboration for example that within the Association of Southeast Nations (ASEAN) Chemicals Industry Council and the Asia Pacific Economic Cooperation (APEC) chemicals dialogue. Several programmes also exist that are led by the Singapore Chemicals Industry Council within Southeast Asia. A point was made that co-operation need not necessarily be measured by that between governments. Indeed, often, as is demonstrated by the lessons from the Montreal Protocol, the industry can play a big role and can sometimes even pioneer the advancement in chemicals management policy.

One main concern for East Asia is the movement of chemicals; the disturbing volume of illegal trade and smuggling of chemicals and poor handling and disposal of electronic wastes have led to worries on the increasing amount of dioxin emission. Asian countries generally welcome the fact that the European Union (EU) has been taking the lead in chemicals management by introducing REACH. However, there are worries that the EU's action could have unintended negative consequences for Asia; affecting exports of chemicals which are subject to REACH. Also, there still remain some reservations that part of the rationale behind REACH and other chemicals policy is an attempt to protect the European market for European producers.

Another concern is that the pesticides market is most probably underestimated in Asia. Given the production/consumption relationship between markets, it has been noted that the EU system of creating positive and negative lists of pesticides creates mixed consequences for Asian countries. On one hand, it has led to some dangerous pesticides being phased out (partly because of EU limits on pesticide residues in foods imported from Asia). On the other, pesticides approved in

Europe have remained on markets in Asia even though some countries are less able to manage exposure to them and thus the risks they pose.

Policymakers and their partners should take into consideration:

1. SAICM needs to be adopted/implemented decisively, with attention to its impact on trade;
2. REACH needs to be communicated well within and outside of Europe; and,
3. illegal trade and movement of chemicals and pesticides need a co-ordinated response in East Asia

Recommendations

The recommendations flowing from this meeting have been divided by the rapporteurs into three sections: recommendations for policymakers and stakeholders in Asia, in Europe and in both regions. Due to the lack of time, these recommendations were not directly discussed or agreed upon during the meeting and are summarised from the discussions.

Asia

It is essential to understand the fact that different levels of economic development among Asian countries have resulted in different national chemicals management policies. This fact needs to be taken fully into account when promoting the SAICM process in Asia.

Policymakers and stakeholders in Asia could consider creating 'common platforms' that involve all relevant ministries in chemicals management issues for a more coherent chemicals policy development. The information that will be generated under REACH may prove to be useful in the development of local SAICM implementation in Asian countries.

Stakeholders should create a communications strategy on chemicals in the Asian region. Case studies from Europe in which lessons have been learned on chemicals policy may be very useful to Asian stakeholders. It should be noted that some Northeast Asian countries have developed and implemented a national pollutant release and transfer register (PRTR) system, which is considered an important initial step towards risk-based chemicals management. Meanwhile, policy 'champions' should be identified to push the chemicals agenda within ASEAN, especially among businesses and small and medium enterprises (SMEs).

Europe

European policymakers and stakeholders could fund capacity-building activities in Asia in order to encourage Asian countries to develop more coherent chemicals policy in Asia. Europe needs to make sure that the information generated under REACH is available as much as possible in Asia.

To this end, Europe could propose to create a mechanism of collaboration with Asia, perhaps by creating a website to share all best practices and all possible updated information on chemicals management in Europe. They should also ensure that Asian stakeholders know that financial support can be available under EU funding programmes to deal with chemicals management issues.

Policymakers should seek to reassure Asian countries that its chemicals management legislation is motivated only by environmental and health concerns, with no protectionist element. They should fund studies on all possible effects REACH will have on Asian countries, particularly with regards to trade with the EU.

Both Regions

Policymakers and stakeholders in both Europe and Asia should try to develop potential collaboration on common achievements to promote a more comprehensive risk-based chemicals management and an appropriate common definition of producer responsibility for chemicals. A 'core group' of Asian countries could take on this job together with the EU.

There needs to be a far greater effort in both regions to improve the exchange of information at the expert level. To make this exchange 'more effective and sustainable', the relevant bodies should set up 'distributed networks' of contacts to improve information flows. The most cost-effective ways of doing this should be chosen – for instance, by using existing networks such as those created under the Montreal Protocol. Governments in both regions could commission a study into the costs of inaction on chemicals policy.

Policymakers and stakeholders in both regions should co-operate to share EU's experiences with REACH policy to Asia very quickly because these countries are rapidly developing their chemicals policies. There is a pressing need for co-operation to secure an adequate pool of risk assessors to carry out the tasks required under REACH. Organisations such as the UNITAR should be involved

in capacity-building activities in countries that will be affected by the provisions of REACH.

In general all policy actors should ensure that chemicals management policy formulation is done with the proper contribution and participation of all stakeholders. In particular, they are invited to make bigger efforts to get journalists and the media interested in chemical policy issues. Finally, stakeholders should make a concerted effort to provide positive inputs regarding the development of chemicals policy on multi-stakeholder platforms such as the SAICM Asian region focal group meeting which was held in May 2007.

Chapter 2

Various Approaches in Chemicals and Hazardous Substances Management for Asia and Europe

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THE CHEMICALS INDUSTRY IN SINGAPORE

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Many initiatives have been taking place these past years to tackle the adverse effects hazardous substances have caused to human health and the environment. This paper presents the perspective of how Singapore manages its young and vibrant chemicals industry.

Singapore's chemicals cluster has become a strong pillar of growth for the Singapore economy in recent years. It consists of the petroleum segment, the petrochemical segment and the specialty chemicals segment. This cluster achieved an output of SGD 66.5 billion, which is about 32% of the Singapore's total manufacturing output of SGD 208 billion. The remarkable growth achieved in the past 3 years is a result of the strong increase in crude oil prices, new plants that had come on stream in the past 5 years and a high demand for polymer products in the world market in recent years. The amalgamation of seven little islands to become a sizeable land mass of about 3,200 hectares, houses 82 companies today. This is Jurong Island, Singapore's chemicals hub, where most of the multi-national establishments hailing from the Americas, Europe and Japan have invested about SGD 23 billion to start their plant operations. The success of Singapore's chemicals cluster is attributed to the government's belief that the manufacturing industry will continue to be the engine of economic growth in the future decades. With further foreign investments expected in Singapore and the additional new chemical plants that will be commissioned in the next few years, one would wonder how the chemicals industry would look to tackle the environmental challenges and the societal expectations that they may face as a result of the expansion programmes.

The chemicals industry should not be looked upon as the one that would pose environmental problems, but as the one that could further development, and one that through its innovative capacity, can provide viable solutions to tackle these concerns. This is evident through the efforts put forth by the industry

prior to the construction of a chemical plant and after the operations have been put in place. For example, more industry members have increasingly taken the initiative to conduct environment impact studies for their intended investment. This is encouraged as ecological consideration is vital to the company's and perhaps the industry's sustenance and survival. Apart from state-of-the-art technologies employed in the construction of new chemical plants, green design and green engineering are also taken into consideration. Green design aims to lessen impact on environment through improved energy and resource efficiency while green engineering promotes the use of processes and products that are feasible and economical while reducing the generation of pollution at the source and also minimising the risks to human health and the environment.

The Singapore Chemical Industry Council (SCIC), together with its members, has been working very closely with the National Environment Agency (NEA) to address environment issues concerning the industry. The past years have seen the council's involvement in providing feedback to the NEA on trade effluent standards, Stockholm and Rotterdam Conventions on Persistent Organic Pollutants (POPs) and Prior Informed Consent (PIC) respectively and participation in environment-related events like the United Nation Environment Programme (UNEP) on Strategic Approach to International Management of Chemicals (SAICM), the EU chemicals policy on Registration, Evaluation, Authorisation of Chemicals (REACH), Restriction on the use Of certain Hazardous Chemicals (RoHs) and the National Taskforce for the Globally Harmonised System on Classification and Labelling of Chemicals (GHS).

With the accession to the Kyoto Protocol as a non-Annex I country on 12th April 2006, Singapore can now participate in Clean Development Mechanism (CDM) projects. This would encourage chemicals companies to further improve their process and environmental performance. The chemicals industry's involvement in Singapore standards development through SPRING Singapore also helps to address issues on environmental concerns for chemicals stored in warehouses and transported on local roads and has put in place sound standards to ensure that the health, safety and environment aspects are well covered in such operations. The NEA has implemented strict pollution control regulations, trade effluent standards, site assessment and soil remediation requirements of which the industry complies.

The chemicals industry, however, continues its relentless efforts to improve its environmental performance through better design, engineering and process management and advocates good environmental management practices. The chemicals industry believes that the environmental and ecological considerations of its operations extend beyond the manufacturing plant. For

example, strong advocacy through the Responsible Care® programme and the initiatives implemented under this framework help improve health, safety and environmental performance as well as raise awareness to stakeholders about the industry's operations.

In early 2006, the International Conference on Chemicals Management (ICCM) was held in Dubai, United Arab Emirates (UAE), aimed to obtain high-level commitment towards the adoption of SAICM.

SAICM was initiated by the UNEP Governing Council in February 2002, recognising that sound policies to protect public health and the environment from potential risks associated with the production, use and disposal of chemicals were often lacking. The aims of the SAICM are to:

a) Promote the use and production of chemicals in ways that minimise adverse effects on human health and the environment; and,

b) support developing countries build their capacity for sound management of chemicals and hazardous wastes by providing technical and financial assistance.

The ICCM sought to adopt three outcome documents pertaining to SAICM:

a) A High Level Declaration which captured the commitment of ministers, heads of delegation and representatives of civil society on the need to implement sound strategies management of chemicals to achieve sustainable development.

b) An Overarching Policy Strategy dealing with the details of SAICM, its principles, scope, and implementation and lists 5 objectives, namely:
   1. Risk reduction;
   2. knowledge and information;
   3. governance capacity-building and technical co-operation; and,
   4. the prevention of illegal international traffic.

c) A Global Plan of Action (GPA), a list containing 273 proposed (voluntary) activities that stakeholders could carry out to achieve sound management of chemicals.

However, the ICCM only adopted the Dubai Declaration on International Chemicals Management and the accompanying Overarching Policy Strategy to underline the global commitment to SAICM and its implementation. The GPA was not adopted because, even though it was clear that it was voluntary in

nature, some countries were uncomfortable to adopt it due to lack of time to go through the exhaustive list of activities. The meeting agreed to merely note that "stakeholders might find the tables useful in their implementation of relevant activities", and that the GPA could be further considered at future ICCM meetings, planned to be held triennially.

The declaration established the overall objective of SAICM as being the sound management of chemicals throughout their life-cycle so that by 2020, chemicals are used and produced in ways that lead to minimisation of adverse effects on human health and the environment. It however noted that SAICM was a 'new voluntary initiative' and 'is not a legally-binding instrument'. The conference also agreed that SAICM only covers agricultural and industrial chemicals. It does not cover products regulated by the domestic food or pharmaceutical industries. Governments at the ICCM also agreed to the establishment of a 'Quick Start Programme', a voluntary, time-limited trust fund administered by UNEP that will mobilise seed-money to support initial enabling capacity-building and implementation activities in developing countries, least-developed countries, small island-developing states and countries with economies in transition to help them manage chemicals safely.

The Singapore government is supportive of SAICM and the Ministry of Environment and Water Resources and the NEA have since embarked on those activities listed in the GPA seeing that it would serve as a useful guide towards achieving the 2020 objective. Of the 273 activities under the GPA, Singapore has to date implemented 203 activities. Some of the remaining activities are under study while others are in progress. The NEA has started to work with SCIC to implement the relevant activities under SAICM, especially on those related to the GHS and the Responsible Care® initiatives.

The chemicals industry's Responsible Care® programme was first conceived by the Canadian Chemical Producers' Association more than twenty years ago as a domestic solution to a domestic problem. The founders never thought that this 'domestic' solution would one day evolve to become a highly respected process that is changing the chemicals industry's way of operating internationally. Responsible Care® is adopted by fifty-two countries around the world today, with the principal commitment to continue improving the health, safety and environmental performance of the chemicals industry globally. It is a challenging commitment and an ongoing process that the industry considers the right thing to do.

This commitment was further strengthened with the launch of the Responsible Care® Global Charter (RC-GC) in February 2006 in Dubai, as an important side

event to the ICCM. It was endorsed by the then United Nations Secretary General, Kofi Annan, in a letter that he wrote to Peter Elverding of ICCA just before the Dubai event. Responsible Care® is also recognised as the chemicals industry's initiative to assist in the global efforts to achieve sustainable development as part of the SAICM's High-level Declaration.

With the launch of the RC-GC, the ICCA Technical Advisory Group is currently working on the Global Product Strategy (GPS) initiative. The Responsible Care®'s GPS will be rolled out to support the chemicals industry's efforts in achieving sustainable development. The chemicals industry firmly believes that the introduction of better governance and guidance on product stewardship would contribute to the global move toward sustainable development. The GPS would aid in the achievement of sustainable development objectives and the main focus is on the Responsible Care®'s Product Stewardship Code of Management Practice, where efforts on the responsible and ethical management of the health, safety and environmental aspects of a product throughout its life-cycle will be stepped up. In short, GPS objectives are as follows:

a) Develop guidelines for product stewardship, share best practices within the chemicals industry and with customer industries.

b) Develop a tiered process for completing risk characterisation and risk management actions for chemicals in commerce.

c) Enhance product stewardship performance with special focus on working directly with downstream customers of the chemicals industry.

d) Explore potential partnerships with inter-governmental mechanisms to enhance GPS.

e) Provide greater transparency, including ways to make relevant product stewardship information available to the public.

Responsible Care® is the chemicals industry's contribution towards sustainable development efforts, as indicated within the strategies of SAICM.

In Singapore, the SCIC adopted Responsible Care® in 1990 and it has formed the backbone of all that is done by the council in the industry. They have been actively engaging all stakeholders in the effort to maintain and uphold the principles of Responsible Care®. Some of these efforts include:

a) Working with the relevant government agencies to ensure continual government-industry interaction and increased transparency.

b) Organising training courses, workshops and seminars to build up the knowledge of health, safety and environmental best practices within the industry.

c) Outreach efforts to the community to raise awareness of the chemicals industry. Partners not only include industry members, but also government agencies such as the NEA and the Occupational, Safety and Health division of the Ministry of Manpower, the Singapore Civil Defence Force and other concerned agencies. Companies from the industry have also been involved in government led initiatives such as the Clean and Green Week organised by the NEA.

Regionally, countries with Responsible Care® programmes have also been advocating this initiative for the benefit of Cambodia, Laos, Myanmar and Vietnam. In the Asian region, the Japanese government and the Japanese Chemical Industry Association have been developing capacity-building programmes to assist these developing country.

The chemicals industry in Singapore understands that environment challenges cannot be overlooked as it strives for greater heights in trying to provide a better quality of life for the people and a favourable economic achievement for the country while keeping in line with the global sustainable development objective. The focus on health, safety and environment issues has enabled the industry a safe one to work in despite the misperception that associates 'chemicals' with 'fear' or 'undesirable outcome'. The chemicals industry will sustain efforts in managing the life-cycle of chemicals through collaborating closely with the stakeholders concerned.

THE MISSING LINK BETWEEN RISK ASSESSMENT AND RISK MANAGEMENT OF CHEMICALS IN DEVELOPING COUNTRIES: A MATTER OF SCIENCE AND REGULATION

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Risk assessment is a complex and necessary procedure for proper management of chemicals. However, the relevant processes are still evolving in developing countries and economies in transition. The Korean experience demonstrates that the introduction of the risk assessment system required time and preparedness to take on a certain financial burden. Therefore, it is suggested that an efficient way of training official risk assessors in developing countries is necessary along with the development of essential testing facilities. It is recommended that the establishment of the Asia-Europe Training Center for Official Risk Assessors (AETCOR) and/or the Asia-Europe Network of Risk Assessment Centers (AENRAC) is one of the options for improving preparedness of countries in the region to tackle challenges in this context.

Introduction

It is estimated that about 100,000 chemicals are commercial worldwide. Among these, nearly 3,000 to 4,000 are actively traded, used, and disposed in every country (UNEP, 1992; Calow, 1997), of which a few hundred are designated hazardous ones and regulated by laws domestically and internationally. Chemicals with specific properties of persistence and trans-boundary occurrence are especially treated by international conventions or treaties.

In order to implement the international effort of the proper management of chemicals, regional, bilateral, and international organisations have been formulating the framework of risk assessment and management as recommended in the United Nations Conference on Environment and Development (UNCED) Agenda 21, Chapter 19 (United Nations, 1992). The content of implementation largely consists of two approaches: 1) the harmonisation of methods of risk assessment and risk management; and 2) the provision of training and infrastructure to developing countries by industrialised countries. The harmonisation process has shown significant progress due to interest and commitment at the political level. However, by multiple reasons some of which will be discussed here, co-operation amongst developing countries is relatively slow, less fruitful and cannot be easily accounted for.

Capacity-building is a challenging job and it is not often easy to analyse factors responsible for the slowness of progress in propagating the risk assessment and risk management of chemicals from developed countries to developing countries and economies in transition. Therefore, the intention here is to identify some limitations/drawbacks of current international approaches from the author's personal experience in a Korean research/testing facility in safety assessment (KIT); the United Nations Industrial Development Organization (UNIDO); and the Office of Pesticide Programs (OPP) of the Environmental Protection Agency (EPA) in the United States (US). The author would like to underline that the viewpoints presented in this paper are his own and are not that of current or past organisations he has represented.

Risk Assessment: science and art

Some believe that risk assessment is not complex or difficult while others believe that it is complicated and hard to understand. Irrespective of a person's exposure to the risk assessment process, risk assessment procedures are complicated and complex beyond the scope of individual person's input. Simply put, risk assessment is both a science and an art. Risk assessment has properties of science, because the process totally depends on data generated by good scientific practice. The difficulty is, while scientists can possibly wait until final conclusions are reached using agreed scientific methods, the society and the risk manager cannot wait that long. The science and art aspect of risk assessment is illustrated in the table below.

Risk assessment is "science and art": determination of toxicity end point for TDI of Dioxin

CountryOrganization (yr)	Taz. End point	Scientist,, animal, year	Uncertainly factor	TDI (pg TEQ /kg. b.w/day)
WHO (1998)	Reproductive/ Developmental	Gray etal, Rat, 1997	10	1 - 4
	Immunological	Gray etal, Rat, 1997		2
	Neurobehavioral	Schants and Bowman, Monkey, 1989		2
	Endometeriosis	Rier etal., Monkey, 1993		2
UK FSA (2001)	Reproductive/ Developmental	Gray etal., Rat, 1997	9.6	2
Japan	Reproductive	Gray etal., Rat, 1997		2
	Immunological	Gray etal., Rat, 1997		
I.S.EPA	Cancer			Rf not finalized
Korea	In process	Body burden	10	2 or 4 (?)

Source: KFDA, 2006

The Korean Food and Drug Administration (KFDA) is under the process of re-evaluating the Tolerable Daily Intake (TDI) of Dioxins. By summarising the origin of the different TDIs used in the industrialised countries and the international organisations, it was evident that TDI of developed countries are diverse and the Korean authorities had to have its own rationale for decision. Therefore, the original toxicity data had to be analyzed for its integrity. This clearly demonstrates that developing countries can not pick just the simple figures of 1, 2, or 4 which are the outcome of the risk assessment processes of other countries and organisations.

Risk assessment has been partially practiced for occupational hygiene and food incidences in the first half of the 1900s. The concept was officially promulgated and pronounced in 1983 by the National Academy of Science in the US (NAS-NRC, 1983). Since the introduction of Delaney clause in 1958 prohibiting the addition of carcinogens in food, acceptable risk was of much concern and the risk assessment methodologies were evolved in 1970s in US. (Klaassen, 2001). In the early 1990s, the EPA remodeled the structure of national research institutions based on the concept of risk assessment: exposure, toxicology, and risk assessment. The figure could not be exact due to the difference in the definition of terms, but there should be approximately 500 risk assessors working routinely full-time on

the task of reviewing dossiers and inputing ideas for advancing the science and art of managing chemicals. An equivalent number of risk assessors are working in the multinational companies, struggling with their counter parts in the regulatory authorities. At the initial stage of building up of the risk assessment system in the organisation, the starting members of risk assessment must have been well-experienced personnel in testing and reviewing the data outside the organisation. Once the review system is established, new staff could be adjusted to the system by on-the-job training.

Complexity of Risk Assessment: not a one-person task

In the concept proposed in 1983 in the US, risk assessment comprised of four steps, namely, hazard identification, dose-response analysis, exposure analysis, and risk characterisation. In a simplified procedure of risk assessment, only three types of information is needed, namely, physico-chemical characteristics, toxicology, the behavior of the chemical at the 'use' situation. The physico-chemical data is supposed to show some sense of toxicity and behaviour of the chemical. The toxicology data shows the kind of symptoms to be elucidated, the target organism, and the amount of chemicals needed for showing the symptoms. Behaviour data would show the extent the receptor - here, humans or other natural organisms - is contacted by the chemical at the 'use' situation. The risk assessment is simply to compare the extent the receptor is contacted and the amount of the chemicals needed to show the symptom.

Such simple procedures, however, cost a lot of money. To obtain a single toxicity figure, for example, many tests need to be conducted to answer questions of interest such as"Does this chemical cause cancer?"; "Does this chemical cause malformation?"; and so forth. In fact, more than 20 animal toxicity tests are needed to answer such questions and obtain a toxicity figure. This could cost approximately USD 15 million. Similarly, to obtain a single exposure figure, the tests on residue analysis and environmental behaviour can cost up to USD 5 million. To examine the toxicity of natural organisms usually three aquatic species are tested as representatives of the water environment: fish, water flea, and algae. For terrestrial species, earthworms, honey bees, and birds are tested. For these tests, approximately USD 1 million is needed.

The data generated from the tests are huge and the process of checking the credibility of each data is an important task. At the stage of data generation, government authorities require the data to be generated under the Good Laboratory Practice (GLP) system. That is, if the data were not generated under the GLP system, the data would not be considered for a risk assessment procedure. For

all the tests above, which are considered routine tests, various areas of expertise in toxicology, pharmacology, veterinary medicine, chemistry, biology, statistics, and computer science are needed. Almost 100 scientists and technicians need to be secured for a cost of almost USD 5 million.

The Importance of an Official Risk Assessor

It is difficult to enumerate the importance of an official risk assessor, because the social, economic, and political impact of a good or bad decision on chemicals management is very diverse depending on the chemical. For example, the endocrine disruptor incidence in Japan or Korea could not be summed up in simple terms. The psychological impact on the public, the economic loss of the industries involved in the manufacturing of relevant products, and the distrust of the public regarding the chemicals management policy of the government are the components of the impact estimation. Alternatively, the other way of estimating the importance of the official risk assessors indirectly is by the cost of data generation which is the official requirement for assessing risk. The official risk assessor in fact assesses cases which are worth 15 to 150 times more than his or her annual salary. The indirect impact of the work of the official risk assessor could be elucidated by the annual sales volume of the chemicals, the pharmaceutical, agrochemical, or the industrial or household chemicals. For example, he or she can easily deter the annual sales of one item amounting to USD 10 million. This figure could be amplified enormously, if counting the benefits being received by the public or the disaster to be experienced by the public if the final decision on chemicals depends upon the quality of the risk assessor.

It should be clarified here that the distinct capabilities of the official risk assessor are:

a) Data evaluation; final report and raw data. Through this function, the assessor should be capable of rejecting the data for resubmission.

b) Data interpretation with or without manipulation of data. This function requires the assessor to be able to understand the meaning of individual study results and to estimate/calculate the data to generate a new data of assessment using equations or models.

c) Data integration. This is the hard part for an individual scientist, because this requires consensus on determining the end point among data interpreted by concerned assessors.

Status of Risk Assessment in the Developing Countries

Most of the developing countries in Asia and other regions of the world are importing chemicals from the industrialised countries. The former countries usually have no capacity to invent new chemicals and could even still have manufacturing plants for chemicals with expired patents. Therefore, they do not have capacity to generate data for risk assessment. Governments in these countries have very limited human resources for risk assessment, because there are only few scientists who have had experience in data generation and interpretation. Subsequently, the concerned laws for chemicals management, such as new chemicals registration or environmental quality standards, could not introduce the concept of risk assessment. Does this mean that developing countries do not have chemicals laws or regulations?

Laws and regulations are certainly in place but their implementation is not based on detailed understanding of the risk assessment. The introduction of an environmental quality standard could be an example. The concerned government official might collect the standards in the industrialised countries, international organisations, and neighbouring countries, and pick one of the figures based on the socio-economic status of the country. A national committee might play an advisory role in the process. This process does not generally include the process of toxicity assessment, exposure analysis, and risk characterisation due partly to the lack of a risk assessment system and a lack of man power. It is not that there is lack of critical mass for risk assessment and management in developing countries, because there are good scientists in every disciplines needed for risk assessment. However, the perception of the importance and necessity of risk assessment and management system in governments of developing counties is very low (Kim, 2001).

The Korean Experience in Capacity-Building in Risk Assessment

In 1987, the Korean Ministry of Health and Welfare established the National Institute of Toxicology Research (NITR) and started to strengthen the capacity-building of the toxicity testing laboratories by introduction of the GLP certificate system. The NITR was mainly involved in the basic toxicology research and solving the domestic regulatory issues in food and pharmaceuticals. With the introduction of the GLP certificate system, the NITR had to be involved in the generation of toxicity data of pharmaceuticals and the registration for domestic industries in order to compensate for the limited domestic capacity for data generation. The NITR was also involved in the decision-making process of the ministry as a technical reviewer and as an inspector of the GLP system. This

duplicative role as data generator and data reviewer caused the conflict of interest and the data generation role was terminated after seven or eight years. However, this period might have produced 20-30 possible risk assessors in the toxicology area in the government.

In 1991, the Korean Ministry of Environment was responsible for managing industrial chemicals, and introduced significant amendments to laws in chemical management. It announced an existing chemical list to differentiate new chemicals from the existing chemicals. One of the drastic changes with the co-operation of the customs office is that any importing chemicals should be checked at the port and if the chemical is not on the list, the importer should get the permission from the Ministry of Environment for risk clearance. Furthermore, the ministry requested the submission of a bare minimum of 6 datasets for classification and further management measures like a periodic report of use. The risk management was very limited due to the limited number of the submitted data. However, the port authorities could refuse to import a chemical if it was considered acutely toxic. It could be said that this procedure has not been based on the whole scheme of risk assessment, but based on the simple criteria of a few toxicity data. This practice must have been inevitable, because the data generation capacity was not fully working at that time and the industrial capability was not as strong as to invest in data generation needed for meeting the safety needs. However, several risk assessors were employed for this task of data collection and review process. The National Institute of Environmental Research also had a minimal role to play.

In Korea, the Ministry of Agriculture and Forestry was responsible for pesticide registration. The agrochemical industry was requested to submit relevant data and pass both the Efficacy Committee and the Safety Committee before marketing. As there were no active domestic agrochemical ingredients, all the data needed for registration were the ones generated and reviewed in industrialised countries. Hardly any deviation from the outcome of the toxicology review was possible. Only the residue data had to be generated by the local scientists and it was taken for risk assessment. Through this process, about ten to twenty scientists affiliated with the National Institute of Agricultural Research must have been trained. The Maximum Residue Limit (MRL) of each agrochemical had to be decided by the Food and Drug Administration of the Ministry of Health and Welfare, taking into consideration the advantage of the expertise in toxicology, food consumption and residue data.

In 1987, Korea adopted the international patent law. Before that, private companies could synthesise or manufacture and sell the internationally-patented chemical products without restriction. However, after the introduction of the international

patent law, the practice was prohibited. Before the introduction of the law, the government formulated astrategy of inventing new chemical products for the domestic and international markets. Government-affiliated research institutes initiated the task of inventing new chemicals: pharmaceuticals and agrochemicals as major targets. To accomplish the goal, three groups of experts were recruited: organic chemists for synthesis; pharmacologists and agrochemical biologists for screening efficacy of the pharmaceuticals and agrochemicals; and toxicologists for risk screening and assessment.

The toxicology team started with about ten persons with annual budget of USD 0.3 million. Each scientist set up individual items to be tested as specified in the guidelines used in Korea, Japan, the US and the Organisation for Economic Co-operation and Development (OECD). For the task, purchase of equipments, apparatus, and reagents were necessary. Standard operating procedures were then written for each test. In the process, international organisations such as the UN Development Programme (UNDP), UNIDO, and the World Health Organization (WHO), provided consultants, training abroad and even hard money for equipment. The Korean government provided a budget for maintaining the manpower and the building of animal facilities, especially the first barrier system in Korea. After about ten years of this effort, a novel agrochemical, Flupyrazofos, invented by the Korea Research Institute of Chemical Technology (KRICT), was officially registered to the Korean Ministry of Agriculture and Forestry in 1996 as shown in the figure below. This achievement had to wait for forty -even years after the country started to use DDT in 1949 by importing the active ingredient for agricultural use.

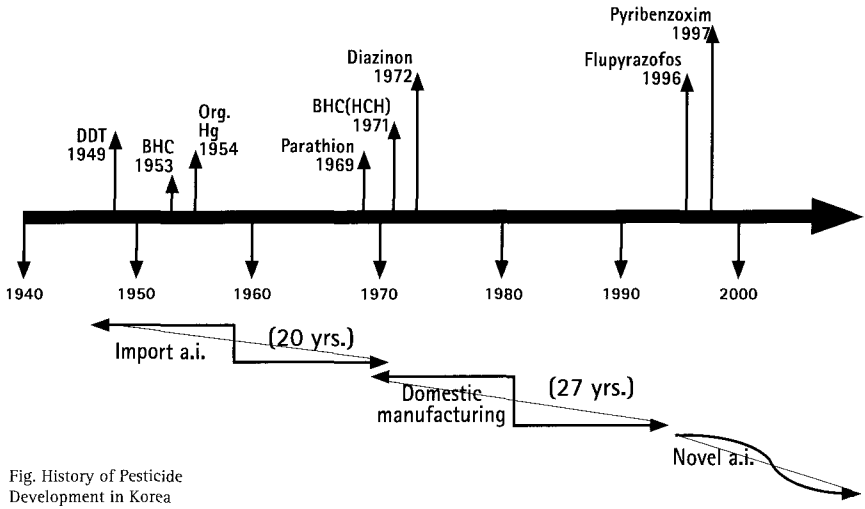

Fig. History of Pesticide Development in Korea

In 2000, a novel pharmaceutical was registered to the Korean Ministry of Health and Welfare. For the registration of the new agrochemical, KIT provided all the data needed for the risk assessment. In 2006, after 20 years from the start of the team, the manpower of KIT is 200 persons, and the annual budget is USD 20 million. About 150 scientists and supporting technicians are involved in 40 types of tests. Among them, about fifty scientists are study directors, who are potential risk assessors. The progress is summarised in the table below.

Growth of Kit

	Number of staff	Budget
1986	10	$ 0.5 million
2006	200	$ 20 million

- **Total budget for 20 years: $1 billion**
- **Building facility: $5 billion**
- **50 Potential Risk Assessors**

This figure should not be interpreted as a sheer purpose of national capacity-building in risk assessment, because the institute was responding to the requests of the industry as well as the government to develop chemicals and relevant research. This figure reflects the continuous need of risk assessment in the country. Capacity-building was one of the natural by-products of the activities of KIT. During the years of capacity-building in tests for the generation of data for risk assessment, the scientists of the institute served as committee members for risk-decision making on new and existing chemicals in the Ministry of Health and Welfare, the Ministry of Agriculture and Forestry, and the Ministry of Environment. The Ministry of Health and Welfare started the GLP regulation and KIT received the first GLP certificate in the country in 1988. The scientists of the institute also had to be involved in the policy-oriented research requested by the concerned ministries, such as the introduction of the risk assessment concept and practices in the revision and setting-up of water quality standards for existing and new chemicals, the introduction of the chemical inventory system to manage the existing and new chemicals, and stressor identification of existing chemicals by risk quotient.

At the turn of the century, since 2000, the Korean Ministry of Environment started to introduce the risk assessment procedure in the process of revising water

quality standards. The process is on-going and the procedural guideline is under refinement. The regulatory standards of other environmental matrices are also in the process of being actively introduced to the risk assessment procedure. Still, one of the administrative difficulties among concerned departments is the co-ordination of the experts involved in different ministries and the synchronisation of the guidelines of the procedure. One of the significant improvements in the area of policy-related research is the introduction of a risk-based decision-making system in the management of chemicals in the industrial complexes in the country. Using risk quotient as a tool, the computer programme with chemical use data and toxicological data can identify high risk industrial complexes or cities, high risk chemicals, and high risk organisms including humans.

This short story demonstrates that that the capacity-building in chemical risk assessment in Korea was incompletely fractioned in different ministries and not built for the sole purpose of risk management in the government, rather for the purpose of the development of new chemicals and the vitalisation of chemical industries. It could also be understood from the brief history of the chemical management in Korea that there is still a big imbalance in the chemical law/regulations and implementation, especially in risk assessment and management, between the developing countries and the industrialised countries.

The Impact of the Imbalance in Risk Assessment/Management between Developing Countries and Industrialised Countries

A chemical officially approved by industrialised countries could be refused by a developing country for importing when the decision is made on the basis of a single criterion such as acute toxicity, not by the whole process of risk assessment. This could be a non-tariff barrier to the free international chemicals trade. Conversely, the chemical could be approved without a proper reviewing system in the developing country and may cause a hazard during the use of the chemical, because the use pattern of chemical was not fully taken into consideration in the risk assessment process. The approval in the industrialised country could have considered the use of the chemical and would be applied by a certified applicator, but the chemical was allowed to be used by all populations in the process of import. This aspect was emphasised by recognising that a significant number of hazardous chemicals has been dumped in developing countries from industrialised countries. In either case, the harmonisation of the methodology of risk assessment and risk management is urgently needed to minimise the impact of chemicals worldwide.

Regional and International Effort for Risk Assessment and the Management of Chemicals

Even if the effort for the harmonisation and capacity-building in risk assessment and the management of chemicals in the world was explicitly expressed in the Chapter 19, Agenda 21, in 1992, various national, regional, and international organisations were involved in this effort several years earlier. For example, the Korea Institute of Toxicology was supported by the UNDP/UNIDO programme starting in 1985. For more than five years capacity-building in the area was also supported by consultants from the US, Europe, and Japan and later on for on-site training of personnel in the laboratories of the industrialised countries. Also minimal amount of supportive budgets were allocated to purchase necessary equipment and apparatus. The WHO was also involved in the technical supportive effort during the period. Since the Rio Declaration of Agenda 21, almost all the international organisations were active and deeply involved in the new bodies of the UN's International Program on Chemical Safety (IPCS) and the International Forum on Chemical Safety (IFCS). A national/regional organisation, Chulalongkorn Research Institute in Thailand, has trained significant numbers from ASEAN countries in risk assessment and the management of chemicals annually by inviting many eminent lecturers in the field from the US and Europe. Also, the Japan International Cooperation Agency (JICA) supported the establishment of animal experiment facilities in the Health Ministries in the Philippines, China and Turkey.

One of the common trends/features of these regional and international efforts in capacity-building in risk assessment was training of government officials who had very limited provision of hardware: facilities and equipment. Three drawbacks of these efforts are evident. First, the trained officials are usually transferred to other branches or departments after the training, say in one or two years. Experts in the government could not be nurtured in developing countries. Secondly, provision of software or training could not contribute significantly to the wholesomeness of risk assessment training without hardware in the country. It would not be an exact analogy, but this sounds like training a chemist without a laboratory experiment. Thirdly, these efforts are almost 'sporadic' with very limited co-ordination among programmes, sometimes overlapping or ignoring urgent areas.

Asia-Europe Strategy for Co-operation in Capacity-building in Risk Assessment and Management of Chemicals in Developing Countries

The necessity of risk assessors in every country was questioned consistently by many administrators at the national and international levels, because most of the essential risk assessments of major hazardous substances is performed by the official risk assessors and managers in the industrialised countries. It is generally thought that the number of chemicals that needed to be assessed are not as many perceived. It may also be thought that it is easier to adopt the outcome of the risk assessments and management from industrialised countries. However, as illustrated, risk management without understanding the whole process of risk assessment may result in the wrong decision made regarding the safety of human and the environmental organisms. The geopolitical and socioeconomic aspect should also be considered on the firm base of scientific analysis of risk which is very complex and need technical updates from time to time. The question about the strategy of capacity-building in risk assessment of chemicals in developing countries that should be raised is, "Should the developing countries follow the example of Korea in capacity-building in risk assessment and management of chemicals for twenty years and make an investment of billions of dollars?" Some may say yes, and some may say no. The ideal answer would be yes, but with less time and cost.

The first option would be the formulation of a centralized official body of risk assessors which can be utilised by every department or ministry in the particular country concerned as the number of chemicals assessed would not be so many in the initial stage. Risk assessors should be trained on the new techniques. This could be possible by training new and old staff involved in the risk assessment and management of chemicals. The training of these risk assessors in every country in software and hardware might be costly and time-consuming. However, an Asia-Europe co-operation could be efficient in this endeavour, for example, through the establishment of the Asia-Europe Training Center for Official Risk Assessors (AETCORA). The training center should provide not only teaching of concepts and practices of the procedures involved in risk assessment, but also the experimental experience of the components of the risk. The committed country should have a strong will to establish minimum hardware infrastructure of generating fundamental data specifically needed by the country, e.g. toxicity tests with domestic organisms or residue analysis. This matter needs to be thoroughly discussed at the initial stage of formulating the centre.

The second option would be the Asia-Europe Network of Risk Assessment Centers (AENRAC) of each country. The activities of this network would essentially be the same as the AETCORA: the training of official risk assessors and the building of infrastructure for risk assessment. The network system could facilitate the political role among member countries, such as a synchronisation effort for laws and regulations. Of course, the second most important role of the AETCORA and the AENRAC would be the propagation of the method of risk assessment to the other parties of society, in other words, risk communication. The success of the training of official risk assessors could be measured by the propagation of the practice of risk assessment at the industrial and the public sectors of the society. This propagation is a very natural outcome of the training, because the official risk assessors would initiate the amendment and implementation of the laws and regulations based on the risk concept in a retrospective (managing existing chemicals) and prospective (managing new chemicals) manner. All the three parties could start talking to try to resolve the chemicals management issues with the same term: RISK. Asia and Europe might need to push hard to secure many qualified risk assessors with concerted effort.

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ASIAN INSTITUTIONAL MECHANISMS FOR CHEMICALS MANAGEMENT: BRIDGING CURRENT CAPACITIES WITH FUTURE DEMANDS[1]

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Institutional mechanisms for chemicals safety and management in Asia exist at national, sub-regional and regional levels. They have continually been developing but progress has been slow and outpaced by the demands of the sector and the problems affecting it. However, all three major sectors of society – government, business and civil society – have all been involved more actively than ever before. Governments are preparing and implementing plans, policies, regulations, and monitoring movements of chemicals. However, its capacity is substantially limited by lack of human and financial resources. The business sector contributes through its corporate social responsibility policies but its participation is limited by its primary purpose of earning profit. Civil society organisations (CSOs) have thus taken the slack and have been achieving some degree of success. Still, much remains to be addressed and undertaken. The existence and use of chemicals are very pervasive, hence the problems and needed work related to safety and management are enormous and far-reaching.

Institutions have a key role to play in safeguarding the public from the hazards of chemicals. Thus, it is the purpose of this paper to identify the various institutional mechanisms in Asia that tackle chemicals safety and management at various levels. It shall identify possible areas for improvement and provide some recommendations. While mechanisms within government and business will be discussed, more emphasis will be given to the initiatives of CSOs. In this regard, the paper will substantially draw from the results of an assessment conducted by

[1] *Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.*

the author under the auspices of the United Nations Institute for Training and Research (UNITAR) on the capability of CSOs to handle chemicals issues and implement the Strategic Approach to International Chemicals Management and the Globally Harmonized System (SAICM).

The paper shall also present specific initiatives to strengthen CSOs in the region. These initiatives come in the form of networks of public interests and labour organisations that would help improve knowledge and awareness and harness synergies among their members. It shall describe the terms of reference of said networks for the information of interested organisations. It is hoped that through this paper, more organisations would be encouraged to join or support the networks for the common good.

Introduction

The Asian region under the Asia-Europe Meeting (ASEM) process covers the 10 member-countries of the Association of Southeast Asian Nations (ASEAN) and its three Northeast Asian partners (China, Japan and South Korea) which together form East Asia, as well as India, Pakistan and Mongolia. As far as East Asia is concerned, except for Japan and Korea, governmental institutional mechanisms for chemicals management in the other 11 countries are far less developed than their counterparts in Europe. Individually, however, the countries do have initiatives towards the strengthening of their respective policy and institutional frameworks for chemicals in support of the implementation of their commitments to the World Summit for Sustainable Development (WSSD) and existing global protocols (e.g., Montreal Protocol) and conventions (e.g., Basel and Stockholm Conventions). National preparations would also be necessary for the implementation of the Strategic Approach to International Chemicals Management (SAICM) and the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)[2].

There has been no regional institutional mechanism dealing with chemical hazard and safety matters that involves all 13 countries in East Asia. However, this does not mean that there should be one since there is already a proliferation of inter-country groupings within Asia and among the 13 countries that could handle these matters. This paper will thus look into these institutional mechanisms and determine how well they handle matters pertaining to chemicals or, if they are not yet doing so, how they can become responsive. However, it will only attempt

[2] *The Globally Harmonized System (GHS) of Classification and Labelling of Chemicals is an international standard for chemical classification and hazard communication that countries can use to establish comprehensive national chemical safety programmes.*

to cover the countries of East Asia with a focus more on ASEAN countries as these are the ones that need greater attention at this time.

This need for attention was recognised by the United Nations Institute for Training and Research (UNITAR) and the International Labor Organization (ILO). They have co-operated closely to help improve capacities by having an ASEAN component in their Global GHS Capacity Building Program, 2005-2007. Under this ASEAN component, two studies were conducted, namely:

a) "Regional GHS Capacity Assessment in ASEAN" undertaken by the Malaysian Institute for Environment and Development (LESTARI); and,

b) "Regional GHS Assessment and Chemical Safety and GHS Implementation Network for Public Interest and Labour Organizations in ASEAN" undertaken by the author in behalf of Earth Council, Asia-Pacific.

The LESTARI study was focused on governmental institutions while that of the author covered public interest and labour organisations (PILO) or civil society organisations (CSO). These studies served as references to this paper.

A discussion of institutional mechanisms cannot be separated from the discussion of their agenda since form must follow the substance, i.e. the substance must shape the form of the institution. Hence, this paper will first provide a bird's eye view of existing national policy frameworks and systems to situate the succeeding discussion on institutional mechanisms. It will then describe some relevant existing institutional mechanisms in government, business and civil society. Finally, it will identify and focus on key roadblocks as inputs to the discussions of the Round Table. Some roadblocks apply to overall development so the paper will attempt to focus or link them to issues pertaining to chemicals and hazardous substances.

Policy Framework

Development and income levels of Asian countries vary widely. Corollary to this, their national policy frameworks vary widely in terms of level of development and sophistication. Needless to say, this mirrors the state of chemical policy frameworks in the region.

The degree of variation narrows a little at the sub-regional level since sub-regional mechanisms try to harmonise policies and programmes among their members. For instance, ASEAN has a very clear vision for its member-countries and Southeast Asia as laid out in ASEAN Vision 2020. It envisions a peaceful,

just, prosperous, caring and environmentally-sound community of nations in Southeast Asia. ASEAN endeavours to achieve this vision through regional integration and close co-operation among its members and with the rest of the world under a spirit of partnership and mutual respect.

In the Hanoi Plan of Implementation, 1999-2004, ASEAN spelled out a concrete plan that would attain the vision. This plan was later sharpened and translated into key priority programmes that now form part of the Vientiane Action Program, 2004-2010. ASEAN's framework for its plan, policies and programmes has always been guided by the principles of community, integration and co-operation.

At the national level, the development agenda of each ASEM country in East Asia are likewise in place (see Table 1), most of which are being implemented fairly well. Each one has a Medium-Term Socio-Economic Development Plan that covers 5-6 years, depending on the official tenure of the head of government. Some already have long-term sustainable development strategies such as China Agenda 21 (CA21), Malaysia's Vision 2020 (MV2020), Philippine's Agenda 21 (PA21) and Vietnam's Agenda 21 (VA21). Others such as Cambodia, Laos and Myanmar are still developing their respective long-term strategies albeit already having other sector strategies such as the National Environment Plans and Poverty Reduction Programmes.

A national Agenda 21 has always been viewed as an environmental or ecological strategy because its development is one of the national commitments that came out of the UN Conference on Environment and Development (UNCED). However, it has always been intended to be a long-term strategic agenda that would integrate the environment in social and economic development. Over the years, it has evolved and many national agendas were modified and updated to sharpen this integration. Most of these are now considered the long-term national strategies for sustainable development (NSDS), which the WSSD is committed to develop and pursue. South Korea's NSDS is an example of one that was developed from scratch recently, while PA21 is an example of one that was improved and updated to further tighten the integration of environmental, economic and social dimensions.

It may be noted that practically all of above-mentioned plans and strategies do not have clear policy framework on chemicals safety and management. However, all of them have strategies and policy pronouncements on waste management; some promote sustainable agriculture (i.e. elimination of pesticides); and a few mention safety in workplaces. This indicates that chemicals are not viewed holistically despite their insidious and omnipresent nature. The focus has always

been on products and wastes and little attention has been given to chemicals (both toxic and non-toxic) production, importation and handling.

Table 1: National Policy Frameworks in Asian Countries of ASEM

Plan/Policy/Strategy	Country
Medium-Term Social & Economic Development Plan	All countries
Agenda 21	Almost all, e.g. China, Indonesia, Myanmar, Philippines, Thailand, Vietnam
National Sustainable Development Strategy	Korea, Vietnam and those which consider their existing plans as the NSDS e.g. Japan, Malaysia, Philippines,
National Environment Action Plan	Most countries such as Cambodia, Indonesia, Japan, Thailand
Poverty Reduction Strategy Programme	Cambodia, Indonesia, Laos, Philippines, Thailand, Vietnam
Vision Document	Malaysia

Notwithstanding the lack of coherent chemicals development and management strategy at the national level, the legislative and policy frameworks for chemicals have long been in place and improving in Asia. There have been existing laws from way back that regulate quality, use, supply, importation and exportation and so forth of hazardous chemicals and related products. They also provide for rules and regulation (e.g. product labeling) that ensure the safety of labour in industrial floors and handlers of chemicals during transportation. The support and accession of most countries to related global protocols and agreements such as the Montreal Protocol and Stockholm and Basel Conventions heightened the efforts to tighten up the national policy frameworks on chemicals. To date, countries such as Laos, Cambodia, Indonesia, Philippines and Thailand, have been developing their national GHS implementation strategies under the Global GHS Capacity Building Program, 2005-2007.

In ASEAN, the Classification and Communication Systems are well in place. Except for a few gaps, the countries have established both the chemical and hazard classifications in relevant sectors as shown in Tables 2 and 3 below:

Table 2: Chemical Classification System in ASEAN

Country	Industry	Agriculture	Transport	Consumer	Others
Brunei	x	X			
Cambodia		X			
Indonesia	x	X	x	x	
Laos	x	X	x	x	x *
Malaysia	x	X	x		
Myanmar		X			x **
Philippines	x	X		x	
Singapore	x		x		
Thailand	X	X	x	x	
Vietnam	X	X	x	x	

*Toxic and Hazardous Substance; Chemicals for Health & Medical Purposes
**Precursor chemicals for dangerous drugs
Source: UNITAR/LESTARI Report

Table 3: Hazard Classification System in ASEAN

Country	Industry	Agriculture	Transport	Consumer	Others
Brunei	x	X			
Cambodia		X			
Indonesia	x	X	x	x	
Laos	x	X	x	x	x *
Malaysia	x	X	x		
Myanmar		X			
Philippines	x	X		x	
Singapore	x	X	x		
Thailand	x	X	x	x	
Vietnam	x	X	x	x	

*Chemicals for Health & Medical Purposes
Source: UNITAR/LESTARI Report

Notwithstanding the foregoing, most Asian countries still have a long way towards achieving a coherent policy framework for chemicals. Most frameworks may be described as patchy, some are conflicting, while others are sorely lacking. This situation emanates from high variability in capabilities for chemicals safety and management.

Regional Institutional Mechanisms in Asia

Asia is home to a huge number of global, regional and national institutional mechanisms. However, only a small percentage of these are actually engaged in chemical issues for reasons to be cited in succeeding discussion. These mechanisms exist mainly among national government agencies or within inter-governmental organisations (IGOs). Business and CSOs likewise exist at all levels but they cover the whole gamut of chemicals sectors and issues. These organisations come in various forms and sizes, and advocate for a wide range of issues. Following are some of these key formations:

Government

ASEAN

ASEAN has intricate processes with a structure that consists of four key components:

a) The ASEAN Summit, the policy-making body, which consists of heads of governments or states.

b) Ministerial Meetings, which are grouped according to sectors, e.g. labour, agriculture, transport, industry, and environment, prepare recommendations to the summit. As the name suggests, the ASEAN Ministerial Meeting on Environment (AMME) is the formation responsible for environmental matters.

c) Senior Officials Meetings, which undertake the technical review and prepare recommendations to the Ministerial Meetings. This is also grouped by sector such as the ASEAN Senior Officials for Environment (ASOEN).

d) Sub-Sector Working Group Meetings, which discuss more specific issues within a sector and provide recommendations to the Senior Officials Meetings. For instance, issues pertaining to Multilateral Environment Agreements (MEA) are handled by the ASEAN Working Group on MEA (AWGMEA).

Supporting all these meetings and the whole operations of the association is the ASEAN Secretariat that is likewise organised by sector.

ASEAN does not have a specific group dedicated to chemicals. Most issues pertaining to chemicals, especially hazardous wastes, are deal within the environment sector grouping and process, i.e. from AWGMEA to ASOEN to AMME. Chemical-related issues impacting on other sectors are taken up in relevant ASEAN formations such as the following:

a) ASEAN Labor Ministers Meeting (ALMM) discusses issues and agrees on co-operative actions pertaining to industrial workplaces. It draws inputs from the ASEAN Occupational Safety and Health Network (OSHNET), a regional network of National Occupational Safety and Health Centers or their equivalent, which gathers and disseminates information and conducts training and research for the improvement of working conditions and safety mainly in industrial floors. These include the classification, labeling and packaging of chemicals.

b) ASEAN Ministers on Agriculture and Food (AMAF) for matters pertaining to pesticides with guidance from its Strategic Plan of Action (2005-2010). For instance, the Plan promotes Integrated Pest Management (IPM), which is expected to improve agriculture productivity and ensure environmental sustainability. AMAF set the maximum residue limits of pesticides in traded crops, vegetables and fruits. Through AMAF, the ASEAN pesticide network and database were established for information sharing and discussion and resolution of problems pertaining to pesticide management.

c) ASEAN Transport Ministers Meeting (ATMM), which handles transport issues. Among others, ATMM adopted Protocol 9 in line with the ASEAN Framework Agreement on the Facilitation of Goods in Transit (1998). Protocol 9 provides for the simplification of procedures and requirements for the transit transport of dangerous goods in ASEAN by using internationally accepted standards and guidelines.

In addition to its sector-oriented mechanisms, ASEAN forges partnerships with its partner countries. One relevant formation is a partnership with Japan that was created under the ASEAN Economic Ministers - Ministry of Economy, Trade and Industry of Japan Economic and Industry Cooperation Committee (AMEICC). This is the Working Group on Chemical Industry (WGCI), which aims to promote co-operation, exchange information and knowledge and build capacities pertaining to the interaction of environment and chemical industrial production and use. It is composed of government and industry representatives from ASEAN countries and Japan.

APEC

The Asia-Pacific Economic Cooperation (APEC) is the formation that covers both the Southeast Asian and Northeast Asian members of ASEM except Cambodia, Laos and Myanmar. As the name implies, the organisation focuses on expanding economic co-operation among countries along the Pacific Ocean to enhance economic growth and development. Its mechanism for chemicals is called the APEC Chemicals Dialogue Steering Committee. The committee meets about once a year and one of its key agreements is to accelerate and co-ordinate the implementation of GHS without impeding the flow of trade among the member countries. It is currently helping improve the capacities and processes among member countries to speed up the implementation of GHS in the region.

Business

ACIC

The ASEAN Chemical Industries Council (ACIC) aims to facilitate the implementation of projects identified under the ASEAN industrial complementation program. It involves the chemical industry associations from Indonesia, Malaysia, Myanmar, the Philippines, Singapore and Thailand. ACIC has been encouraging the participation of other countries and helping them implement GHS by inviting them to participate in their meetings and GHS training programmes.

CropLife Asia

CropLife International is a global organisation that was established mainly by six companies, namely: BASF, Bayer CropScience, Dow Agrosciences, Dupont, FMC, Monsanto, Sumitomo and Syngenta. These companies are involved in research and technology in the areas of crop protection, non-agricultural pest control, seeds and plant biotechnology. It consists of regional and national associations engaged in plant science industry in ninety-one countries.

One of its six regional analogues, CropLife Asia, is based in Bangkok. CropLife Asia is composed of the regional branches of the six companies and fifteen Asian associations. It promotes responsible use of chemical crop protection and agricultural biotechnology products (genetically-modified organisms). It also promotes regulatory frameworks that support sustainable agriculture. It endeavours to work for the safe and responsible use of pesticides, and to provide safe and abundant food to the consumer.

WBCSD

The World Business Council for Sustainable Development (WBCSD) consists of about 180 international companies, which represent thirty-five countries and more than twenty major industrial sectors. It involves some 1,000 business leaders globally. All of these companies are united in a common objective of becoming centers of excellence in sustainable development by promoting eco-efficiency, innovation and corporate social responsibility (CSR). WBCSD helps its members 'make the business case' for sustainable development through access to knowledge and technologies, exchange of good practices and information. It facilitates participation of members in policy development and nurtures future business leaders globally through education. In all these initiatives, WBCSD try collaborate and engage the participation of stakeholders and other sectors of society.

The WBCSD has a Regional Network[3] of fifty-four Business Councils for Sustainable Development (BCSDs), which are mostly located in developing countries such as Malaysia, the Philippines and Thailand. BCSDs are autonomous and largely operate at the national level. Many BCSDs are engaged in chemicals-related activities.

CSOs

Civil society already has a good number of organisations dealing with various chemicals safety issues. Many of these operate globally and have regional and national branches or units. They represent or deal with specific sectors or stakeholders such as farmers, workers, women, consumers, NGOs, etc. Following are examples of such organisations and their activities relevant to chemicals.

PAN-AP

Pesticide Action Network Asia-Pacific (PAN-AP)[4] is the regional arm of PAN-International, and is co-ordinated from Kuala Lumpur. It has autonomous national branches such as those in the the Philippines and Indonesia. PAN-AP is dedicated to helping women, agricultural workers, farmers and peasants protect their health and environment, as well as ensure their safety from hazards of pesticide use. It believes that pesticides are unnecessary and harmful thus their use must be reduced if not altogether eliminated. For this reason, PAN-AP closely monitors pesticide production, trade and use.

[3] *http://www.wbcsd.org*
[4] *http://www.panap.net*

To date, PAN-AP has 108 partner groups and more than 390 participants, which include individuals. They undertake advocacy work, research, training, mobilising, and networking among grassroots and community organisations, all for the purpose of improving awareness, knowledge and ability to do away with pesticides or at the very least, protect themselves from the dangers of toxic chemicals and pesticides.

AFA

From the agricultural sector side, the organisation worth noting is Asian Farmers Alliance Association for Sustainable Rural Development (AFA)[5], a huge regional alliance of farmer federations and organisations in 10 Asian countries (e.g., Cambodia, Indonesia, Japan, Korea, the Philippines, Taiwan, Thailand, Vietnam) covering about 10 million farmers. AFA aims to be a strong lobby and advocacy group for farmers' rights and development, genuine agrarian reform and mainstreaming of sustainable agriculture in regional and national policies and programmes. It supports its members by serving as the mechanism for co-operation and solidarity and for exchange of information on agriculture and farmers' development.

The activities of AFA related to chemicals are a direct consequence of its priority agenda of promoting sustainable agricultural policies and practices, which are supported by its key programmes that include policy advocacy, management of on-ground initiatives and capacity-building. Among others, AFA analyses policies for its campaigns, networks with other groups and lobbies and discusses with policy-makers.

IPEN

Many of those engaged in sustainable agriculture and other advocacy areas further grouped together to work for their common mission of global elimination of persistent organic pollutants (POPs) to form International POPs Elimination Network (IPEN)[6]. This global network is currently composed of more than 400 NGOs operating in about seventy countries that are working in the areas of public health, environment, and consumer protection, among others. Its mission is to have a toxic free future in order to protect the public and the environment from injuries and disease that may be brought about by toxic chemicals.

[5] *http://www.asianfarmers.org/*
[6] *http://www.ipen.org/*

IPEN has a number of regional counterparts such as the Southeast Asia Pops Elimination Network (SEAPEN), which aims to build capacities of NGOs so that they may help their respective countries implement the Stockholm Convention. It undertakes projects that are supportive of IPEN objectives such as conducting tests and follow-up examinations of persons poisoned by pesticides, and conducting training and disseminating information on alternatives to pesticides.

CI

In the area of consumer protection, Consumers International (CI) is worth mentioning. It is also a huge network of 230 organisations in 113 countries, which defends the rights of the consumers and represents their interests regionally and internationally. Its focal point for Asia-Pacific has been in Malaysia and this has been providing support and services to 58 non-profit consumer organisations and government affiliates in 22 countries and territories in the region. It delves on a wide range of issues such as health and pharmaceuticals, food security and safety, trade and economics, and sustainable consumption. Among others, CI in Malaysia conducts research, capacity-building, policy development, information dissemination, policy development, campaign and advocacy, and representation in international discourses on consumer issues. It also facilitates networking and solidarity among the members as well as disseminates information and promotes consumer principles and policies to the wider public.

CI is generally focused on consumer or finished products, their production and the manner by which people consume them. However, it also undertakes activities pertaining to chemicals mainly through its members. For instance, a member from the Philippines, IBON Foundation, Inc., has been undertaking initiatives pertaining to pesticide use in agriculture and households, and poisoning of freshwater bodies due to mine tailings.

ICEM

Workers who are more exposed to chemicals, tackle safety issues through their labour groups or unions and one group that stands out is International Federation of Chemical, Energy, Mine and General Workers' Unions (ICEM)[7]. It is a highly organised federation that has a membership of over 20 million workers representing 384 industrial trade unions in 125 countries. ICEM aims for the highest health and safety levels at the workplace, environmentally responsible industrial products and processes, and the application of the best possible standards and practices within the industries that it represents. It organises and

[7] *http://www.icem.org/en/12-About-ICEM*

unites workers; safeguards and advances their economic, social, environmental and cultural interests; and advocates against labour exploitation.

In late 2006, ICEM drew up an action plan that includes the following commitments pertaining to chemicals safety and management:

a) Use the SAICM process to strengthen influence on chemicals management, safety and occupational health and safety at all levels; and,

b) Promote the 1990 ILO Safety in the Use of Chemicals at Work Convention 170 and the GHS, and engage with the International Council of Chemical Associations (ICCA) regarding trade union involvement in the Responsible Care® programme.

In Asia, ICEM has 23 affiliates in four member countries of ASEAN, namely: Indonesia (1), Malaysia (9), the Philippines (4), Singapore (2), and Thailand (7).

Greenpeace-SEA

Toxic waste movements and trade have been a primary area of advocacy of Greenpeace, an international environmental campaigner that has about 2.8 million supporters worldwide and national and regional offices in 41 countries. Greenpeace Southeast Asia (Greenpeace-SEA) was established with three branches located in Bangkok, Jakarta and Manila. Each branch has a specific campaign focus that includes forests, climate change and energy, and toxic waste. Greenpeace-SEA has been helping enforce the ban on waste trade put forth by the Basel Convention, actively blocking hazardous waste imports, opposing radioactive shipments, campaigning against forest destruction, lobbying governments on sustainable energy issues and drawing attention to the dangers of waste incinerations.

The Toxics Campaign of Greenpeace-SEA aims to 1) Protect both the environment and public health by eliminating threats posed by POPs; 2) guard against the unintentional release of POPs through the use and disposal of products such as PVC, and waste incineration; and, 3) promote cleaner alternatives in agriculture, industry and waste management.

National Mechanisms in Asia

At the national level, there is likewise a substantial number of organisations that are engaged in chemicals and related issues. Mechanisms in government are usually

based in ministries or agencies responsible for trade and industry or environment or occupational safety. They are the ones that draw up and implement laws, policies, rules and regulations. They are the key actors in chemicals management at all levels. They represent their countries in regional and global discussions and mechanisms such as ASEAN and relevant UN bodies.

The realisation that CSR improves the company's bottom-line rather than adds to its costs has given birth to more responsible and discerning private companies and business organisations. Since then, committees that are dedicated to environment matters have become regular features of business organisations. Chemicals are normally taken up in these committees although the levels of discussions depend on the nature of businesses of member organisations. These committees become the venue for exchange of information, co-ordination, and undertaking projects or activities that help companies improve their efficiency and competitiveness while protecting the environment and improving the lives of people.

Even taken together, the government and business sectors would not be able to meet the normally enormous needs of a country. Governments, particularly in developing countries, generally have extreme limitations in exercising its roles. On the other hand, the business sector's priority and focus will always be the conduct of business in the most productive way despite its commitment to and exercise of CSR. The remaining needs are oftentimes met by CSOs, which are able to do more and even better despite limited resources, in view of their independence, wide reach and flexibility. The number of CSOs in Asia is almost countless and they are engaged in a whole range of issues and come in varying sizes, forms, and levels of capabilities. However, CSOs in the chemicals arena may be considered few when taken against the number of issues and the magnitude of work that needs to be faced. Examples of these CSOs are the national chapters of regional CSOs described in the preceding section (e.g., PAN, AFA, Greenpeace) and those participating in IPEN's project called International POPs Elimination Project (IPEP) as shown in Table 4.

Individually, these three major sectors of society substantially contribute to environment and sustainable development. However, it has been proven and well-recognised that when the three sectors work in partnership, the synergistic results and impacts are far more potent and cost-efficient. Thus, UNCED promoted the creation of multi-stakeholder mechanisms for sustainable development which have been generically referred to as the National Council for Sustainable Development (NCSD). This was reiterated in WSSD and reflected in Johannesburg Plan of Implementation.

Table 4: IPEP NGO Partner-Beneficiaries

Indonesia	FIELD Indonesia Foundation; BaliFokus; Garbage Network
Malaysia	Pesticide Action Network Asia Pacific; Consumer's Association of Penang
Philippines	Southeast Asia POPs Elimination Network; Pesticide Action Network Philippines; Global Alliance for Incinerator Alternatives; EcoWaste Coalition; Advocates of Science and Technology for the People; Fisherfolk Against Toxics; Cavite Green Coalition; People's Task Force for Bases Cleanup; LAKABA; RESIST
Thailand	Campaign for Alternative Network; Phuket Environmental Conservation Group; Foundation for Consumer Alternative Agriculture Network; Chomchon Thai Foundation; Greenpeace Southeast Asia

Countries in the sub-region have been slow in complying with this commitment largely due to a number of factors such as: 1) Tendencies of governments to be too controlling and not allow participation of non-government groups in governance matters; 2) weak civil society due to government restrictions, low capabilities, and inability of CSOs to work together; and, 3) unresponsive business sector. To date, only Japan, Korea, the Philippines and Vietnam have actually established and used the NCSDs. Nonetheless, the UN Environment Programme (UNEP) has been providing assistance to countries in the Greater Mekong Sub-region (i.e., Cambodia, China, Laos, Myanmar, Thailand and Vietnam) to enable them to formulate their sustainable development strategies and establish their NCSDs.

The NCSDs of Japan, Korea and the Philippines have played various roles and served different purposes. They have demonstrated the potency of co-ordinated and synergistic actions and contributed to their respective country's sustainable development processes. The Vietnam NCSD is still in its infancy stage but it has already served as a venue for consultation and co-ordinated action for the implementation of VA 21. The NCSDs could serve as the institutional mechanism for chemicals safety and management at the national level.

Institutional Challenges

Notwithstanding the progress in institutional development, Asia continues to face a number of challenges that must be addressed to strengthen its capability

to bridge current demands with those of the future. These challenges include the following:

a) Some laws and policies need to be developed, updated or made internally consistent. In many cases, existing laws are not properly and consistently implemented.

b) The chemicals agenda is weakly integrated in regional and national development strategies and agenda as the usual case with environment. The lack of chemicals champions or institutions, integration tools and technical capability inhibit said integration.

c) Awareness and knowledge on chemical issues, particularly on risks and hazards posed by chemicals on people and countries are very low. This has been the most serious problem facing chemicals management including GHS implementation.

d) Co-ordination and synergy among institutional mechanisms at all levels and sectors are sorely lacking. There is weak co-ordination and co-operation among government, business and civil society due to the absence of a co-ordinating mechanism such as NCSD. Within these major sectors, co-ordination and co-operation have also been lacking. Among CSOs for instance, the consumers and labour groups are not quite linked with pesticides and toxic wastes groups, more so between themselves. Related to this, the potentials of CSOs in other key sectors (e.g., media and academe) remain barely tapped due to the misconception that the core objectives and competence of these sectors are not directly related to chemicals, not realising that these sectors would be effective agents for creating knowledge and undertaking information, education and communication.

e) Capabilities to manage chemical hazards and address challenges posed by global trading and transportation of hazardous wastes continue to be low. There is lack of technically-equipped personnel that would understand the intricacies and bolts and knots of chemicals management particularly in government and civil society.

f) Funding has been inadequate and has constrained the major sectors in sustaining their respective work and initiatives pertaining to chemicals safety.

g) Partnership and co-operation between Asia and Europe to resolve issues and manage chemicals production and use need strengthening.

Recommendations

Facing the foregoing challenges require the concerted efforts of government, business and civil society. Each sector has a role to play that needs support from others. Hereunder are some recommendations that may address above challenges:

a) Governments must strengthen or build coherent national legislative and policy frameworks for chemicals in co-operation with stakeholders and with support from development institutions and experienced countries in Europe. The frameworks must be considered and find meaning in their national development plans and strategies.

b) Stakeholders, particularly government, must set up or strengthen necessary institutional mechanisms to forge partnership and co-operation among them, facilitate exchange of information and knowledge, and create synergies among activities, programmes and projects such as in the development of a policy framework. The following must be given priority:

   1. Multi-stakeholder and multi-sectoral entities such as NCSDs at the national level and networks of these NCSDs at the sub-regional or regional level. Countries which do not have NCSDs must strive to establish their own and those that already have NCSDs must share their experiences. The network of NCSDs should be able to help in mentoring and in the exchange of experience and knowledge.

   2. CSOs or public interest and labour groups especially in countries where they are still weak (e.g. Brunei, Myanmar, Laos), and link or network them at the sub-regional or regional level. CSOs are specially highlighted here because there are already existing mechanisms for government and business particularly in ASEAN.

c) Adopt a multi-disciplinary approach that would harness the energies and commitments of all stakeholders, including those from other disciplines, in developing and implementing comprehensive information, education and communication program; and that would improve stakeholder understanding of issues and their ability to resolve them. Among others, the following disciplines must find their way in the chemicals agenda and help address issues within their areas of competence:

1. Media, for the much needed information dissemination and communication advocacy.

2. Educators, for education, training and skills upgrading.

3. Business and industry people, for alternative perspective and realities in business and the workplaces.

4. Local governments, for local-level policy making and implementation.

5. Scientists and medical practitioners, for research and actual treatment of chemical effects on health.

d) Governments must allow civil society to flourish and participate in nation-building. Development institutions must help such countries, for instance, by tapping the experiences in countries with developed civil society.

e) Development institutions must strengthen the capacities of governments and CSOs to build their technical capabilities and mobilise resources for their respective advocacies and activities.

f) Asia and Europe must closely work together and understand each other's needs and capacities so that together, they can come up with acceptable and equitable solutions to issues pertaining to chemicals and establish a workable management strategy.

Institutional Responses

Even prior to the Asia-Europe Environment Forum 4th Roundtable, a couple of initiatives were already being undertaken in order to respond to the institutional weaknesses already identified and described above. These initiatives, which involved many of the roundtable participants, have already produced concrete and meaningful results that are worth mentioning hereunder.

SEACSEA

In its desire to help organise CSOs in the sub-region, the environment group of the ASEAN Secretariat mounted a civil society forum that facilitated the establishment of Southeast Asian Civil Society Environment Alliance (SEACSEA) by the participating CSOs themselves. The forum also became the venue for determining the priority issues of CSOs that served as inputs to the ASEAN Secretariat and governments.

The organising CSOs created SEACSEA as a network of CSOs working on and for environmental protection (EP) and sustainable development (SD). They adopted the following vision for SEACSEA:

> "An environmentally sustainable ASEAN that promotes the well-being of its people and the global environment through partnership between civil society organizations, governments and other stakeholders"

They also agreed that SEACSEA shall aim to:

a) Strengthen the linkages and capacity of CSOs in Southeast Asian to enhance synergies and approaches to EP and SD;

b) Facilitate dialogues and partnership between civil society and ASEAN to mainstream and prioritise EP and SD into ASEAN deliberations and mechanisms;

c) Enhance environmental quality by preventing and responding to key regional, trans-boundary and shared EP and SD issues through joint action among CSOs and other stakeholders.

The CSO organisers see the alliance as a strong network with active national focal points and strong central secretariat that is assumed by a Malaysian NGO (Global Environment Center) in the interim. The CSO organisers agreed that SEACSEA shall apply for ASEAN affiliation as soon as possible so that it can already serve as the voice of civil society in ASEAN deliberations. It is currently in the development and recruitment stages.

SEApChemNet

Soon after the creation of SEACSEA, the UNITAR-Earth Council assessment project had its culminating activity in the form of a workshop among ASEAN CSOs for the following purposes: 1) To validate the findings of the study and provide comments on the recommendations; and, 2) to agree on and actually establish a chemicals network of CSOs. This workshop brought to life the Southeast Asia PILO Chemicals Network (SEApChemNet), the CSOs mechanism for promoting and communicating chemicals safety and implementation of GHS.

SEApChemNet envisions a "Southeast Asian community that is protected from the adverse effects of chemicals to human health and the environment." Its mission is "to be the leading PILO network that promotes and works for chemical safety

in collaboration and co-operation with other stakeholders in Southeast Asia." SEApChemNet endeavours to support and participate in the global management of chemical safety and facilitate and enhance the implementation of initiatives related to chemicals safety such as the GHS, all for the purpose of protecting the people and the environment of Southeast Asia from the hazards posed by chemicals and other toxic substances. In specific terms, it aims to:

a) Help ASEAN members meet the global target of implementing the GHS by 2008.
b) Strengthen civil society involvement and participation in chemicals management and sustainable development.
c) Create synergies and maximize human and financial resources through co-ordinated efforts and initiatives.
d) Develop knowledge and generate information, and disseminate these among CSOs and other stakeholders including government and the people at large.
e) Provide a venue for exchange of information, expertise, and knowledge among CSO in order to influence policies at national and local levels.
f) Forge partnerships with government and private sector in facilitating the promotion and raising awareness on the importance of GHS and sound Chemical Management System.

These objectives are expected to be attained mainly through a number of activities that would include, but not be limited to, the following:

a) Capacity-building.

b) Information, Education and Communication (IEC):
   1. Awareness-raising (e.g., publications, pictograms).
   2. Education (e.g., assistance with filling up Safety Data Sheets).
   3. Information sharing/exchange.

c) Testing and research, whenever necessary and feasible.

d) Project development and implementation.

An interim governance mechanism was put in place to fully establish SEApChemNet. It is led by a Malaysian consumer group (FOMCA) and composed of CSO representatives of Cambodia, Philippines, Thailand and Vietnam. Other ASEAN countries are invited to participate as soon as possible. SEApChemNet would immediately affiliate with SEACSEA and, if still necessary, ASEAN.

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THE NEW EU CHEMICALS POLICY: REACH

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The chemicals industry is the third largest manufacturing sector in the European Union (EU), with approximately 25,000 companies employing about 1.7 million people. Given the importance of the EU's trade relationship with the Asian countries of the Asia-Europe Meeting (ASEM), and the share of trade in chemicals and related products in total trade between the two regions[1]*, the EU's new chemicals policy, REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) is understandably of interest to Asian ASEM partners. REACH has ambitious aims to safeguard human health, reduce environmental impacts and ensure the sustainability of the EU chemicals sector. By consolidating or replacing about forty different legislative texts on which the former chemicals regime was based, REACH also contributes to clarifying the legislative environment governing chemicals in the EU and will bring benefits to the environment, industry and people in Europe and beyond.*

The Asia-Europe Environment Forum 4th Roundtable was particularly timely in light of the then-imminent adoption of the REACH Regulation by the European Parliament (EP) on 13 December 2006[2] *and provided an excellent opportunity for the European Commission (EC) to 'outreach REACH', as advocated by Gabriele Schöning of the European Environment Agency (EEA) in her contribution to this publication. Indeed, the REACH Regulation was the culmination of a lengthy legislative process involving extensive consultation of a broad range*

[1] *The Asian members of ASEM are key trading partners of the EU, accounting for one fifth of the EU's trade with the world (in 2003). EU exports to Asian ASEM members were worth EUR 134 billion (13.8% of total EU exports) in 2003. Chemicals and related products comprised a 5.5% share (€18.4 bn) of total EU imports of these products from Asian ASEM countries in 2005, whereas 14.5% (€23.2 bn) of EU exports to the Asian ASEM countries consisted of chemicals and related products.*

[2] *The Council of the European Union subsequently adopted the Regulation on 18 December 2006, formally completing the decision-making process.*

of stakeholders, including those from third countries. The EU will continue to take the views of partner countries into consideration in the various stages of implementation of REACH.

Why did the EU embark on a major revision of its chemicals policy? How does REACH work - in a nutshell? What are the costs and benefits of REACH? How have the interests and concerns of non-EU players been taken into account?

Introduction

The new European Union (EU)'s Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) entered into force on 1 June 2007 following three years of extensive negotiation involving a plethora of stakeholders both within the EU and beyond. The same day, the Helsinki-based European Chemicals Agency, ECHA, which is responsible for the registration of chemical substances and will provide expert opinion to the European Commission (EC) in the authorisation and restriction processes required under REACH, began operating. Implementation of REACH will be progressive, with the registration process spanning a period of 11 years.

REACH will oblige producers to register all chemical substances produced in or imported into the EU, above a total quantity of 1 tonne per year. Authorisation will be required for certain hazardous substances. The most dangerous substances will either be banned or progressively substituted by safer alternatives. REACH should ensure a high level of protection of human health and the environment as well as the free movement of substances, on their own, in preparations, or in articles, while enhancing competitiveness and innovation. It should also promote the development of alternative methods for the assessment of hazards of substances in order to avoid unnecessary testing on animals.

The Case for a New EU Chemicals Policy

REACH came about as a result of the growing awareness that the former legislative framework governing chemical substances in the EU, which consisted of a patchwork of many different directives and regulations that had developed over the years, contained several serious flaws that risked jeopardising human health and the environment and hampering the competitiveness of the EU chemical industry.

For one, the system did not produce sufficient information about the effects of the majority of existing chemicals on human health and the environment. Risk identification and assessment covering the potential hazards of a substance

as well as exposure of humans and the environment to it proved to be a slow process. As a result, risk management measures were likewise slow to be put in place. For instance, under the old system 'new' chemicals had to be tested before being placed on the market, whereas 'existing' chemicals were exempt from such provisions. The distinction between new and existing chemicals established 1981 as the cut-off date.[3] More than 100,000 chemicals were reported as being on the European Community market before 1981, thereby qualifying them as 'existing' chemicals and exempting them from testing requirements. Only 3,800 chemicals were registered as having been introduced to the Community market after 1981. The result is that while the old system produced some information on the properties and uses of existing chemical substances, there is generally insufficient information publicly-available that is needed to effectively assess and control chemical substances.

The allocation of responsibilities for carrying out risk assessments of substances under the old system was also problematic, with the burden placed on public authorities rather than the enterprises that manufactured, imported or used the substances. Moreover, the risk assessments were required to be comprehensive rather than targeted and use-specific, resulting in a lengthy assessment process. By 2006, only 141 high-volume chemicals had been identified as priority substances for risk assessment. Information on uses of substances under the old system also tended to be incomplete, as only manufacturers and importers of chemicals were required to provide information, whereas downstream users (industrial users and formulators) were not, with only few exceptions.

The previous system was also problematic for industry insofar as it stifled innovation by requiring that new chemicals be notified and tested starting from volumes as low as 10 kg per year (as compared to 1 tonne under REACH). This had the effect of discouraging research into new substances and alternatives, favouring the development and use of existing substances over new ones. The result was that the EU chemicals industry lagged behind its counterparts in the United States (US) and Japan in this regard.

Aims and Objectives of REACH

The two most important aims of the REACH Regulation are to improve protection of human health and the environment from the risks of chemicals while enhancing the competitiveness of the EU chemicals industry.

[3] *Set out in Regulation (EC) 793/93.*

The ideas behind the adoption of a new EU chemicals strategy was laid out in a 2001 EC Communication on a "Strategy for a Future Chemicals Policy" (COM (2001) 88). This document took stock of the system that existed at the time and called for a new strategy based on a system for the Registration, Evaluation and Authorisation of Chemicals – REACH. The Communication set out seven objectives that needed to be balanced within the overall framework of sustainable development:

a) Protection of human health and the environment.
b) Maintenance and enhancement of the competitiveness of the EU chemical industry.
c) Prevention of fragmentation of the internal market.
d) Increased transparency.
e) Integration with international efforts.
f) Promotion of non-animal testing.
g) Conformity with EU international obligations under the World Trade Organization (WTO).

How REACH Works

REACH is based on the idea that the industry itself is best placed to ensure that the chemicals it manufactures and puts on the market in the EU do not adversely affect human health or the environment. This requires that industry has certain knowledge of the properties of its substances and that it manages potential risks safely. Authorities should focus their resources on ensuring that industry is meeting its obligations and on taking action on substances of very high concern or where there is a need for official action.

REACH introduces a single system covering both 'existing' and 'new' substances under the old system and categorises substances as either non-phase-in substances (i.e. those not produced or marketed prior to the entry into force of REACH) or phase-in substances (those listed in the European Inventory of Existing Commercial chemical Substances Information System - EINECS, or those that have been manufactured in the Community, but not placed on the Community market, in the last fifteen years).

The scope of REACH is very wide, covering all substances whether manufactured, imported, used as intermediates or placed on the market, either on their own, in preparations or in articles, unless they are radioactive, subject to customs supervision, or are non-isolated intermediates. Waste is specifically exempted. Food that meets the definition of a substance, on its own or in a preparation, will

be subject to REACH, but are largely exempted from Registration, Evaluation and Authorisation. EU member states may exempt substances used in the interests of defence. Substances occurring in nature such as minerals, ores and ore concentrates, cement clinker, and so forth are not required to be registered as long as they are not chemically modified. Polymers are also exempted from the requirement to register, but, in certain circumstances, monomers in polymers have to be registered. Other substances are exempted from parts of REACH, where other equivalent legislation applies. The EC will review the scope of the Regulation five years after entry into force.

In a nutshell, the basic elements of REACH are as follows:

a) All substances are covered by REACH unless they are explicitly exempted from its scope.

b) Registration requires manufacturers and importers of chemicals to obtain relevant information on their substances and to use that data to manage them safely.

c) To reduce testing on vertebrate animals, data-sharing in exchange for payment is required for studies on such animals for both phase-in and non-phase-in substances. For other tests, data-sharing is required on request by other registrants. Communication mechanisms are set up to enable manufacturers and importers to reach agreements on the sharing of studies on vertebrate animals. Information not involving tests on vertebrate animals (e.g. in-vitro studies and QSARs) must be shared on the request of a potential registrant.

d) Better information on hazards and risks (health, safety and environmental) and how to manage them safely will be passed down and up the supply chain. The primary tool for information transfer is the well-established and familiar safety data sheet (SDS) for all dangerous substances. Commercially sensitive information is not required to be exchanged.

e) Downstream users (i.e. industrial users of chemicals, whether formulators of preparations or users of chemicals such as oils and lubricants in other industrial processes or producers of manufactured articles such as electronic components) are brought into the system. They are required to consider the safety of their uses of substances, based primarily on information from their suppliers, and to apply appropriate risk management measures.

f) Evaluation will be undertaken by the European Chemicals Agency (ECHA) for testing proposals made by industry. ECHA will also check compliance with the registration requirements and co-ordinate substance evaluation by

the authorities to investigate chemicals with perceived risks. This assessment may be used later to prepare proposals for restrictions or authorisation.

g) Substances with properties of very high concern will require authorisation once included into Annex XIV of the REACH regulation. Applicants will have to demonstrate that risks associated with uses of these substances are adequately controlled or that the socio-economic benefits of their use outweigh the risks. Applicants must also analyse whether there are safer suitable alternative substances or technologies. If there are, they must prepare substitution plans, if not, they should provide information on research and development activities, if appropriate. The EC may amend or withdraw any authorisation on review if suitable substitutes become available.

h) The restrictions provide a procedure to regulate that the manufacture, placing on the market or use of certain dangerous substances shall be either subject to conditions or prohibited. Thus, restrictions act as a safety net to manage Community wide risks that are otherwise not adequately controlled.

i) ECHA will manage the technical, scientific and administrative aspects of the REACH system at Community level, ensuring proper implementation and upholding the system's credibility with all stakeholders.

j) A classification and labelling inventory of dangerous substances will help to promote agreement within industry on the classification of a substance. For some substances of high concern there may be a Community-wide harmonisation of classification by the authorities.

k) Access to information rules combine a system of publicly available information over the Internet, the current system of requests for access to information and REACH-specific rules on the protection of confidential business information. The requirements ensure that not only manufacturers and importers but also their customers, i.e., downstream users and distributors, have the information they need to use chemicals safely.

A Step-by-Step Approach

To facilitate the transition to the REACH system, the registration provisions will be applied in a step-wise fashion to phase-in substances manufactured/imported at and over one tonne per year. For these substances, a series of registration deadlines are established for the different tonnage ranges, with the registration

period ending 31 May 2018. In addition, certain substances of high concern will need to be registered early.

ECHA is responsible for managing all registrations. About 30,000 phase-in substances (excluding intermediates) are expected to be registered over the first 11 years after the entry into force of REACH, plus a number of 'non-phase-in' substances. Given the number of registrations expected, only a simple electronic completeness check will be performed by the ECHA at this stage (the quality of the submitted dossiers may be checked in the evaluation process). If the registration is not rejected within a set deadline, then the registrant may begin (for non-phase-in substances) or continue (for phase-in substances) to manufacture or import the substance. However, this does not imply any form of approval by ECHA of the assessment or use of the substance.

Costs and Benefits of REACH

REACH creates a level playing field for existing and new substances. It simplifies the EU regulatory framework in replacing 40 existing pieces of legislation and in creating a single system for all chemicals. By closing the knowledge gap for more than 30,000 existing substances it will provide information on both their acute and long-term effects. For industry, there will be an incentive for the use and development of safer substances which will direct and stimulate innovation, since REACH gives more flexibility for chemicals used for the purposes of research and development.

As regards the costs, the extended impact assessment carried out on behalf of the Commission estimated the overall costs to fall in the range of 2.8 - 5.2 billion, with direct costs to the chemicals industry totalling approximately 2.3 billion over the first 11 years after the entry into force of the regulation. With regard to the benefits, positive occupational impact and public health impact of REACH is expected as chemicals are linked to respiratory and bladder cancers, mesothelioma, skin disorders, respiratory diseases, eye disorders, asthma, etc. Increased information on hazards and controls will help better implementation of existing legislation. Authorisation of substances of very high concern and speedier restrictions will also have a positive effect on occupational and public health and a positive environmental impact.

All in all, REACH will contribute to reduce pollution of air, water and soil as well as to reduce pressure on biodiversity. Improved control of persistent, bio-accumulative and toxic substances is needed to ensure that these substances are not polluting the environment as they are very difficult to remove. In addition, REACH will help to reduce the effects from endocrine disrupting chemicals.

Integrating Third Country Concerns

REACH does not impose obligations on manufacturers outside the EU that export products to the EU. The obligations under REACH are incumbent upon the EU actors who import these products (so-called 'importers'). Under REACH, only an EU manufacturer or EU importer can register a substance. Non-EU manufacturers exporting to the EU may appoint within the EU a representative as their 'only representative' who must comply with the obligations that would otherwise apply to the importer. This only representative may register a substance on its own, in a preparation or in an article.

The EC organised extensive stakeholder consultations and actively sought information and opinions of manufacturers and users beyond the EU's borders. Furthermore, representatives of third countries industry and governments have been involved in the process of preparing guidance documentation for industry (including small and medium sized enterprises) and competent authorities on the detailed requirements of the new system. This has been carried out in the context of REACH Implementation Projects (RIPs). Experts from EU member states, industry and non-government organisations (NGOs) – including from outside the EU – have worked closely together with EC staff to manage the detailed technical work. The guidance documents will be freely accessible to public via ECHA.

Now that REACH has been adopted, the practical implementation of the regulation is underway. Here too, representatives of non-EU governments and industry are expected to be involved through regular working groups.

Conclusions

The EU chemicals industry is one of the EU's most international, competitive and successful industries, accounting for around 30% of the total world chemicals production. At the same time, the EU imports almost as many chemicals as it exports, and a sizeable number of European production facilities belong to non-EU multinational companies. It is therefore no surprise that the new EU chemicals Regulation, REACH, has caught the attention of such a vast range of stakeholders both within and beyond the EU.

REACH will bring multiple benefits in terms of health, the environment, but also to industry in the EU and to countries to which the EU exports chemicals and related products. For instance, exports of substances that have been subject to the requirements under REACH will have benefits for consumers in

the importing country and result in fewer impacts on the environment. The industry will also benefit from the clearer legislative environment across the Single Market.

Given the importance of the trade in chemicals and related products in the overall trade relationship between the EU and the Asian Asia-Europe Meeting (ASEM) partner countries, ASEM partners should integrate chemicals policy into their co-operation – including and beyond the field of environment – to ensure a regular exchange of information and the sharing of best practice in this crucial area. The ultimate aim should be to encourage closer convergence of legislation governing chemicals in all ASEM partner countries, which would bring a myriad of shared benefits.

References

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Chapter 3

Initiatives and Opportunities in Chemicals and Hazardous Substances Management in Asia and Europe

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BEYOND COMMAND AND CONTROL: VOLUNTARY ACTIONS AND INCENTIVES FOR THE CHEMICALS INDUSTRY

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This article aims to answer three key questions, namely, (1) Are there voluntary actions by the industry?; (2) is there recognition of this contribution by governments?; and, (3) how can these contributions be further encouraged and their impact improved?

Opportunities for the Chemicals Industry Afforded by SAICM

Held in Dubai, the United Arab Emirates (UAE), from 4-6 February 2006, the International Conference on Chemicals Management (ICCA) brought to a close a three-year process of negotiations on the development of the Strategic Approach to International Chemicals Management (SAICM), which was endorsed on 9 February 2006. The ICCA is the recognised voice of the global chemical industry. It is a trusted leader in international advocacy and a leader of world class performance initiatives. ICCA sees the Strategic Approach to International Chemicals Management (SAICM) as a real opportunity for the chemicals industry to address the concern of governments and non-government organisations (NGOs). These range from rational, risk-based regulatory policies and programmes, greater consistency in national regulatory requirements worldwide and co-operative partnerships of public and private sectors to improve the capabilities for handling chemicals all over the world (capacity-building).

In three core texts of the meeting which came to be known as the "Dubai Declaration", it was decided that there should be a high-level declaration embodying the political commitment of governments and stakeholders (including the private sector); an overarching policy strategy comprising key long-term strategic elements and principles to achieve the United Nations (UN) 2020 goals as defined at the Johannesburg Summit of 2002, and a Global Plan of Action;

and, a working tool and guidance document for national governments to set priorities in chemicals management.

Voluntary Actions by the Industry: helping achieve the goal of safe global management of chemicals

The global chemical industry makes a significant contribution to many UN chemicals-related activities. It has recently launched a number of voluntary actions to help achieve the UN's goal of safe global management of chemicals and, specifically, that by 2020 in the future, chemicals are used and produced in ways that lead to the minimisation of significant effects on human health and the environment, based on sound science, risk assessment, and risk management, following the precautionary approach.

The industry's main successful initiatives and programmes include Responsible Care®, an initiative that has been running since 1985; the Global Product Strategy (GPS), launched in 2006 in Dubai; the Long-range Research Initiative (LRI), a global research initiative of the chemical industry, which funds independent research into the interaction between chemicals, human health and the environment; and, the HPV programme, launched in 1998 by chemical companies, primarily in Europe, Japan and North America, to deliver globally harmonised data and initial hazard assessments for some 1,000 High Production Volume (HPV) chemicals, as well as trade policies.

Chemical associations also play a key role, co-ordinating effectively on global negotiations and policy issues such as SAICM, international conventions and trade negotiations.

Contributions by the Chemicals Industry to SAICM

Two major chemical industry initiatives – the Responsible Care® Global Charter (RC-GC) and the GPS – were launched at a side event of the Dubai Meeting, as an important contribution to SAICM implementation. The GPS and the RC-GC are consistent with SAICM and are built upon the chemical industry's long-standing record of improving product stewardship. These voluntary initiatives are described in a little more detail below. At this side event, the industry committed to doing more and better for chemical safety throughout the supply chain, and to learning from scientific progress as well as from public perception to update its knowledge and adapt its practice, under the LRI initiative. It also committed to managing information flows to ensure chemical safety and organise public access to information to build confidence in chemicals – building on the HPV initiative.

RC-GC and GPS as Contributions to SAICM Implementation

RC-GC

The RC-GC is a commitment to improve environmental, health and safety performance, and has already been signed by more than seventy Chief Executive Officers (CEOs) of chemical companies and industry associations.[1] Launched by ICCA in 2006, the charter extends and builds upon the original elements of Responsible Care®. It focuses on new and important challenges facing the chemical industry and society including: sustainable development; effective management of chemicals along the value chain; greater industry transparency; and, greater global harmonisation and consistency among the national Responsible Care® programmes. The charter further expands the global chemical industry's actions to implement the environmental principles of the UN Global Compact.

GPS

The GPS is designed to improve the global industries product stewardship performance by recommending measures to be taken by ICCA and their members along the chemicals value chain, while allowing for considerable flexibility in recognition of the different cultural and national regulatory arrangements.

The strategy recommends a broad range of actions including: voluntary industry actions; co-operative efforts with industry groups and companies that are customers and suppliers to the chemical industry; a potential role for partnerships with inter-governmental organisations (IGOs) and other stakeholders; and, a common global position on principles of regulation for the sound management of chemicals.

These two initiatives, complementary in nature, can make a substantial contribution to the SAICM implementation in terms of risk reduction, knowledge/information and capacity building/technical co-operation.

On risk reduction, the RC-GC commits signatories to utilise clean and safe technology, establish partnership across the value chain, minimise waste, and assess product stewardship practices, whilst GPS recommends measures to complete risk characterisations and risk management recommendations for chemicals in commerce, establish global product stewardship guidelines and develop a management system approach for implementation.

[1] *Speech by Larry Washington, Corporate Vice President, Environment, Health & Safety (EH&S), Human Resources and Public Affairs, The Dow Chemical Company, 7 February 2006.*

On knowledge/information, RC-GC commits signatories to continuously improve health, safety and environment (HSE) knowledge and performance of technologies, processes and products; provide help-assistance across the value chain; share best practices through an information network; increase dialogue and partnership and help extend Responsible Care across the value chain. GPS recommends measures to periodically re-assess chemicals risk – using new and additional information; participate in scientific HSE-related research; improve the flow of hazard and safety information across the value chain and ensure public access to product stewardship information.

Lastly, in the area of capacity building/technical co-operation, RC-GC embraces commitments to give help/advice to foster the responsible management of chemicals and products across the value chain; to support national/international capacity-building initiatives; assess stakeholder expectations; share/adopt best practices to improve HSE performances and facilitate the extension of Responsible Care along the value chain. GPS recommended actions include establishing partnership with IGOs and other stakeholders and improving chemical safety downstream and at global level.

But the chemical industry's contribution is by no means confined to these two initiatives. An equally significant voluntary initiative relates to the important area of research.

LRI

LRI has become one of the industry's key signature initiatives, a long-term voluntary research investment to improve the scientific basis for understanding the impacts of chemicals on public health and the environment and to improve the methods available for assessing the associated risks.

The ultimate goals of the LRI are to fill the knowledge gap that is distorting public debate; replace misinformation with scientific data; increase the knowledge of the potential impacts that chemicals may have on the health of human and wildlife populations and the environment, especially sensitive sub-populations; replace decisions based on hazard alone with decisions based on risk; address issues such as bio-monitoring, methodologies, endocrine disruption; and provide alternatives to animal testing and persistent bioaccumulative toxic substances (PBTs).

ICCA HPV PROGRAMME

This is another major initiative of the chemical industry, a global programme focusing specifically on the assessment of HPV chemicals. Launched through the ICCA in 1998 in co-operation with the Organisation for Economic Development and Co-operation, this programme builds on early co-operative work of chemical companies with the OECD Chemicals Programme.

In this programme, co-producers of chemicals work together to share health, environmental and safety data, assess chemicals, and engage in a 'peer review' of their assessments with government experts of OECD member countries and NGOs.

End November 2006, the number of ICCA substances evaluated and accepted by OECD the Screening information Data Set (SIDS) Initial Assessment Meetings (SIAMs) was 465 but in November 2007 it was close to 600. As the EU's new chemicals legislation, Registration, Evaluation, Authorisation and Restriction of Chemical substances (REACH) entered into force in June 2007, there is some concern about competition at European level with REACH requirements but it seems now that the data collected within the HPV programme would be recognised under REACH.

Is the Industry's Contribution Recognised by Governments around the World?

At the UN World Summit in 2002, Responsible Care® received the World Summit Business Award which the International Chamber of Commerce (ICC)'s organises in collaboration with the United Nations Environment Programme (UNEP). And, at the World Summit on Sustainable Development, Responsible Care® was praised as an example of a successful global partnership.

In the run-up to the ICCA Meeting in Dubai, then European Chemicals Industry Council (Cefic) President Peter Elverding and Cefic Director General Alain Perroy received a personal letter from then UN Secretary General Kofi Annan, warmly congratulating them on the launch of the RC-GC and GPS. In his letter, Kofi Annan stated how impressed he was with the two initiatives, expressing hope that the chemical industry would be successful in attracting interest in both projects. He described them as "inspiring models of voluntary self-regulation for other industries to consider following." Clear recognition of the added-value of the two products was also given by UNEP's Executive Director, Klaus Töpfer.

A number of agreements exist with regulatory agencies in Canada, the United

Kingdom (UK), the United States (US) and some emerging countries. In the US, for example, the American Chemistry Council has an agreement with the Environmental Protection Agency (EPA) to make Responsible Care® members more easily qualify for membership in EPA's Performance Track Programme, which can reduce the number of environmental inspections for companies that participate because the Responsible Care® companies are used to thinking in terms of systems, measurements and performance improvements.

Lastly, the results of Responsible Care® commitments have been discussed with many national governments (and NGOs) in the context of reduction of emissions (air, water, waste, greenhouse gases, etc.).

How Can These Contributions Be Further Encouraged and Their Impact Improved?

Working toward this goal, ICCA Communications aims to position the chemical industry as a top sector offering solutions to sustainable development and to demonstrate that the industry cares by is acting responsibly and managing the risks e.g. by ensuring capacity-building. It strives, moreover, to increase awareness of positive contributions of chemicals to everyday health, quality of life, nutrition, and protection of the environment (benefits outweigh risks), and to demonstrate that the chemical industry is proactively listening, understanding and responding to societal concerns. Last but not least, it seeks to engage in constructive dialogue with stakeholders, and to ensure global co-ordination of the communication efforts and consistency of the messages of the chemicals industry on global issues.

TAKING THE LEAD FOR CHEMICALS POLICY CHANGE IN THE ASIA-PACIFIC: APFED'S EXPERIENCES

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ASIA PACIFIC FORUM FOR ENVIRONMENT AND DEVELOPMENT

The paper discusses the trend of sustainable material use and chemicals management in Asia and the Pacific in the recent years. Firstly, it introduces policy recommendations developed and publicised by the Asia-Pacific Forum for Environment and Development (APFED), an expert group focusing on critical issues for equitable and sustainable development of the Asia-Pacific region, in 2005. Secondly, the paper reviews some significant facts regarding chemicals management in the region, including a brief history, an increasing volume of production and consumption of electric appliances, overflowing streams of e-waste into some Asian countries, which requires urgent and proper treatment, and emerging business opportunities associated with strict regulations in chemical management recently introduced. As for the tragic and failure examples of chemicals management, cases of Minamata (Japan) Bhopal (India) and Jilin (China) are reviewed. Efforts of Asian countries in response to major international agreements such as the Basel Convention, the Rotterdam Convention and the Stockholm Convention, as well as the Waigani Convention among the South Pacific countries, are briefly touched upon; while some major progresses in chemicals control in selected countries in Northeast Asia are highlighted. As for the challenges and opportunities for the private sector, successful cases of Panasonic, Fuji Xerox and Samsung Electronics are introduced, which were

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achieved in response to the strict regulations introduced by European Union (EU), in particular, the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) directive that entered into force in July 2006. Thirdly, the paper discusses the needs for investment in further environmentally-sound technologies such as the biochemicals as subsidiarity and/or alternatives to currently used petrochemicals. Lastly, but not least, the paper emphasises the importance of further synergy between Asia and Europe regarding the promotion of sustainable chemical management. The paper reaffirms the importance of such activities as multi-stakeholder dialogues and information-sharing, as well as joint studies and pilot projects for the purpose; then, suggests that APFED and ASEF, together with other participants of the Asia-Europe Environment Forum 4th Roundtable, could play a key role in such future actions.

Introduction

The APFED Experience

The Asia-Pacific Forum for Environment and Development (APFED)[1] was established in 2001 in response to the regional plan of actions adopted at the Environment Congress for Asia and the Pacific (ECO ASIA)[2] 2000 held in Kitakyushu, Japan. APFED consisted of twenty-six environmental leaders from the region, and was chaired by Mr. Ryutaro Hashimoto, the former Prime Minister of Japan. The first phase of APFED was from 2001 to 2004 and developed its Final Report in December 2004 (APFED, 2005), which contained 107 policy recommendations for promoting sustainable development agenda for Asia and the Pacific. APFED is now in the second phase, putting its emphasis on disseminating its messages in the region.

APFED Policy Recommendations (2004)

Taking important overall policy contexts of chemicals management (Box 1) at global and regional levels into account, the APFED Final Report made concrete policy recommendations to tackle the growing need for promoting sound chemical management in the Asia-Pacific region around three major pillars. These pillars are:

a) The establishment of long-term national policies on hazardous chemicals;

[1] *See APFED website at <http://www.apfed.net/> for further information.*
[2] *See ECO ASIA website at <http://www.ecoasia.org/> for further information.*

b) strengthening regional mechanisms for sustainable chemical management; and,

c) the promotion of green chemistry.

The recommended actions were categorised into four areas, namely institution; system; capacity building; and technology.

On the institutional aspect, in order to initiate an active participatory mechanism, involving chemical experts, various organisations, and institutions from all over the region and to exchange knowledge, experience, and ideas for improving chemical management, APFED recommended the establishment of an Asia-Pacific Regional Forum on Chemicals (N-R1).

Seven recommendations were then made on the issues of systems. These include the establishment/development of:

a) A portfolio of integrated chemicals assessment for Asia-Pacific (N-R2);

b) a chemicals registration and inventory system (N-R3);

c) regional strategies of hazardous chemical phase-out (N-R4);

d) a "cradle-to-cradle" management system of chemicals (N-R5);

e) a partnership for safe disposal of outstanding chemical stockpiles (N-R7); and,

f) a chemicals recycling system and the voluntary initiatives of chemical industries (N-R8).

With respect to capacity building, it suggested to promote:

a) Chemically-conscious consumers (N-R9);

b) green chemistry research and development (N-R10); and,

c) an introduction of economic instruments (N-R11).

Box 1: Overall Policy Context on Chemicals Management

The prototype of the policy statement on chemical management was set out by Chapter 19 of Agenda 21 adopted in 1992. In the light of the growing threats posed by hazardous chemicals to the environment and human health, Agenda 21 proposed six programme areas namely:

a) Expanding and accelerating international assessment of chemical risks;

b) harmonisation of classification and labelling of chemicals;

c) information exchange on toxic chemicals and chemical risks;

d) establishment of risk reduction programmes;

e) strengthening of national capabilities and capacities for management of chemicals; and,

f) prevention of illegal international traffic in toxic and dangerous products.

The Johannesburg Plan of Implementation highlights in Section III on changing unsustainable patterns of consumption and production, a series of policy targets on chemical management. It proposed:

a) To minimise the adverse effects on human health and the environment;

b) to promote science-based risk assessment and management procedures; and,

c) to implement the new globally harmonised system for the classification and labelling of chemicals and make them fully operational by 2008.

Concerning technology, it recommended the promotion of technology for the safe disposal of hazardous chemicals (N-R12), through which, for instance, there exists a regional co-operation system to facilitate such technology transfer among member countries and to accelerate the safe and environmentally-sound management of chemicals.

Facts in Asia

Brief History of Accidental Chemical Discharges in Asia

Accidental chemical discharges could happen anywhere in the world and Asia is not the exception. Historical cases include the following.

Box 2: Minamata Disease (Japan, 1956)

A case of Minamata disease caused by the methyl mercury discharged by a chemical factory in Japan provides us with bitter lessons. Inappropriate treatments of toxic chemical substances for the duration of 1932 to 1968 resulted in creating and torturing more than 14,000 victims with a neurological syndrome by severe mercury poisoning. It has been fifty years since the disease was official 'discovered' in 1956. The case is not yet fully solved and lawsuits and claims for compensations continue even to this day.

Symptoms included ataxia, numbness in the hands and feet, general muscle weakness, narrowing of the field of vision and damage to hearing and speech. In extreme cases, insanity, paralysis, coma and death followed within weeks of the onset of symptoms. A congenital form of the disease also affected fetuses in the womb. Some were given birth with the congenital disease; and many were stillborn.

Local residents knew that something was wrong even before 1956. From around 1950 and onwards, local cats had been seen to have convulsions, go mad and die. Even after the official discovery of the disease in 1956, It took another twelve years for the Japanese Government to officially admit the cause of the disease was the methyl mercury discharged by a local chemical factory of Chisso Corporation. Delayed actions of the Government authorities and Chisso Corporation resuleted in expanding the number of victims and kept patients in the dark for years.

During the fifty years history of Minamata disease since 1956, struggles of the victims included fights not only against the disease itself, Chisso Corporation and the Government, but also fights against misunderstanding, discrimination and ostracism by the local community. The livelihood of local community was highly dependent of the chemical factory – it is reported that a half of municipal revenue was from the factory and factory employees.

This has prevented many victims from speaking-up, joining the lawsuits and claiming for compensations. It was only in October 2004, just two years ago, that the Japan's Supreme Court handed down the first verdict recognising the responsibility of the national and prefectural governments and encouraged the victims could not speak-up in the past. Victims are getting older in the fifty years and almost two-thirds of officially recognised victims had already died; however, 4,000 additional victims are applying for the Government official recognition after 2004 verdict, hoping that their human rights will be fully regained within their lifetime.

Source: http://www.nimd.go.jp/english/index.html

1956: Minamata (Japan)

A case of Minamata disease was caused by methyl mercury discharged by a chemical factory in Minamata City, Japan. Inappropriate treatment and discharge of toxic chemical substances by Chisso Corperation continued from 1932 to 1968, which resulted in creating and torturing more than 14,000 victims with a neurological syndrome. The disease was officially 'discovered' in 1956 but it took another 12 years to shut down the source of pollutants.

1984: Bhopal (India)

The Bhopal Disaster of 1984 was caused by the accidental release of 40 tonnes of methyl isocyanate (MIC) from a pesticide plant of Union Carbide India, Limited (UCIL) located in the heart of the city of Bhopal, India. A total number of victims is estimated as many as 600,000[3]. The plant was abandoned and remaining toxic chemicals at the site are still discharging into the environment.

Box 3: Bhopal Chemical Plant Explosion (India, 1984)

The Bhopal Disaster of 1984 was an industrial disaster that was caused by the accidental release of 40 tonnes of methyl isocyanate (MIC) from a pesticide plant of Union Carbide India, Limited (UCIL) located in the heart of the city of Bhopal, in Madhya Pradesh, India.

This toxin manifested its primary acute effects on the lungs and eyes of the victims who came in contact with the gas. It is believed that MIC released from the plant killed 2,000 - 3,000 lives overnight and further larger numbers of people, estimated as 15,000, died within the next few years. It is also believed that the toxin is responsible for chronic health effects in an additional 100,000 to 150,000 survivors. Chronic lung effects, i.e., pulmonary fibrosis, currently appear to be the main cause of morbidity and mortality among the surviving population. A total number of victims, awarded compensations, counted for almost 600,000.

Small amount of compensations were awarded to the victims and the rest was held as the compensation fund. The plant was abandoned and remaining toxic chemicals at the site are still discharging into the environment. It has been twenty-two years from the historical accident, but the Bhopal case is not closed yet at all.

Sources: http://www.bhopal.com; http://www.mp.nic.in/bgtrrdmp

[3] *This is larger than the number of victims of the similar case happened at Seveso, Italia in 1976, which is estimated as 220,000.*

Box 4: Jilin Chemical Plant Explosion (China, 2005)

> On November 13, 2005, a series of explosion occurred within an hour at Petrochemical Plant in Jilin City, Jilin Province, China. The explosions killed five people, injured about seventy people, and caused the evacuation of over 10,000 residents. About 100 tones of benzene and nitrobenzene were discharged into the Songhua River, and a toxic slick drifted down the Songhua River and the Amur River over subsequent weeks ended up flowing into the Strait of Tartary, after going through the Chinese and Russian teritories.
>
> In the cities along the Songhua River and the Amur River, water supplies were suspended durting the period that the toxic slick passed by. For example, water supply in Harbin, the capital of Heilongjiang, with more than three million urban residents, was suspended for four days, school was closed for a week and some residents evacuated from the city.
>
> Sources: http://news.bbc.co.uk/2/hi/asia-pacific/4505650.stm; http://english.people.com.cn/200511/15/eng20051115_221428.htm

2005: Jilin (China)

A series of explosion occurred at Petrochemical Plant in Jilin City, China. The explosions directly killed 5 people, injured about 70 people, and caused the evacuation of over 10,000 residents. About 100 tones of benzene and nitrobenzene were discharged into the Songhua River, drifted down the Songhua River and the Amur River ended up flowing into the Strait of Tartary.

All the cases underlines the strong needs for proper knowledge of chemical substances, proper managemnt skills, proper preventitive actions, and proper post-accident actions. Once the toxic chemicals discharged into the environment, its consequences are enormous and cannot be easily recovered.

In the Jilin case, the real consequences of the acident are not known yet. In the Bophal case, it is far from solution even after twenty-two years. In the case of Minamata, it has been already fifty years from its official discovery, but the case is not closed yet.

Becoming a Production and Consumption Centre of Electric Appliances

Asia is rapidly becoming a production and consumption center of the world. This is particularly true with electric appliances.

Asian makers overwhelmingly dominate the manufacturing of mobile personal computers (PCs) supplied to all over the world. For example, in 2005, worldwide mobile PC production amounted to 61.9 million units, of which 82.6 percent, or 51.2 million units, were made by contract manufacturers located in Asia. Undoubtedly, China was the leading manufacturer with its 85% of the world's mobile PC manufacturing capacity (Electronic Business Asia magazine, 2007). Consumption of electric appliances is not as high as manufacturing; however, it was estimated that in 2005, 43% of total global subscribers to cellphones were from Asia-Pacific (In-Stat, 2006).

E-waste Flows into China and India

A large amount of e-waste is flowing into Asian countries mainly from developed countries; and a substantial part of the e-waste is not appropriately treated. There is no reliable statistics available on how much e-waste is flowing into Asia or circulating within Asia for inappropriate 'recycling' operations; however, it seems that at least a part of exported electric appliances are coming back to their birth places after their product lives end.

A report prepared by The Basel Action Network (BAN) and Silicon Valley Toxics Coalition (SVTC) in 2002 (BAN and SVTC, 2002) introduced an insider story by a recycling operator in the United States (US). The story indicates that around 80% of what comes through their doors have been exported offshore to Asia and 90% of that was to China.

E-waste is coming not only from the US, but also from countries in Asia such as Japan and Korea. It is also believed that the growing amount of electric appliances now consumed in China will soon become the major source of e-waste. India is also known as a big recipient of e-waste and faces inappropriate treatment of e-waste.

Inappropriate 'recycling' operations include, for examples, melting circuit boards over makeshift grills, acid stripping of chips and printed circuit boards, burning wires to recover metals, etc. Toxic substances released from such operation include: PCDDs, PCDFs, PBDD, PBDFFs, PBDEs, PAHs, PCBs, Heavy Metals, HNO3, HCl, Cl2, SO2, and lead-tin fumes, respirable suspended particulates (RSP), etc. As a consequence, toxic substances are damaging the health of laborers, as well as contaminating air, soil and surface and ground water (BAN and SVTC, 2002).

Business Opportunities with Strict Chemical Management Regulations (WEEE, RoHS and REACH)

Manufactures of electric appliances in Asia are facing great business chances; at the same time, they are facing requirements of strict chemical management, namely, the Waste Electrical and Electronic Equipment (WEEE) directive; the Restriction of the Use of Certain Hazardous Substances in Electrical and electronic Equipment (RoHS) directive; and the Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH) legislation. Not only the major manufactures of electric appliances, but also the suppliers of electronic parts, manufactures and vendors of other goods as well, are all doing their best to meet the requirements not to lose their market shares in Europe and to maximise their business opportunities.

Major Efforts of Asian Countries

Efforts to deal with chemicals include those related to multilateral environmental agreements such as the Basel Convention (on the Control of Transboundary Movement of Hazardous Wastes), the Rotterdam Convention (on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade) and the Stockholm Convention (on Persistent Organic Pollutants), as well as the Waigani Convention among the South Pacific countries. Most Asian countries have welcomed the Strategic Approach to International Chemicals Management (SAICM) and Intergovernmental Forum on Chemical Safety (IFCS) processes, and actively participated. WEEE, RoHS, REACH and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) brought challenges for many manufactures and other stakeholders in Asia, but still these challenges are addressed step by step. National regulations are also gradually being developed.

Response to International Agreements

With respect to the chemical-related international agreements, a positive progress has been made on the development of the Stockholm Convention and the Rotterdam Convention. Both conventions were adopted and came into force in the timeframe that was set out by paragraph 23 of the Johannesburg Plan of Implementation. Most Asian countries have ratified both conventions recognising them as key international policy tools for promoting environmentally sound management of chemicals in addition to the preceding Basel Convention which came into force in 1992.

The 'number' of the convention parties is, however, only an initial indication interest held by many Asian countries. What really matters is how to transform these conventions into real on-the-ground action in each country. While the 'number' of the Asian country parties to these conventions is comparable to

those of the other regions, Asian countries need to take more proactive actions in facilitating the development of national policies and implementation activities.

For example, under the Stockholm Convention, only four Asian country parties have prepared national implementation plans, so far. With respect to the Rotterdam Convention, only seventeen countries have notified the import responses under the prior informed consent schemes of the Rotterdam Convention. Likewise, just twenty-one countries reported on the trade of hazardous wastes under the Basel Convention as of 2006. Indeed, Asian countries need to take actions necessary to implement relevant chemical related conventions at the national level.

Progress of Chemicals Control in Northeast Asia

In most countries, environmental regulation of chemicals started with the introduction of emission standards. The air pollution control law and the water pollution control law were typical examples of this type.

In the second stage, the control of production and importation of chemicals is introduced, in response to wide spread use of various chemicals. Registration and evaluation of chemicals become an important part of the system. These kind of measures were taken around 1990 in Northeast Asia, except for Japan, where the first law of this type was introduced as early as 1973, as a response to a serious pollution incident with printed circuit boards (PCBs).

Then, chemicals control becomes further sophisticated, as risk management measures are introduced in the light of the precautionary principle. Risk reductions by private companies and risk communications among various stakeholders are considered essential. Measures such as Pollutant Release and Transfer Register (PRTR) and Material Safety Data Sheets (MSDS) have been introduced. This type of measures has become important in Northeast Asia since the late 1990s.

China

China introduced the Law for Safe Management of Chemically Dangerous Materials in 1987. This law was replaced by the Law for Safe Management of Dangerous Chemicals in 2002, which introduced MSDS in China. In 2003, registration of new chemicals became mandatory, and in 2005 a regulation equivalent to RoHS was introduced.

Korea

Korea introduced Toxic Chemicals Control Law (TCCL) in 1990. This law was

amended substantially twice. In 1996, the first amendment introduced PRTR in Korea. In 2004, the law was amended to expand its evaluation criteria to include environmental hazards, and to give the leading role to the Environmental Authority.

Japan

Japan introduced a law to control production and importation of hazardous chemicals as early as 1973. The law was amended many times since then. A major addition was made in 1999, when the Japanese PRTR law was introduced. The law also introduced MSDS in Japan. Then, the Law for Evaluation and Regulation of Chemical Substances of 1973 was amended in 2003 to expand its evaluation criteria to include environmental hazards, and to introduce a risk based evaluation and regulation system.

Box 5: Progress of Chemicals Control in North East Asia

China	
1987:	Law for Safe Control of Chemically Dangerous Materials (Repealed in 2003)
2002:	Law for Safe Management of Dangerous Chemicals (introduction of MSDS)
2003:	Regulation for Environmental Management of New Chemicals (Registration of new chemicals at the National Chemicals Registration Center)
2005:	Regulation to Control Pollution Arising from Electronic Information Products
Korea	
1990:	Introduction of the Toxic Chemicals Control Law (TCCL)
1996:	Amendments to TCCL (introduction of PRTR)
2004:	Amendments to TCCL (Overall coordination by the Environmental Authority, and Introduction of environmental toxicological test)
Japan	
1973:	Law for Evaluation and Regulation of Chemical Substances
1999:	Introduction of the PRTR Law
2003:	Amendments to the Law for Evaluation and Regulation of Chemical Substances (Introduction of environmental toxicological test, and risk based regulation)

Although a lot of progress has been made in Northeast Asian countries such as China, Korea and Japan, to control chemicals for the environment, a lot of

improvements are still considered necessary. For examples, piecemeal approaches by many related laws and regulations on chemicals need to be improved, more efficient and transparent risk communications need to be introduced, and more harmonised standards and practices need to be introduced at the regional level.

Challenges and Innovations by Private Sector

Challenges and innovations are also made by the private sector. Responding to strict regulations introduced by the European Union (EU), in particular responding to the RoHS directive that entered into force in July 2006, many manufactures of electric appliances eliminated designated chemical substances from their products.

Lead-Free Challenge (Panasonic Case)

Matsushita Electric Industrial Co., kown as Panasonic for example, started their research and development on this matter in 1994, which was even before the RoHS initiative was sireously discussed among EU countries. In 1996, an alternative lead-free solder, which was the amalgum of tin, silver and others, was preliminarily applied to 700 electronic memory device so called "phase change rewritable disk drive." Panasonic has further developed this technology and applied to its music player, the so called Mini-Disk Player, on a mass-production basis for the first time in the world, which was in 1998. Panasonic achieved eliminating tin-lead soldering from its all production lines in 2003, almost three years in advance of the RoHS entering into force.

Panasonic is still a front runner in the field of lead-free challenges. It has announced that lead was now elimnated from their plasma display panel (PDP), which is currently one of the exceptional items of RoHS Directive.

Box 6: Lead-freeing Challenges by Panasonic (Matsushita Electric Industrial Co.)

1994: R&D on lead-free soldering started: from (Sn-Pb) to (Sn-Ag-Cu), (Sn-Ag-In-Bi), (Sn-Zn-In-Ag), etc.
1996: Preliminary application (PD-Drive)
1998: First application to mass-production (MD Player)
2003: Lead-free in soldering of all products achieved
2006: Lead-free in plasma display panel (PDP) achieved

Source: http://panasonic.co.jp/ped/en/environment/index.html

This is a good example of regulatory policy leading and promoting the efforts of the business sector. Once a clear direction is set and a lead-time for changes announced, the private sector can meet the regulations by all means, and even prior to the regulations entering into force, through which individual corporations intend to avoid business risks and to maintain their competitiveness in the market.

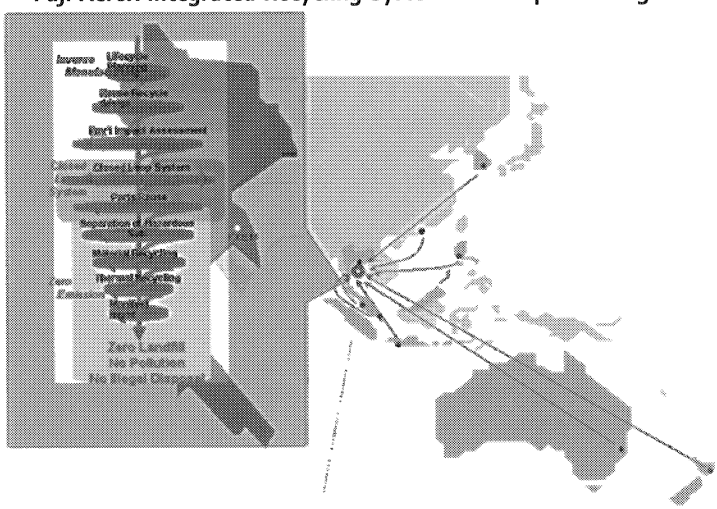
Advanced Recycling and Chemical Management (Fuji Xerox Case)

As discussed earlier, Asia is becoming a production and consumption centre of electric appliances and also becoming the recycling centre of e-waste. Without proper arrangements, developing countries may keep accepting e-waste from others and operate inappropriate recycling activities.

Box 7. Advanced Recycling and Chemical Management by Fuji Xerox

A regional integrated recycling system covering nine countries in Asia, with a centralised recycling centre in Thailand, was established and launched in December 2004. Nearly 100% recycling (material and thermal recycling) is achieved; while four hazardous parts are separated and sent to Japan for proper treatment.

Fuji Xerox Integrated Recycling System in Asia-pacific Region



Source: http://www.fujixerox.co.jp/release/2004/1207_recycling_system.html

Fuji Xerox established a regional integrated recycling system covering nine countries in Asia. The centralised recycling centre was established in Thailand with a view to ultimately achieve zero emission.

Accepting such a recycling centre could be a risk if proper arrangements are not made and followed. Two important conditions were imposed by the Thai government, when they agreed to set up the recycling centre in Thailand. These conditions were:

a) No final disposal is allowed in Thailand; and,
b) making sure that hazardous parts shall be transferred and properly treated in Japan

Chemicals Control Program (Samsung Electronics Case)

In Korea, SAMSUNG ELECTRONICS is a leader in establishing sound chemical management. In July 2004 it announced a phased elimination of hazardous chemical substances from its mobile phones, TVs, computers, and so forth. In

Box 8: Chemicals Targeted by Samsung Chemicals Control Programme

Substances banned in all applications:
- Cadmium and compounds
- Lead and compounds
- Mercury and compounds
- Hexavalent chromium and compounds
- Polybrominated diphenyl ethers (PBDEs)
- Polychlorinated biphenyls (PCBs)
- Polychlorinated terphenyls (PCTs)
- Polychlorinated naphthalenes (PCNs, with three or more chlorine substituents)
- Ozone depleting substances (CFCs, HCFCs, Halons)
- Asbestos

Substances banned in some designated applications:
- Formaldehyde
- Short-chain chlorinated paraffins
- Azo colorants
- Nickel and compounds
- Organotin compounds
- Arsenic and compounds

Substances considered for phase-out in future:
Phthalates
PVC
Beryllium and compounds
Other chlorinated flame retardants
Other brominated flame retardants

Source: http://www.samsung.com/uk/aboutsamsung/environsocial.htm

February 2006, Samsung LCD TVs and monitors obtained RoHS certification by the Nemko Group, a private Norwegian organization offering testing, inspection and certification services concerning products, machinery, installations and systems worldwide.

Needs for Investment in Further Environmentally Sound Technology

In order to further improve environmental soundness of chemical management, it is necessary to consider not only the improvement of conventional technologies and management systems, but also development and promotion of 'greener' alternatives to currently used toxic chemicals.

Constraints of Petro-Chemical and Promotion Needs for Bio-Chemicals

To this regards, the importance of biochemicals as substitutions for petrochemicals should not be underestimated. In technological innovation, government regulations never succeed in developing pre-emptive regulatory measures for newly emerging petrochemicals. To minimise the risks of chemicals production and use, investment in research and development of bio-chemicals should receive further attention.

Anticipated Effects

The effects of biochemical use are at various folds, but the major direct substation of biochemicals for petrochemicals is found at the upstream of chemical production processes. For instance, the oil distraction from crops is far less harmful than the oil extraction from petroleum. In the case of phenol, making phenol from plants is estimated to generate 80 percent less pollutants than making phenol from petroleum. Another example is limonene. Limonene derived from citrus fruit

can perform the function similar to TCE (trichloroethane), a petroleum based solvent. Such indirect substitution even helps reducing pollution at the upstream chemical production level as well as at the downstream chemical disposal level.

Expected Benefits

The benefits of biochemicals range from various levels. The environmental benefits of biochemicals are unequivocal. The use of biochemicals reduces upstream and downstream pollution. Highly biodegradable chemicals, in most cases, can be disposed of safely and inexpensively, resulting in less downstream pollution.

The health benefits are also clear that businesses can improve the work environment for their employees by using biochemicals and thus reducing health and safety hazards and risks as biochemicals are lower in toxicity, flammability and corrosivity than their petrochemical counterparts.

Compliance benefits can be also highlighted in this connection as bio-chemicals provide business with a strategically important compliance tool with regulatory measures and mechanisms such as those provided for by environmental authorities.

Biochemicals are becoming more competitive and even more favourable to the business in the market demonstrating their economic benefits. Bio-chemical also support the rural community development (community development benefit).

Enabling Conditions

Preconditions for advancing biochemical applications include the following. First, the proper lifecycle assessment needs to be integrated in planning process of chemical management. For instance, even if the price of the biochemical is higher, the overall cost of using the biochemicals may be lower when all costs associated with using the comparable petrochemical are taken into account such as disposal costs and disposal liability costs. Administrative cost of reporting on the use of petrochemical can be also taken into account.

The consumers' awareness on the benefit, costs and risks of chemicals need to be bolstered. The green market development and green consumer initiatives will further make the business climate more favourable to the use of biochemicals.

Opportunities for Further Synergy between Such Efforts in Asia and Europe

Although challenges to realise safe chemicals management remain enormous, at the same time, a lot of encouraging developments have taken place in many countries in the Asia-Pacific region. Certainly synergies exists between Asia and Europe in this respect; and further promotion of such synergies is essential. Possible collaborations could be designed around activities such as:

a) Multi-stakeholder dialogues and information sharing; and

b) joint studies and pilot projects.

Perhaps, APFED, the Asia-Europe Foundation (ASEF), and others present at the Asia-Europe Environment Forum 4th Roundtable can join hands to help promote sustainable chemicals management in Asia. As for Asian counterparts, members of recently launched Network of Researchers and Research Institutions (NetRes)[4] of APFED and others could play key roles in conducting such activities and contribute to enhance synergies between Asia and Europe.

[4] *Current members of NetRes (as of August 2007) are Chinese Society for Environmental Sciences (China), Korean Environment Institute (Korea), Singapore Institute of International Affairs (Singapore), Thailand Environment Institute (Thailand), The Energy and Resources Institute (India), University of South Pacific (Fiji) and Institute for Global Environmental Strategies (Japan).*

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CREATING A CRITICAL MASS TO INFLUENCE INTERNATIONAL POLICY DIALOGUE IN CHEMICALS MANAGEMENT

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Since 1992, international chemicals policy has been based on a well defined common ground viz. the United Nations Conference on Environment and Development (UNCED)'s Agenda 21, Chapter 19. However, the conventions implementing these goals are not always well-aligned. The way and extent by which the targets are being implemented also vary between the individual countries and different regions. Now, the Strategic Approach to International Chemicals Management (SAICM), offers a chance to improve inter-institutional co-ordination and reduce the gap between industrialised and developing countries on sustainable chemicals management issues. This paper reflects on the role of networks, recalling some of the key statements put forward during the Asia-Europe Environment Forum 4th Roundtable discussions, and makes an attempt to provide provisional answers to three central questions, namely, (1) How to encourage governments to set up focal points for chemicals issues, particularly given present participation levels of Asian countries?; (2) Pending the creation of such focal points, where and how can civil society and industry engage governments?; and, (3) How can various actors improve the quality of research and recommendations in chemical management in order to present a credible front?

To find answers to these questions, there is a need to explore the lessons learned from existing international chemicasl-related policies and associated networks, in this paper taking as one example, the European Environment Information and Observation Network (Eionet) that is co-ordinated by the European Environment Agency (EEA). Besides the challenges of networking between governments and institutions, it has been increasingly recognised that it is not sufficient to involve authorities but that engagement is needed from a wider range of stakeholders such as business, the research community, and civil society. Aspects of community participation that need to be considered include a variation in public awareness in different stages of the policy cycle, instruments for community involvement

(again using the EEA products and services as an example) and approaches to allow active contributions and initiatives from civil society. Further the paper looks into elements from (technical) information networks to find out what makes networks sustainable and efficient and to deduce provisional answers to the three guiding questions.

International Chemicals-related Policies

As early as 1992, the United Nations Conference on Environment and Development (UNCED) in Rio, Brazil, identified the need for global action and enhanced international co-operation in the field of chemicals safety. The UNCED goals regarding chemicals, as outlined in Chapter 19 of the Agenda 21, define the common understanding of safe chemicals management amongst policymakers. Chapter 19.4 defines the following programme areas for action:

a) Expanding and accelerating international assessment of risks;
b) harmonisation of classification and labelling;
c) information exchange on toxic chemicals and chemical risks;
d) establishment of risk reduction programmes;
e) strengthening of national capabilities and capacities for the management of chemicals; and,
f) prevention of illegal international traffic in toxic and dangerous products.

In addition, the UNCED goals highlight the need for enhancement of international co-operation.

Looking at the different areas addressed in this list of commitments, it is evident that sound management of chemicals and hazardous substances has to involve many players. To enhance co-operation, different networks have been set up under the umbrella of the UN, the World Health Organization (WHO), the Organisation for Economic Co-operation and Development (OECD), the Food and Agriculture Organization (FAO) and others. However, the method and extent by which the targets are being implemented still vary between individual countries and different regions.

This pertinent point was further underlined in the discussions during the Asia-Europe Environment Forum 4th Roundtable in Brussels, Belgium on 30 November-1 December 2006. As Viveka Bohn, former President of the SAICM Preparatory Committee, highlighted, there is a growing gap in chemicals management between industrialised and developing countries and illegal chemical traffic

is increasing. Yong Hwa Kim of the Korean Institute of Toxicology reported on the challenges in creating the capacities and capabilities to conduct a risk assessment, integrating state-of-the-art development. Kim further argued that risk assessment certainly requires a multidisciplinary approach and a high level of knowledge and resources. This investment is rewarded by a switch from a retrospective to a prospective approach and the establishment of proper procedures to set air and water quality standards. Treatment of contamination after use is replaced by assessment and regulation of chemicals before they enter the market and the environment.

The UNCED goals for safe chemicals management encounter other environmental strategies from different environmental protection starting points. For instance, CLRTAP (the UNECE convention on long range transport of air pollutants), with its focus on clean air, is dealing with the long-range transport of persistent chemicals. Marine conventions as well as the European Union (EU)'s Water Framework Directive address the pollution of marine and inland waters from hazardous substances as one of the factors preventing a good status of water bodies.

The roundtable discussion further pointed out that some regional policies reach out beyond the borders of the area for which they had been developed. Nadia Haiama of Greenpeace, for instance, included REACH and electronic waste as the two main priorities of the work on toxics by non-governmental organisations (NGOs), while Kim Myung Ja, Member of the Korean National Assembly, highlighted the importance of production and the use of electronic products for the Asian region.

At the same time researchers, from Boston University in the United States (US) running an ongoing research project on hazardous substances management in Europe and globally, state that the expansion of EU hazardous substances and e-waste policy were already influencing firms and political actors beyond Europe's borders – from the US to China and elsewhere. The authors especially highlight the global influence of the Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH), WEEE (Council directive 2002/96/EC on waste electrical and electronic equipment) and RoHS (Council directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment) (Selin and VanDeveer, 2006).

Despite Chapter 19 as common ground and success stories from individual conventions and initiatives, the overall picture of international chemicals management resembles a patchwork of unconnected parts. The problem is well spotted and addressed in the SAICM Overarching Policy Strategy:

"VII. Implementation and taking stock of progress

23. To sustain an integrated approach to managing chemicals, each Government should establish arrangements for implementing the Strategic Approach on an inter-ministerial or inter-institutional basis, so that all concerned national departmental and stakeholder interests are represented and all relevant areas are addressed. To facilitate communication, nationally and internationally, each Government should designate a Strategic Approach national focal point to act as an effective conduit for communication on Strategic Approach matters, including invitations to participate in meetings and information dissemination. The Strategic Approach national focal point should be a representative of the country's inter-ministerial or inter-institutional arrangements, where such arrangements exist."

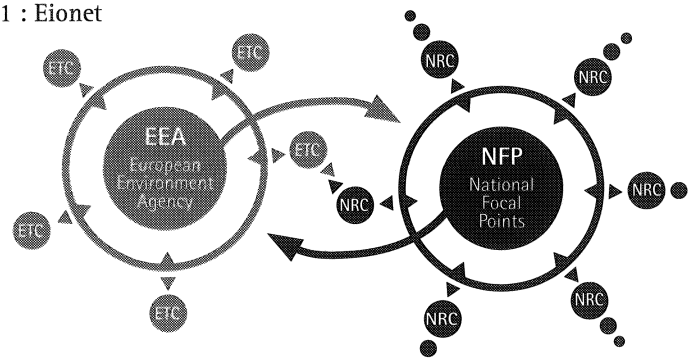
Considering that many institutions and conventions have already built their own networks to implement their work and experience shows that the situation can soon become very complex. To connect these initiatives in a meaningful way, there is a need to investigate what defines a well-functioning network, what are the characteristics of a national focal point and what composes a constructive and successful interaction.

Networks and the Challenges of Networking: the EEA example

The European Environment Agency (EEA) can serve as an example with its network for the collection of environmental information, the European Environment Information and Observation Network (Eionet).

Eionet is a partnership network of the EEA and its thirty-two member and six participating countries. It consists of the EEA itself, the European Topic Centres (ETCs) and a network of around 900 experts from thirty-seven countries in over 300 national environment agencies and other bodies dealing with environmental information. These are the national focal points (NFPs) and the national reference centres (NRCs).The Eionet partnership is crucial to the EEA in supporting the collection and organisation of data and the development and dissemination of information. Information technology infrastructure (sometimes referred to as e-Eionet) supports the organisations and individuals in the network.

Figure 1 : Eionet



ETCs

ETCs are centres of thematic expertise contracted by the EEA to carry out specific tasks identified in the EEA strategy (five-year work programme) and the annual management plans. They are designated by the EEA Management Board following a Europe-wide competitive selection process and work as an extension of the EEA in specific topic areas. Each ETC consists of a lead organisation and specialist partner organisations from the environmental research and information community which combine their resources in their particular area of expertise. The ETCs, working together with member and participating countries, facilitate the provision of data and information from the countries and deliver reports and other services to the EEA and Eionet. There are currently five ETCs covering the following topic areas:

a) Air quality and climate change (ETC-ACC);
b) biological diversity (ETC-BD);
c) landuse and spatial information (ETC-LUSI);
d) water (ETC/W); and,
e) resource and waste management (ETC-RWM).

NFPs

NFPs are the main contact points for the EEA in the member countries. They are in charge of co-operation with the EEA and the ETCs and organise national co-ordination of activities related to the EEA strategy. Their working methods differ from country to country. This partly reflects the diverse nature of the national environmental systems within which they are based. For example, some NFPs are located in environmental agencies, others are part of environment ministries; some are in centralised national administrations, whereas others operate in decentralised, sometimes federal systems.

NFPs maintain and develop the national network, facilitate and co-ordinate contacts, requests and deliveries at the national and EU level. In addition, they act as advisers to their EEA Management Board members and develop contacts with other relevant networks such as Eurostat. In order to promote key EEA publications, many NFPs organise launch events and issue press releases.

NRCs

NRCs are nominated by member countries. They are nationally-funded experts or groups of experts in organisations which are regular collectors or suppliers of environmental data at the national level and/or possess relevant knowledge regarding various environmental issues, monitoring or modelling. NRCs are established in specific areas of environmental activity, like air quality, climate change, river quality, waste generation, biodiversity, and energy. NRCs play a role in technical co-ordination of these topics and work with the EEA and the relevant ETCs. The NRC structure varies in accordance with the requirements and priorities of the EEA strategy. Currently (2006) the number of NRC-areas is 24. NRCs on chemicals have been created only recently, following a Management Board decision of April 2005. One of their tasks of the NRC chemicals is to provide cross links to chemical-relevant activities in other areas, such as air and water quality or environment and health.

Operating the Eionet

Finally networking is about connecting people. The EEA therefore holds meetings with the NFP-Eionet group three times a year to provide a forum for co-ordinating Eionet support to the EEAs work programme across activities. The group has had notable success especially on cross-cutting activities.

Each ETC regularly invites the relevant NRCs to Eionet workshops where they present the results of their activities and discuss and agree the way forward with the country representatives. These workshops help to maintain and strengthen good contacts between the ETCs and NRCs and between the countries themselves.

This intensive co-operation has enabled the EEA to collect and distribute timely, relevant and targeted information to support environmental policy. The Eionet provides a platform from which countries have benefited from sharing advice, expertise and experience in developing national capabilities, particularly in the areas of data collection and management and in the production and dissemination of policy-relevant information (EEA 2004).

Situation in South and Southeast Asian Countries

There is no structure comparable to Eionet in South and Southeast Asian countries but awareness is rising in the region of the importance of institutional networking and information-sharing. Currently, several initiatives aim to strengthen environmental networking such as the Mekong River Commission (MRC), regional partnerships for sustainable development, the Bali Strategic Plan, and the United Nations Environmental Watch Proposal (UNEP 2006). However, because of different legislative and administrational structures in each of the countries, the starting conditions in the region are harder than in the EU with its acquis communautaire of harmonised environmental and especially chemicals legislation.

International conventions and multilateral agreements trigger the evaluation of regional co-operation arrangements on the safe management of chemicals. Assessment and gap analysis are carried out under the Stockholm Convention (National implementation plans), the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and SAICM (National profiles) (IOMC 2001, UNITAR/ILO 2005, SAICM 2007).

Depending on the country, different sectors are covered by chemicals legislation, chemical classification and hazard communication systems (UNITAR/ILO 2005, LESTARI 2006). GHS implementation, for instance, is progressing in industrial workplaces and agriculture, but less in consumer products. Major challenges include lack of: finance, human resources, expertise/capacity, awareness, co-ordination and co-operation amongst relevant agencies, time constraints and low participation from small and medium enterprises (SMEs) (LESTARI 2006).

Community Participation

Typically, networks as described above are most experienced in connecting government institutions or specified expert groups as they have originally been set up for this purpose. How does civil society link to these networks? Heterogeneous stakeholder groups, fluctuations in public awareness and different levels of involvement all call for a differentiated approach using various instruments and developing dedicated ways to involve civil society.

Stakeholder: NGOs, industry, scientific community

One way in which information flows and opinion-building are channelled is via NGOs. Some organisations, especially in Europe are well-established and

powerful. Similarly in Asia, NGOs are become increasingly influential by bringing local knowledge and interests into the policy debate. Both the industry and the scientific community both have their interest groups too. However, input from all these organisations might not always be enough to derive a balanced picture. Individual members of the public or small enterprises might find it difficult to connect to and to navigate through this maze of interconnected networks.

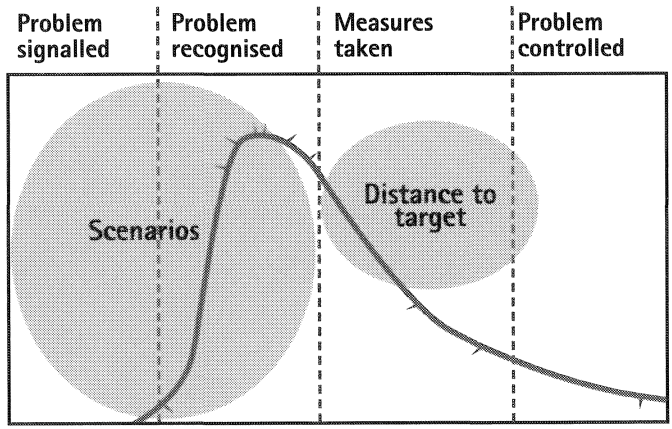
The Brussels Roundtable discussions also point out the interactions between the different stakeholders, e.g. the industry and consumers. As Terence Koh of the Singapore Chemicals Industry Council argued, the chemicals industry demands that it "should not be reduced to a role of polluter" and in fact, it has recognised that it does well in accommodating public concerns. Daniel Verbist of the European Chemicals Industry Council further argued that "We need to learn from scientific progress as well as from public perception to update our knowledge and adapt our practice."

Public Awareness in Different Stages of the Policy Cycle

Public perception is influenced by a variety of factors such as specific cultural backgrounds and the activity of the media. Timing of the information is another factor to consider. Public awareness as well as policy attention are not equally distributed during the different phases of the policy cycle. For example, there is nearly no awareness of a problem in the phase when first signals of early warnings are already apparent. Policy attention rises only when the public recognises an issue as a concern, and when action is taken to solve the problem because of demands being made by interest groups and dominant values in society. The attention is usually highest during the political decision making debate and slowly goes down when measures are taken and the problem is controlled.

Thus – when trying to increase community participation – one has to be conscious that different communication strategies and efforts to attract attention may be needed for emerging issues as compared to problems where measures are being taken. Further there is hardly any systematic search to pick up signals of early warning. In the case of chemicals 'emerging' substances causing new problems for environment and human health, they are often only detected by accident or as a result of research projects. In the future, the Water Framework Directive will require EU member states to conduct investigative monitoring as well as regular surveillance controls. Some countries have already implemented screening programmes, e.g. the Nordic countries (Denmark, Faroe Islands, Finland, Iceland, Norway and Sweden) have been screening the environment (air, biota, sludge, soil, water) systematically for potentially hazardous substances since 2001.

Figure 2: Public Awareness during the Policy Cycle



Source: EEA

Different Instruments for Community Involvement

Instruments for community involvement include contact with stakeholder groups as indicated above, the use of traditional means, e.g. press releases, paper reports, presentations to visiting groups, and new media, such as the Internet, video clips or other means of visualisation. Taking again the EEA as an example, various products and services such as reports, maps and graphs, several databases, and interactive multimedia products are available on the EEA website for free download. For those who want to look behind the scenes or use the information for their own assessments, the EEA data service provides access to most datasets and applications which have been used in EEA's periodical environmental reports. Also metadata are provided for data that are maintained by other international organisations. The data sets contain aggregated data, typically on a country level, with a geographical coverage of at least 15 EU member states. Graphs and, in the future, maps, can be generated from the datasets. Information about the source of each dataset and its geographical and temporal coverage is provided. In the maps and graphs section one can find and download maps and graphs used in EEA products.

The Economic Instruments database, created in close collaboration between the OECD and the EEA, contains information on the use of economic instruments such as environmentally-related taxes and charges, environmentally motivated subsidies, tradable permits, and deposit refund systems. It also outlines voluntary policy approaches such as environmental agreements negotiated with industry, and public programs in which firms can volunteer to participate.

There is an increasing offer of spatial 'in your neighbourhood' type information. The European Pollutant Emission Register (EPER), online since 2004, is the first European-wide register of industrial emissions into air and water. In addition, real-time ozone concentrations are provided in interactive maps via ozone-webs and geo-referenced information is also available on biodiversity and protected habitats.

A special section of the EEA webpage contains educational products intended for a wide audience including children and adults alike. It contains a glossary, an encyclopaedia, Epaedia, on environmental issues and games and quizzes for children. Within Epaedia, the user will find easy-to-read texts, footage and interactive animations as well as interviews with experts, to make environmental subjects easier to understand. The EEA Environmental multilingual glossary contains about 1500 English terms used on the website (1200 unique concepts) with definitions and definition sources, synonyms and links as well as translations into the 23 other EEA languages. The margin of many pages on the EEA's web site automatically lists the terms used on that page that appear in the glossary and oving the mouse over a term displays its definition.

How to Avoid a One Way Route?

Many of the instruments presented above have their main focus on information dissemination and education of the public. Respecting the citizens' right to know and giving access to information is a basic prerequisite for community involvement but as a one-way relation it is not enough to fully integrate the civil society in policy processes. Additional measures are needed to make sure that each citizen can have a say in public decision-making.

The OECD has defined three types of government-citizen relations in policy-making:

- **Information**: a **one-way relation** in which government produces and delivers information for use by citizens. It covers both 'passive'access to information upon demand by citizens and 'active' measures by government to disseminate information to citizens.

  Government ⟹ Citizens

- **Consultation**: a **two-way relation** in which citizens provide feedback to government. It is based on a prior definition by government of the issue on which citizens' views are being sought and requires the provision of information.

  Government ⟺ Citizens

- Active participation: a relation based on partnership with government, in which citizens actively engage in the policy-making process. It acknowledges a role for citizens in proposing policy options and shaping the policy dialogue – although the responsibility for the final decision or policy formulation rests with government.

  Government ⟷ Citizens

  (OECD 2001)

Information is provided by many institutions, often via the Internet and with similar instruments as described above in the EEA example. An example for a recent consultation process is the development of the REACH legislation where the European Commission (EC) actively sought the opinion of interest groups in public stakeholder consultations.

Approaches to trigger an active participation exist but are less often used. This means that a high-level of engagement is needed for individuals to bring forward their interests. In the Brussels Roundtable, two cases were discussed. Yukio Murata of WWF Japan described that he managed to mobilise more than 20,000 individuals and 130 Japanese groups or organisations to support a petition for the Tokyo Declaration for a Toxic Free Earth, that was handed to the Japanese cabinet and ministries of environment and economy. Also Ezra Clark of the Environmental Investigation Agency (EIA), showed an impressive example how NGOs successfully supplement international conventions (here the Montreal Protocol) and national governments, in this case to identify and control illegal trafficking of toxic chemicals.

National focal points can play an important role in connecting an institution to the local population. Using a language appropriate for the different target groups is another issue to be considered. The information provided has to take into account the level of background knowledge in the target group. In an international context, resources should be provided to allow for translation of key documents into local languages. Pictograms are useful instruments to support important messages (e.g. for labelling of hazardous substances) but can also lead to misunderstandings if cultural particularities are not taken into account.

In the Asia-Europe context, the conference "1/3 of Our Planet: What Can Asia and Europe Do for Sustainable Development, held in Jakarta in November 2005, was the largest ever multi-stakeholder event between the two regions on sustainable development. This demostrates that the Asia-Europe Foundation (ASEF) as a forum built to promote better mutual understanding between the peoples of the Asian and European regions can have a key role here in facilitating a better exchange of views on options for a safer use of chemicals and in supporting SAICM.

What Make Networks Sustainable and Efficient?

In exploring what elements make a network sustainable and efficient, it might be worthwhile to look across to one of the most successful networks in the modern world, the Internet. Crucial elements of the Internet such as the digital packet switching are based on the research of Paul Baran conducted in the early sixties. In the era of the Cold War, the RAND (research and development) project was set up to define an information system that would resist a military attack. Within this project Baran deducted that from all constellations investigated, distributed networks came out as the most stable solution while the centralised network is obviously vulnerable as the destruction of a single central node destroys communication between the end stations (see Figure 3). Baran's ideas mainly centred on the redundancy and survivability of a network in the case of a nuclear assault. By creating multiple routes and paths between points, if a path or two were to be destroyed, the network could still function. On the Internet, between any two points are thousands of paths. Following this logic, even if North America were destroyed, the rest of the world would still be able to function. With the advent of communications satellites, even if an area were cut off from all ground links, it could still use a satellite to reach out into the surrounding world. Baran also strongly advanced the notion of each switching stations or nodes to be able to know how to route a packet independently of information from other nodes using a store-and-forward design. (Baran 1964)

Figure 3: Centralised, Decentralised and Distributed Networks

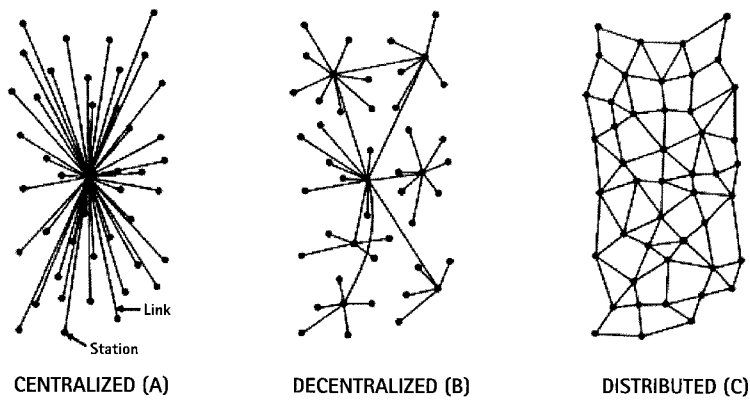


FIG. 1 - Centralized, Decentralized and Distributed Networks

Source: Paul Baran 1964. Copyright 1964 by Rand Corporation. Reproduced with permission of Rand Corporation via Copyright Clearance centre

Of course technical networks and the Internet are not directly comparable to the set-up of institutional focal points and their communication structures. However some lessons might be learned by applying the results of Baran's research on inter-institutional/inter-personal networks. Obviously, one can conclude that each focal point should therefore have the full set of information and be enabled to establish its own network and parallel contacts.

These considerations are supported by the experience made within the Montreal Protocol. Part of the success, as presented by Rajendra Shende, Head of the United Nations Environment Programme (UNEP)'s OzonAction Unit, at the Brussels Roundtable, was due to the fact that the protocol supports its NFPs in networking with other regional groups. Further the protocol successfully co-operates with NGOs, e.g. the EIA.

SAICM in its overarching policy highlights the "multi-sectoral nature" of chemicals management and the need to establish interconnections and arrangements for co-ordination on an inter-institutional and inter-ministerial basis. The quality of these relations will be crucial for the overall outcome of the activity.

Provisional Answers to the Guiding Questions

How to encourage governments to set up focal points for chemicals issues, particularly given present participation levels of Asian countries?

A variety of such networks already exists, however, the challenge is to make sure that these networks do not compete and interfere. To benefit from the synergies, there is a need to 'network the networks' and manage this sustainably.

Pending the creation of such focal points, where and how can civil society and industry engage governments?

Active participation offers the greatest benefits in terms of enrichment and acceptance of policies. On the other hand, this type of government-citizen relationships is the most difficult to achieve. It is therefore necessary to identify and develop dedicated ways to involve civil society. In respecting the diversity of the regions and local communities, we need to be creative and develop a variety of different communication channels.

How can various actors improve the quality of research and recommendations in chemicals management in order to present a credible front?

There is a need to broaden the basis for consultation and input of ideas, get media involved as well as women parliamentarian networks or environmental managers in companies, working towards self-containing distributed networks in business, the research community and civil society.

Conclusions

In order to drive the chemicals agenda from 'piecemeal' conventions to sustainable lifecycle management of chemicals as envisaged by SAICM, there is a need to increase the synergies between the different communities and existing networks. At the same time, there is also the need to respect the local conditions.

The range of practical recommendations from the Brussels Roundtable discussions indicates the wide field in which stakeholders operate and may help to tap the full potential of a strengthened co-operation to:

a) Solve acute problems e.g. WHO class 1 pesticides and in parallel start capacity-building.

b) Use SAICM as a 'golden opportunity for developing countries to catch up with the galloping development'.

c) Outreach REACH and other European initiatives. This is a challenge and opportunity at the same time. However, calculation of external costs and the costs of inactivity puts the investment into perspective. This could be monitored by longitudinal studies on economic development together with chemical management plans.

d) Revise chemicals legislation but keep regional/cultural distinctions.

e) Encourage the active participation of civil society. This requires creativity and the utilisation of various communication channels with, for example, multi-media approaches.

ASEF as a well-established link between the regions could play a significant role, e.g. by developing a communication strategy for Asian regions and therefore putting into practice the Helsinki declaration on the future of ASEM:

"We emphasis ASEM's continuing vital role as a framework for dialogue and co-operation serving as a prime point of convergence between Europe and Asia. We reiterate our commitment...to promoting conditions conducive to sustainable economic and social development through ASEM." (ASEM 2006)

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INTEGRATING CHEMICALS MANAGEMENT INTO CO-OPERATION PROJECTS

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It is imperative to improve chemicals management at all levels -- national, regional and global. In this process, comprehensive legislative and institutional frameworks for chemicals control are important tools. The Swedish example is used to illustrate some of the elements of comprehensive chemicals management.

Chemicals management is an issue that has come into focus during 2006. In the European Union (EU), the new legislation on chemicals, Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH) will have a significant impact on how chemicals are handled, also outside the EU. It is therefore important to explore how REACH may be of benefit to Asia-Europe co-operation. Another recent development is the Strategic Approach for International Chemicals Management (SAICM) adopted in Dubai, United Arab Emirates (UAE) also in 2006. It is important to discuss how Asia and Europe may co-operate in the implementation of these initiatives, maybe with a focus on legislative and institutional frameworks.

Contrary to popular beliefs, there is good evidence that there is a positive link between chemicals management and economic development. This is an area which needs further research and assessment. Close stakeholder involvement is a prerequisite for the success of chemicals management at the national level. Some

[1] *KemI is an agency under the Ministry of Sustainable Development (since 1 January 2007, the Ministry is again called the Ministry of the Environment). Swedish ministries are comparatively small and national agencies therefore also have a policy-developing function. KemI has around 200 employees (e.g. toxicolo gists, ecotoxicologists, legal advisors, inspectors). KemI works in Sweden, in the European Union (EU) and internationally to promote rules and legislation which contribute to achieving 'a Non-Toxic Environment', one of Sweden's sixteen environmental objectives. All stakeholders such as companies, users, consumers and local, regional and central agencies are needed in the work to achieve the objectives. KemI is the driving force in efforts to co-ordinate and stimulate attaining a non-toxic environment. Additional information can be found on KemI's website http://www.kemi.se*

tools that have been developed in Sweden in co-operation with stakeholders e.g. PRIO, Future Trade Dialogue and BASTA are presented. In co-operation, the development of institutional-strengthening mechanisms should be an integral part. The Swedish Chemicals Agency's (KemI)'s ongoing co-operation project to support countries in Southeast Asian the region is described.

It is recommended that the Asian region sets a vision for the management of chemicals which includes 1) Making an effort to mainstream chemicals management into national development plans and poverty reduction strategy papers; 2) Developing an Asian SAICM implementation plan; 3) Developing tools for users and producers of chemicals; and, 4) exploring how REACH can be used as one tool in SAICM implementation.

Swedish Chemicals Control, General Principles, Overarching Policies

In Sweden, chemicals are regulated to the largest extent through common legislation in the European Union (EU). In addition, the Swedish government has regulated some chemicals, e.g. mercury, at the national level.[2] Chemicals are a priority issue in Swedish environmental politics and Sweden is strong supporter of international regulations in the chemicals area. It participates actively in the Rotterdam and Stockholm Conventions and in the implementation of Strategic Approach for International Chemicals Management (SAICM).

Swedish chemicals control is built on some basic principles e.g. precaution, substitution, polluter pays, producer responsibility and inversed burden of proof, to mention a few. It is the belief that such principles are crucial for achieving a Non-Toxic Environment, one of the 16 environmental goals set by the Swedish Parliament,[3] and are thus promoted in all the arenas in which Sweden participates – regional and international. The Swedish Chemicals Agency (KemI) has been tasked by the Swedish government to oversee the implementation of this objective, which includes such targets as making sure that man-made substances are present in the environment in concentrations that do not cause harm to human health or the environment. KemI covers many types of chemicals – industrial chemicals, consumer chemicals, biocides and pesticides and has a good overview of the substances and products put on the Swedish market through its Products Registry. Certainly, all chemicals health and environmental concerns are integrated in the KemI's assessments and actions. Another important element of KemI's mandate is the incorporation of enforcement which gives the inspectorate valuable feedback from the real world outside KemI.

[2] *The main Swedish legislation on chemicals can also be found on http://www.kemi.se*
[3] *Summary of Government Bill 2004/05:150, Environmental Quality Objectives:- A Shared Responsibility*

The EU Chemicals Legislation: REACH

It is of course impossible to talk about chemicals management without mentioning REACH, the EU's new chemicals legislation which has just entered into force on 1 June 2007.[4] (Indeed, some of the overarching principles for chemicals control in Sweden mentioned above are now also embedded in REACH. It is a comprehensive legislation that addresses health and environment concerns, covering a broad range of chemicals. Under REACH, enterprises that manufacture or import more than one tonne of a chemical substance per year will be required to register their substances in a central database. REACH also gives greater responsibility to industry to manage the risks from the chemicals they produce and provides users in the supply chain with safety information on the substances. KemI views the implementation of REACH as both a challenge and an opportunity. It is a challenge in that several new groups of stakeholders e.g. the users of chemicals are included. It is necessary to find ways of how to best address this diverse group of companies, big and small. REACH is also an opportunity in that it in the long run it provides information on all chemicals on the market, which will make it much more convenient to prioritise those that deserve the most attention.

SAICM Implementation and Asia-Europe Co-operation

In the context of the Asia-Europe Environment Forum 4th Roundtable, KemI sees SAICM as the golden opportunity for the developing countries to catch up with the rapid globalisation of chemicals production and use and the demands it puts on capacities and capabilities. SAICM addresses knowledge and information, risk reduction, safe use, governance and capacity development – all necessary components in better managing chemicals. This is reinforced by the recent deliberations as part of the development of the SAICM. REACH will provide a lot of the knowledge on chemicals with free access to the information for the developing countries including the partners of the Asia-Europe Meeting (ASEM) process. The Globally Harmonized System for the Classification and Labelling on Chemicals (GHS) is another important tool for disseminating information on chemicals that will assist users in better handling hazardous substances and preparations.

[4] *REACH: OJ L 136, 29.5.2007, p 3 (Corrected version) Regulation of the European Parliament and of the Council of 18 December 2006 concerning the Registration, evaluation, Authorisation and Restrictions of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/105 and 2000/21/EC).*

A large part of the implementation of SAICM will be executed and monitored at the regional level. The African region has led the way by developing a regional plan for SAICM implementation. To support the implementation of the regional plan they have also formed an African core group. It is suggested that such a plan could be a useful tool for Asian countries to further develop chemicals management in the region. An important point in the implementation is to make sure that chemicals are mainstreamed into the national development agenda and chemicals issues addressed in national poverty reduction strategy papers. Sweden is working together with United Nations Development Programme (UNDP) in a few pilot countries to see how this process may be encouraged and supported.

The Link between Chemicals Management and Social and Economic Development

All too often, chemicals management and chemicals control has been thought of in terms of extra burdens on particularly small and medium-sized companies in developing countries. This need not be so. As illustrated in a recent publication "Building a Healthy Economy: chemicals risk management as a driver of development"[5] there need not be any conflict between better chemicals management and making profit. In most cases, even small investments in risk reduction pay off quickly by e.g. more efficient use of chemicals, decreased waste, cleaner products, better markets and last but not least, better health of the workers and a cleaner environment. There are also more subtle/long-term effects, such as customer/consumer confidence, increased market access and increased productivity through healthier workers. In a complementary report commissioned by Norway, the beneficial impacts of better chemicals management at the level of the national economy have been discussed. There is certainly more room for more initiatives in this area, e.g. by starting longitudinal studies on economic development in the ASEM countries together with national or regional projects on chemicals management.

Working with Stakeholders for Chemicals Management

Governments have a leading role in setting the legislative and institutional frameworks within which the other actors may be enabled to perform optimally. But true development can only take place if everyone in the product chain shoulders responsibility. Below are a description of some tools KemI has developed for multi-stakeholder engagement, in some cases in co-operation with the relevant sectors of industry.

[5] *KemI Report published in September (2005).*

PRIO

The different actors in the product chain need easily-accessible information on substances that are regulated but also on those that are not yet regulated but should be regarded with caution and where substitution or replacement should be sought, if possible and feasible. One such tool is KemI's web-based risk reduction tool, PRIO, on priority substances, available also in English. It was launched in 2004, with the intention for it to be used preventively to reduce risks to human health and environment from chemicals. PRIO consists of a database of 4,000 dangerous substances and a guide for risk management.

The aim of PRIO is to facilitate the assessment of health and environmental risks of chemicals and identify the need for risk reduction by environmental managers, purchasers or product developers. To achieve this, PRIO provides a guide for decision-making that can be used in setting risk reduction priorities. PRIO was developed in co-operation with other authorities, industry organisations and companies within different sectors.

The recommendations for chemicals prioritised for risk-reduction measures correspond to the current proposal for the new EU-legislation, REACH, and also to the environmental quality objective a 'Non Toxic Environment' adopted by the Swedish parliament. The tool is also appreciated by companies and organisations outside Sweden, as a source of knowledge or inspiration. This tool may be used and further developed by Asian ASEM countries to suit their chemicals management needs.

Future Trade Dialogue

Initiated by the Swedish government, this completely new form of co-operation between companies, municipalities, regions and the government, relates to applying chemicals-related product requirements when making purchases. KemI has actively contributed to the dialogue, and in a unique collaboration between government agencies and businesses, developed a guide[6] with a five-step model to help prioritise products and substances to apply requirements on. The work is based on the participating companies' own experiences of applying chemicals-related product requirements and on the criteria included in PRIO. The guide is aimed mainly at preventative, long-term efforts to prevent certain hazardous substances being included in products. Participation in the dialogue has benefits for all actors not only by usage of the guide but equally as important, working

[6] *KemI's Environmental Requirements for Chemicals in Products – a guide for purchases.*

in dialogue provides an excellent opportunity for different actors from industry and government to meet and learn from each other.

KemI's initiatives with market driven tools should be seen as a complement to legislation and enforcement. Many companies look upon the PRIO databases or the guide on purchasing as an incentive and a guide to fulfil the legal requirements. The PRIO database is also used by local and regional authorities both as a knowledge base and as a tool for inspiration.

BASTA

There is a great need to reduce the use of hazardous substances in chemical products and articles used in construction. In the BASTA system, the Swedish construction sector has agreed on common criteria for substance properties for decisions as to whether a product is to be accepted or not. The industry standard for properties criteria has been developed in open consultation and therefore with broad endorsement by large parts of the Swedish construction sector and are linked to the REACH regulation. The burden of proof in the BASTA system is put on the supplier, who has to confirm whether the product meets the criteria or not. A system of self-declaration of this kind needs to be supplemented by quality-assuring auditing, and the BASTA project has drawn up the procedures to ensure that such validation can be carried out in a credible and cost-effective way. For the dissemination of suppliers' assessed products, the BASTA project has developed a web-based database. The validation method to assure the system of credibility consists principally of two parts: firstly requirements relating to the supplier's expertise, documentation and organisation, which are collated in a contractual document each participating supplier signs; and secondly random-sample audits of the suppliers' data.

The examples above demonstrate how the business sector and the industry can be active movers for change, through a participatory, or as in the case of BASTA, a self-driven process. It is therefore important to understand how these and other tools may be tailored to the needs of the Asian region.

Co-operation with the Region

To set in motion a process for global chemicals management, co-operation is key and may take many forms. One is this dialogue; another is development co-operation between donor countries and recipient countries. Although the Asian region has taken giant steps towards increased health and welfare for its citizens, there are still big discrepancies between the capacities of individual countries in the region and between individuals in the countries. Chemicals management

has so far, with the exception of pesticides management, not received sufficient attention as witnessed by the recurring incidents and accidents with chemicals in the region. KemI in co-operation with the Swedish International Development Agency (Sida) have developed a framework agreement which will be used to support other countries and regions in their efforts towards better chemicals management.

Historically, chemicals issues have been dealt with one at the time, for example pesticides, ozone depleting substances, lead, PCB and arsenic. "Towards a non-toxic environment in Southeast Asia" is a long-term programme devised in partnership with the Food and Agriculture Organization (FAO), the Pesticides Action Network Asia-Pacific (PAN-AP) Chulalongkorn University, Thailand, and others, to holistically address some of the issues of chemicals management in the Asian region, specifically in Southeast Asia. The strategy follows three-pronged approach:

a) *Raising broad awareness about risks of chemicals;*
b) strengthening the regulatory framework and its enforcement; and,
c) strengthen bottom-up approaches that enable users to change to more sustainable production practices and to reduce risks.

KemI's experience from capacity-building in Sweden and development work in Eastern Europe as well as Vietnam has shown that such an undertaking takes a long time. It consists of many cross-cutting issues that involves political and technical matters and requires the support of several relevant ministries and agencies. In the initial phase, a major part of the resources will be used to handle acute problems with pesticides. However, at the same time capacity-building for all chemical issues will commence. The prime target countries are Vietnam, Cambodia, Laos and the region of Yunnan in China, involving experts from neighbouring countries to take part in different activities including relevant ministries, institutions, organisations and the civil society in the region.

The programme will be operating within a framwok of ten years and has started with an inception phase of three years. The main objectives for the inception phase are:

a) Awareness raising, health and environmental education, and advocacy work in support of a non-toxic environment.
b) Strengthening of Integrated Pest Management (IPM) field programmes to address pesticide issues at farm-level.
c) *Strengthening of pesticide regulatory framework and policy reform in* support of sustainable plant protection approaches and elimination of the use of WHO Class I pesticides.

d) Needs assessments and project formulation on capacity-building on chemicals management (institutional development, implementation of conventions, strengthening and enforcement of regulatory and administrative systems, human resources development).

The concept of developing generic chemicals management approaches and strengthening legislative and institutional frameworks through the implementation SAICM is new and a challenging task. It is equally important to support the work of this programme and other good programmes that are dealing with chemicals management.

Conclusions and Recommendations

It is evident from the discussion that in order to develop and implement a well-defined integrated chemicals management strategy several things need to be kept in mind. It is necessary to involve all stakeholders in the process, and share the responsibility for chemicals management with the industry. It is also necessary to develop tools for users and producers of chemicals. In this regard, it may be worthwhile to examine and integrate best practices from already-developed tools such as PRIO, Future Trade Dialogue, BASTA and others. It is important to set a regional vision for SAICM and develop an appropriate implementation plan in Asia. Such a plan should include exploring interest in developing a regional/sub regional plan for SAICM implementation; incorporating chemicals management into national development plans and poverty reduction strategy papers; as well as using REACH as one tool in SAICM implementation and further Asia-Europe co-operation.

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Rachel Massey, Global Environment Institute, Tufts University
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Annexes

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AGENDA

DAY 1 – Thursday, 30 November 2006

Venue: **Room AB-2C**
Centre Albert Borschette
36 rue Froissart
Brussels 1040, Belgium

9:00-9:45 **Introductory Session**

Chair:
Mr. David Grant Lawrence
Head, Chemicals Unit
ENVIRONMENT DIRECTORATE-GENERAL
EUROPEAN COMMISSION

Welcome Remarks from the Co-organisers

Mr. Christian Hegemer
Director
HANNS SEIDEL FOUNDATION INDONESIA

Mr. Peter Ryan
Director for Intellectual Exchange
ASIA-EUROPE FOUNDATION

Mr. Christer Holtsberg
Director
SWEDISH ENVIRONMENTAL SECRETARIAT IN ASIA

Mr. Hideyuki Mori
Vice-President
Programme Managing Director
Kitakyushu Office Director
INSTITUTE FOR GLOBAL ENVIRONMENTAL STRATEGIES

Mr. Surendra Shrestha
Director, UNEP-ROAP
UNITED NATIONS ENVIRONMENT PROGRAMME

9:45-10:00 Overview of the Asia-Europe Environment Forum

Ms. Sol Iglesias
Assistant Director, Intellectual Exchange
ASIA-EUROPE FOUNDATION

Session 1: Common Global Approaches in Chemicals and Hazardous Substances Management for Asia and Europe
There is an increasing recognition of the importance of an environmentally-sound management of chemicals in all sectors of society in line with Rio's Agenda 21, to meet the internationally agreed Johannesburg Plan of Implementation and Millennium Development Goals (MDGs). This session aims to provide a broad overview to participants, through a series of introductory presentations, addressing common global approaches in chemicals and hazardous substances management through the perspectives of key stakeholders in Asia and Europe.

10:00-10:20 Keynotes on SAICM and Other Related Agreements

Question:
How has the Strategic Approach to International Chemicals Management (SAICM) and other international processes alike (e.g. Rotterdam, Stockholm, etc.) provided a framework for Asian and European governments to achieve the Johannesburg commitment of 2020?

HE Viveka Bohn
Former President
PREPARATORY COMMITTEE FOR STRATEGIC APPROACH TO INTERNATIONAL CHEMICALS MANAGEMENT

10:20-10:40 *Keynote from Environmentalists/Activists*

Dr. Nadia Haiama
EU Policy Director, Chemicals
GREENPEACE EUROPEAN UNIT

10:40-10:55 Discussion

10:55-11:10 COFFEE BREAK

11:10-11:30 Moderator:
Dr. Surendra Shrestha
Director, UNEP-ROAP
UNITED NATIONS ENVIRONMENT PROGRAMME

Keynote from the Industry

Mr. Terence Koh
Executive Director
SINGAPORE CHEMICALS INDUSTRY COUNCIL

11:30-11:50 *Keynote from the Research Community*

Dr. Yong Hwa Kim
Vice President
KOREA INSTITUTE OF TOXICOLOGY
and
Past President
SOCIETY OF ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY ASIA-PACIFIC
KOREA

11:50-12:20 Roundtable Discussion

12:20-14:00 LUNCH

Session 2: Overarching Policy Regime Issues in Chemicals and Hazardous Substances Management in Asia and Europe

This session aims to better share information amongst the different chemicals stakeholders by highlighting the overarching policy regime issues in Asia and Europe. Examples of achievements made and challenges encountered will help identify better development and implementation of chemicals and hazardous substances management policies and encourage greater co-operation between in the two regions.

14:00-14:20 Moderator:
Mr. Christer Holtsberg
Director
SWEDISH ENVIRONMENTAL SECRETARIAT IN SOUTHEAST ASIA

How the Montreal Protocol Provides Lessons for SAICM Implementation

Questions:
The Montreal Protocol can be said to be one of the more successful treaties involving chemical management. What were the key elements leading to the success of the Protocol and what can be learnt in order to effectively manage broader chemical issues?

Mr. Rajendra Shende
Chief, OzonAction Programme
UNITED NATIONS ENVIRONMENT PROGRAMME

14:20-14:40 *Evaluating What Asia Needs for Effective SAICM implementation*

Questions:
What are the existing regional and national institutional mechanisms dealing with chemicals management and how can we bridge what is currently available with future demands?

Ms. Ella Antonio
President
EARTH COUNCIL, ASIA-PACIFIC

14:40-15:00 *Overview of the Registration, Evaluation and Authorisation of Chemicals (REACH) in the EU*

Questions:
Why is there a need for REACH? How does it complement other chemicals initiatives? What are the implications of this new initiative on EU and ASEAN+3 countries?

Mr. Bjorn Hansen
Chemicals Unit
ENVIRONMENT DIRECTORATE-GENERAL
EUROPEAN COMMISSION

15:00-15:10 Discussion

15:10-15:30 Moderator:
Mr. Philippe Bergeron
Member of the Board
REGIONAL INSTITUTE FOR ENVIRONMENTAL TECHNOLOGY

Beyond Command and Control: Voluntary Action and Incentives for the Chemicals Industry

Questions:
Are there voluntary actions by the industry and is there recognition of this contribution by governments? What are the impacts of such actions and how can these be further encouraged?

Mr. Daniel Verbist
Executive Director Build Trust & Communications
EUROPEAN CHEMICALS INDUSTRY COUNCIL

15:30-15:50 *Taking the Lead for Chemicals Policy Change in the Asia-Pacific: APFED's experiences*

Dr. Kim Myung Ja
Member
NATIONAL ASSEMBLY, KOREA
and
Member
ASIA PACIFIC FORUM FOR ENVIRONMENT AND DEVELOPMENT

15:50-16:00 Discussion

16:00-16:15 COFFEE BREAK

16:15-17:05 Discussion
Dr. David Stanners
Head of International Cooperation
EUROPEAN ENVIRONMENT AGENCY

17:05-17:30 Wrap-up by Moderators

DAY 2 – Friday, 1 December

Venue: **Room AB-2C**
Centre Albert Borschette
36 rue Froissart
Brussels 1040, Belgium

Session 3: Specific Areas for Practical Co-operation in Chemicals and Hazardous Substances Management

This session will identify specific areas for practical co-operation in between Asia and Europe in chemicals and hazardous substances management. Discussions within each topic will be guided by common questions such as (a) what specific multilateral agreements apply?; (b) what kind of training/capacity-building/ education activities are involved?; (c) what roles do the different stakeholders (government, business, activists, research/academe) play?; (d) where does funding come from? There will be neither speakers nor prepared presentations, rather, one or two "lead discussants" to launch and moderate the discussion.

09:00-09:45 Moderator:
Mr. Ismid Hadad
DIRECTOR
THE INDONESIAN BIODIVERSITY FOUNDATION - KEHATI

Movement of Chemicals and Curbing Illegal Trade

Questions:
- How can we better monitor trade and movement of toxic chemicals?
- What kind of procedures are in place and how do these procedures cope exist especially in less developed areas? Are there sufficient monitoring in Asia and Europe?

Lead discussant:
Dr. Ezra Clark
Senior Campaigner
ENVIRONMENTAL INVESTIGATION AGENCY

09:45-10h:30 *Protecting Consumer Rights and Increasing Awareness and Participation in Preventing the use of Hazardous and Toxic Chemicals*

Questions:
- What existing information regarding chemicals is available to consumers?
- Are there effective bodies to whom consumers can address their concerns and questions?
- Is there sufficient awareness of the presence and use of chemicals in products?
- How receptive are governments and industry to the consumers regarding chemical concerns?

Lead Discussant:
Mr. Yukio Murata
Senior Officer, Toxics Programme
WWF JAPAN

10:30-10:45 COFFEE BREAK

10:45-11:30 Moderator:
Mr. Martin Kastler
Former Member of the European Parliament
and
Head of Department
Development Policy and co-ordinator for EU Projects
HANNS-SEIDEL FOUNDATION MUNICH

Chemicals Risk and Accident Management

Questions:
What are the steps taken to address better handling of chemicals?
Besides legislation, how can chemicals risk be better evaluated and made aware of?

Lead Discussant:
Prof. Yu Gang
Professor
TSINGHUA UNIVERSITY
CHINA

11:30-12:15 *Agriculture and Pesticides?*

Questions:
What is the present situation concerning pesticides in their application within the field of agriculture?
If future regulations are made concerning chemicals in pesticides, how can the various actors (including small to medium farmers) in agriculture be involved and aided in order to facilitate the implementations of such regulations?

Lead Discussant:
Mr. Harry van der Wulp
Senior IPM Policy Officer
GLOBAL INTEGRATED PEST MANAGEMENT FACILITY
FOOD AND AGRICULTURE ORGANIZATION

12:15-12:45 Wrap-up by Moderators

12:45-14:00 LUNCH

Session 4: Synthesis and Conclusion

This session aims to frame Asia-Europe co-operation in chemicals and hazardous substances management. Discussions will be launched by keynotes speakers in order to formulate concrete, practical recommendations.

14:00-14:20 Chair:
Mr. Wolfgang Hehn
Deputy Head of Chemicals Unit
ENTERPRISE AND INDUSTRY DIRECTORATE-GENERAL
EUROPEAN COMMISSION

Creating a Critical Mass to Influence International Policy Dialogue in Chemicals Management

Questions:

- How do we start about having focal points within the various governments for chemical issues, particularly given present participation level by Asian countries?
- Pending the creation of such focal points, where and how can civil society and industry engage governments?
- How can the various actors improve the quality of research and recommendations in chemical management in order to present a credible front?

Dr. Gabrielle Schöning
Project Manager 'Chemicals, Environment and Health'
EUROPEAN ENVIRONMENT AGENCY

14:20-15:00 Open Discussion

15:00-15:20 *Integrating Chemicals Management into Co-operation Projects*

Question:
What were the problems (institutional, mechanisms, etc) in mounting cooperation projects particularly across regions and how do we address them?

Ms. Ethel Forsberg
Director General
SWEDISH CHEMICALS INSPECTORATE

15:20-16:00 Open Discussion

16:00-16:20 COFFEE BREAK

16:20-16:50 *Conclusions and Wrap-up by the Rapporteurs*

Asian Rapporteur: **Mr. Taka Hiraishi** (Institute for Global Environmental Strategies)

European Rapporteur: **Mr. Paul Kaye** (ENDS Europe Daily)

16:50-17:00 Closing Remarks by the Co-organisers

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LIST OF PARTICIPANTS

SPEAKERS

1. Ms. Ella Antonio, President Earth, Council, Asia Pacific, Philippines

2. Ms. Nuala Bannon, Senior Adviser, Department of Environment, Ireland

3. Mr. Art Barrit, Chief, Environmental Protection & Safety Officer, Associated Labor Unions-Trade Union Congress of the Philippines

4. Mr. Philippe Bergeron, Board Member, Regional Institute of Environmental Technology, France

5. Prof. Åke Bergman, Stockholm University, Sweden

6. HE Viveka Bohn, former President, Strategic Approach to International Chemicals Management, Sweden

7. Mrs. Agneta Sunden-Bylehn, Senior Scientific Affairs Officer, United Nations Environment Programme, UNEP

8. Dr. Qwanruedee Chotichanathawewong, Director, Thailand Environment Institute, Thailand

9. Dr. Ezra Clark, Senior Campaigner, Environmental Investigation Agency, UK

10. Mr. Duong Van Long, Director, National Chemical Safety Committee, Director of Centre of Promotion Technology Environment and Chemical Safety, Vietnam

11. Mr. Sergio Gatteschi, President, Friends of the Earth, Tuscany, Italy

12. Dr. Nadia Haiama , EU Policy Director, Chemicals, Greenpeace European Unit, Greenpeace

13. Mr. Bjorn Hansen, Head, Chemicals Unit, Environment Directorate-General, European Commission, EC

14. Mr. Wolfgang Hehn, Deputy Head of Chemicals Unit, Enterprise and Industry Directorate-General, European Commission, EC

15. Mr. Heng Nareth, Director, Pollution Control Department, Cambodia

16. Mr. Taka Hiraishi, Senior Consultant, Institute for Global Environment Strategies, Japan

17. Mr. Martin Kastler, Head of Department, Development Policy and Co-ordinator for EU projects, Hanns-Seidel Foundation Munich, Germany

18. Mr. Paul Kaye, Brussels Editor, ENDS Europe Daily, UK

19. Honorary Kim Myung-ja, Member, National Assembly, Korea

20. Dr. Yong-Hwa Kim, Vice President, Korea Institute of Toxicology, Korea

21. Mr. Ioannis Kinnas, former Ambassador for Environment, Ministry of Foreign Affairs, Greece

22. Mr. Terence Koh, Executive Director, Singapore Chemicals Industry Association, Singapore

23. Prof. Mazlin Mokhtar, Director, Director of Institute for Environment and Development, Malaysia

24. Mr. Yukio Murata, Senior Programme Officer, WWF Japan, Japan

25. Mr. Masatoshi Ogura, Executive Director, Japan Chemical Industry Association, Japan

26. Prof. Jette Rank, Roskilde University, Denmark

27. Dr. Gabriele Schöning, Project Manager 'Chemicals, Environment & Health' European Environment Agency, Germany

28. Mr. Rajendra Shende, Head, OzonAction Unit, UNEP

29. Dr. Jane Stratford, Head, International Chemicals Branch
Department for Environment, Food and Rural Affairs, UK

30. Mr. Daniel Verbist, Executive Director, Build Trust & Communications
European Chemical Industry Council, Belgium

31. Ms. Claire Weill, Program Manager, Risks, Precaution & Chemicals
Institute for Sustainable Development and International Relations, France

32. Mr. Harry van der Wulp, Senior IPM Policy Officer,
Global Integrated Pest Management Facility, Food and Agriculture
Organization, FAO

33. Prof. Gang Yu, Tsinghua University, China

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ABOUT THE CONTRIBUTORS

Rahiman Abdullah

Rahiman Abdullah from Singapore, joined the Asia-Europe Foundation (ASEF) in 2006. He is the Project Executive for the Asia-Europe Environment Forum which deals with environment and sustainable development themes. Rahiman obtained his Honours degree in Sociology from the National University of Singapore and his Masters in International Relations at the Institut d'Etudes Politiques de Grenoble in France. He interned at the United Nations Environment Programme (UNEP) Brussels office prior to joining ASEF. His interest and passion for environment and sustainable development work came about while writing his thesis on ecotourism by an indigenous community in Malaysia, where he spent two months on research and living with them. His Masters thesis was on challenges and opportunities in technology transfer to Malaysia under the Kyoto Protocol. Rahiman's current interests include environmental governance and renewable investments under the Clean Development Mechanisms (CDMs).

Ella Antonio

Ella S. Antonio is President of the Earth Council Asia-Pacific, which promotes multi-stakeholder participation in sustainable development planning, decision-making, programming and project implementation and monitoring, particularly through the establishment of multi-stakeholder mechanisms in countries in the region. She is also the Vice President of EARTH Institute Asia, a membership organisation that undertakes information, education and communication; community outreach, and research and development (R&D) on various aspects of environment and sustainable development. She is a Trustee of pagbabago@pilipinas, a local organisation promoting ethical governance and sustainable development through advocacy, developmental activities, research and training.

Ms. Antonio is President of Brain Trust, Inc., a Philippine consultancy firm focusing on the creation and advocacy of holistic knowledge and options for sustainable development. The company has so far provided services to bilateral and multilateral institutions and Philippine government agencies.

Atul Bagai
Atul Bagai joined the United Nations Environment Programme Regional Office for Asia-Pacific (UNEP-ROAP)'s OzonAction programme initally as a Training Officer in August 2000 before being appointed as the Regional Officer (Networking) for South Asia on November 1, 2002. Before joining UNEP, he worked as the Ozone Cell Director at the Ministry of Environment and Forests, Government of India. As Training Officer, his work included organising training workshops for refrigeration technicians and customs officers in South Asia, Southeast Asia and Countries with Economies in Transition (CEITs). Now he is assisting countries as part of UNEP-ROAP's reoriented Compliance Assistance Programme (CAP). Mr. Bagai, an Indian national, holds a Postgraduate degree in History from the University of Delhi. Before joining UNEP-ROAP, he worked in a variety of field and policy level assignments at both federal and provincial levels in India.

Ethel Forsberg
Ethel Forsberg has been the Director General of the Swedish Chemicals Agency (Kemi) since 2001. She has a Master of Science degree in Landscaping Architecture. Before joining Kemi she held positions in several sectors within the Swedish society: as Environmental Manager in the Federation of Swedish Farmers; Senior Administrative Officer at the Ministry of the Environment; Manager of Food Safety, Environment and Consumer Affairs at COOP (Head office of co-operative retailers in Sweden); and, as Director of Administration of Health, Food and Environment in the City of Stockholm. At present she is on the board of the Swedish Energy Agency and the Stockholm University as well as the recently established European Chemicals Agency, based in Helsinki, Finland. She is also a member of the Scientific Council for Natural and Engineering Sciences of the Swedish Research Council

Taka Hiraishi
Taka Hiraishi obtained his Bachelor of Science (1966) and Masters of Science for Industrial Chemistry (1968) from Tokyo University in Japan. He joined the Ministry of Labour (Occupational Health and Safety Department) in April 1968 and moved to the newly-established Environment Agency in 1971, where he worked in the fields of offensive odours, acid rain, the ozone layer, hazardous wastes, hazardous chemicals and water pollution, till 1996.

In between, he was also posted overseas as Environment Attache (liaison with UNEP) and Second Secretary for Technical Co-operation at the Embassy of Japan in Kenya (1975-1978). He was also Principal Administrator (information exchange on chemicals control), Chemicals Division, Environment Directorate at the Organisation for Economic Co-operation and Development (OECD) Secretariat

(1980-1982). Mr. Hiraishi was Director, Water Pollution Control Division at the Environment Agency, Japan (1987-1989). He also worked for UNEP from 1989-1998 consecutively as: Co-ordinator of Support Measures, Programme Bureau; Officer-in-Charge, Environmental Law and Institutions Centre; Deputy Director of Policy Division; Deputy Director of Environment Programme Division; Assistant Executive Director for Environmental Information and Assessment; and, President, UNEP Staff Association (in 1996).

Mr. Hiraishi currently serves as Special Advisor to the Minister of the Environment, Japan. (part-time); Member, Operations Committee, Center for Global Environmental Research, National Institute for Environmental Studies, Ministry of the Environment, Japan (part-time); Senior Consultant and Member, Board of Directors, Institute for Global Environmental Strategies (IGES), Japan (part-time); Co-chair, Intergovernmental Panel on Climate Change (IPCC) Inventories Task Force Bureau; and, Member, IPCC University, Japan (part-time).

Paul Kaye
Paul Kaye is the Brussels Editor with ENDS Europe Daily.

Kim Myung Ja
Kim Myung Ja currently sits on the National Defence Committee of the Korean National Assembly, and serves as Chairperson for the Ethics Committee and also for the Free Trade Agreement (FTA) Forum of the Korean National Assembly. As scientist-turned administrator and politician, she represents Korea in the Asia-Pacific Forum for Environment and Development (APFED) and chairs the Board of Directors of the Korea Eco-products Institute (KOECO) and the Korea Water Resources Corporation (K-water).

Dr. Kim served as Korea's Minister of Environment (1999-2003) to become the longest serving female minister in the country. Under her leadership, the Environment Ministry received the Excellence in Government Administration Award for two consecutive years (2001 and 2002) in part due to its ability to build a consensus on various highly contentious environmental issues – one such issue being the formulation and successful implementation of the special law on nationwide watershed management.
Previously, Dr. Kim had served as Professor of Chemistry and History of Science at Sookmyung Women's University, Korea, and as distinguished Professor at Myongji University, Korea, for thirty years. Dr. Kim holds a Bachelor of Science in Chemistry from Seoul National University, Korea, (1966) and a Ph.D. from the University of Virginia, United States (US) (1971).

Yong-Hwa Kim
Yong-Hwa Kim is currently Vice President of the Korea Institute of Toxicology. Previously, he was Managing Director of the Institute.

Dr Kim has had extensive experience in the field of toxicology. From March 2003-February 2004, he was a Visiting Scholar at the US Environmental Protection Agency (EPA). Prior to that, he was Director of the Environmental Toxicology Department at the Korean Institute of Toxicology. From 2003-2004, he was President of the Society of Environmental Toxicology and Chemistry (SETAC) Asia-Pacific Chapter.

He has also taught at various institutions such as the College of Pharmacology, SungKyunKwan University, Korea (2001-2003); College of Nutrition, University of Vienna, Austria (1996-1997); College of Agriculture, ChungNam National University, Korea (1990-1994; 1998-2000); and College of Pharmacology, ChungBook National University, Korea (1992-1994).

Dr Kim obtained his PhD. from University of California, Davis, US in 1985 and his Bachelors and Masters from Seoul National University, Korea.

Terence Koh
Terence Koh is Executive Director of the Singapore Chemical Industry Council (SCIC). He has more than sixteen years of experience in the chemical industry and has been involved in SCIC since 2000. He was a Member of the SCIC Board and Chairman of the SCIC Logistics and Distribution Sub-committee from 2001-2004.

Mr. Koh is Member of SPRING, Singapore's Chemical Standard Committee, which looks into the formulation of Singapore Standards and Codes of Practices. He participates in the various Working Groups of the Technical Committee for Chemistry under SPRING Singapore. This committee reviews the Singapore Standards to come in line with the Globally Harmonised System for the labelling and classification of chemicals (GHS).

He represents the Singapore Chemical Industry in the ASEAN Ministerial Groupings' meetings (AMEICC), the Asia-Pacific Economic Cooperation (APEC) Chemical Dialogues (APEC CD) and UNEP meetings.
Mr. Koh is a member of the National Taskforce for the implementation of the GHS which is co-chaired by the Singapore Ministry of Trade and Industry and SCIC. He also sits in the Singapore Manufacturers' Federation (SMa) Environment, Health, Safety and Security Committee.

Natalie Pauwels
Natalie Pauwels has been the Desk Officer for Asia at the International Relations division of the Environment Directorate-General of the European Commision (EC) since October 2005. Originally is from Ontario, Canada, Ms. Pauwels holds a Masters of Science from the London School of Economics and a Bachelor of Arts (Hons.) in Political Science from the University of Toronto, Canada. Ms. Pauwels worked as a Researcher on arms control and disarmament issues, first at the Stockholm International Peace Research Institute, Sweden, before moving to the Bonn International Centre for Conversion, Germany, where her research focused largely on the demobilisation and reintegration of former military personnel and ex-combatants. From there she went to Brussels, Belgium, to work as an analyst of European Union (EU) conflict prevention and crisis management policy at the International Security Information Service, Europe, before being awarded a grant to conduct full-time research at the Université Libre de Bruxelles, Belgium, towards a thesis on natural resources and armed conflict.

Peter Ryan
Peter Ryan, a career diplomat from Ireland, joined the Asia-Europe Foundation (ASEF) as the Director of the Intellectual Exchange Department in September 2006. He received his undergraduate and postgraduate degrees from the National University of Ireland in Dublin and worked in Ireland and Australia in the banking sector before joining the Department of Foreign Affairs of Ireland in 1994. His strong interest in Asian-European relations stems from his appointments to the Irish Embassies in Japan, Korea and Singapore. In addition, he served as Deputy Director, Asia-Pacific, in the Bilateral Economic Relations Division of the Department of Foreign Affairs. Prior to joining ASEF, he was based in Singapore covering eBusiness and new technologies in the Asia-Pacific region for the Department of Communications, Marine and Natural Resources of Ireland.

Gabriele Schöning
Gabriele Schöning is Project Manager for 'Chemicals, Environment & Health' with the European Environment Agency (EEA).

Daniel Verbist
Daniel Verbist is Executive Director, Build Trust & Communications at the European Chemical Industry Council (Cefic). He holds an MBA from the University of Louvain, Belgium. He started in 1973 as Researcher and Assistant in Human Resources at the Institute for Administration and Management (UCL-IAG), Belgium. In 1973,

he joined the Information Technology Office for Wallonia (Office Régional d'Informatique - ORI), becoming Manager of the Economics Department. In 1984, he joined Bull Worldwide Information Systems, Belgium, for a variety of managerial positions such as Business Development Manager, Public Affairs, Quality Manager and Director of Communication for Benelux. In 1995, he joined Fedichem (recently renamed Essenscia), the Belgian chemical federation, as Director Communications and Public Affairs. As from May 2005, he has also been in charge of Cefic's corporate communications and the Build Trust Programme. In May 2006, he was appointed full-time by Cefic and also took over some responsibilities related to Responsible Care.

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ABOUT THE CO-ORGANISERS

Asia-Europe Foundation (ASEF)

The Asia-Europe Foundation (ASEF) seeks to promote better mutual understanding and closer co-operation between the people of Asia and Europe through greater intellectual, cultural, and people-to-people exchanges. These exchanges include conferences, lecture tours, workshops, seminars and the use of web-based platforms. The major achievement of ASEF is the establishment of permanent bi-regional networks focussed on areas and issues that help to strengthen Asia-Europe relations.

In particular, ASEF's Intellectual Exchange Department aims to contribute to policy debate and strategic thinking on themes of current and future inter-regional importance between Asia and Europe. For more information on ASEF, please visit http://www.asef.org

Hanns Seidel Foundation (HSF)

Based in Munich, Germany, the Hanns Seidel Foundation (HSF) is a German political foundation with 35 years of experience in civic education in Germany and international co-operation around the world.

Its office in Indonesia was founded in 1993 with programs developed and implemented jointly with local, national and international partners, focusing on promotion of environmental education, training (capacity building) and public awareness in Indonesia and Association of Southeast Asian Nations (ASEAN) region. Numerous teachers' training on the use of water, air, biodiversity, land and soil, and environmental ethic modules at the national level have been a landmark program of HSF in partnership with universities and Indonesian Ministries of Environment and Education. ASEAN Environmental Education Action Plan, Environmentally Sustainable Cities and Leadership Programme on Environment are among other growing programmes which HSF has been actively involved in partnership with the ASEAN Secretariat and the United Nations Environment Programme Regional Office for Asia-Pacific (UNEP-ROAP). For more information on HSF Indonesia, please visit http://www.hsfindo.org

Global Environmental Strategies (IGES)

Established in 1998, the Institute for Global Environmental Strategies (IGES) is an independent, not for profit think-tank, based in Japan. It goes beyond research to provide practical ways to protect the earth's environment and to realise greater sustainability and equity in the global community. While the outlook of IGES is global, the principal geographical scope of its activities is Asia and the Pacific region – an area which is experiencing rapid economic development and which will affect the global environment through its population growth, urban environmental problems and other environmental issues. For more information on IGES, please visit http://www.iges.or.jp

The participation of the IGES in this endeavour is made possible with the support of the government of Japan.

United Nations Environment Programme (UNEP)

The United Nations Environment Programme (UNEP)'s mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. For more information on UNEP, please visit http://www.unep.org

Swedish Environmental Secretariat in Asia (SENSA)

The Swedish Environmental Secretariat in Asia (SENSA) is the arm of the Swedish International Development Agency (SIDA). It provides enhanced opportunities for a dialogue with regional partners with an environmental focus, thereby strengthening Swedish co-operation in the area of environmental action. For more information on SIDA, please visit http://www.sida.se

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ABOUT THE ENVFORUM

The Asia-Europe Environment Forum (ENVforum) is a platform for dialogue and debate on sustainable development and the environment issues in Asia and Europe. The series is organised by the Asia-Europe Foundation (ASEF), the Hanns Seidel Foundation (HSF-Indonesia), the Institute for Global Environmental Strategies (IGES-Japan) with support of the government of Japan, the Swedish Environmental Secretariat for Asia (Sida-SENSA) and the United Nations Environment Programme (UNEP).

The ENVforum is advised by a steering committee of representatives from the Association of Southeast Asian Nations (ASEAN) Secretariat, the Asian Development Bank (ADB), the European Environmental Agency (EEA), Earth Council Asia-Pacific, the Regional Institute of Environmental Technology, the International Climate Policy Research Group, Zurich University, DG Environment of the European Commission and KEHATI-the Indonesian Biodiversity Foundation. The Research Centre for Sustainable Development of the Chinese Academy of Social Sciences (CASS) joined the steering committee in 2005.

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The Asia-Europe Environment Forum (ENVforum) 4th Roundtable which was held in Brussels in November 2006 was an Asia-Europe contribution to the current global policy dialogue on chemicals management through the promotion of transparency, capacity building and knowledge transfer. This publication is a compendium of the two-day discussion, presenting views expressed during the meeting by leading policy makers and technical specialists on two areas namely (a) common global approaches in chemicals and hazardous substances management for Asia and Europe; and, (b) overarching policy regime issues in chemicals and hazardous substances management in Asia and Europe. It includes contributions from Dr. Kim Myung-Ja, member of the Korean National Assembly, and Mr. Daniel Verbist, Executive Director, Build Trust and Communications, European Chemicals Industry Council. ASEF edited this volume together with Mr. Atul Bagai of the United Nations Environment Programme (UNEP).

This publication is significant given the fact that the Registration, Evaluation and Authorisation of Chemicals (REACH) proposal entered into force in the European Union in June 2007. Additionally, the regional consultation of the Strategic Agreement on International Chemicals Management (SAICM) in Asia was held in May 2007.

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