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Enhancing the role of industry through for example, private-public partnerships, the use of economic instruments at international and national level and allocation and financial and technical participation in implementing sound management of chemicals and waste.

*4th meeting of the Consultative Process on Financing Options for Chemicals and Wastes
4 - 5 May 2011, New York, USA*

I. Background

1. Chemicals are an integral part of daily life with over 100,000 different substances in use. Chemicals make up our physical world; they form the basis of life and they are the building blocks from which we make our products. They are constituents of materials; parts of preparations and products; and are embedded in complex physical systems.
2. Industries producing and using chemicals play an important role in the global economy and in international trade and have a dramatic impact on employment, trade and economic growth worldwide. The chemicals industry furthermore is an essential engine for change and innovation and thus contributes to the development of sustainable patterns of consumption and production.
3. While chemicals industry is a major contributor to national economies and global trade, the sustainable implementation of sound management of chemicals and hazardous wastes is a long-term commitment that has to be shared in a cooperative manner by all concerned stakeholders.
4. To implement sound management of chemicals and waste at the same time should include a model for sustainable financing of associated costs for industry as well as governments. Such a model that could include different financial sources needs to be developed with a clear understanding of what is to be financed by whom.
5. To the extent progress on a global level can be made towards sound management of chemicals and waste will depend, in part, on a successful establishment of the division of responsibility and related costs between national administrations and industry. A sustainable model for financing is dependent on development of national infrastructures allowing for cost allocations. The degree of allocated responsibility between governments and industry might differ between different countries and different approaches to legislation.

II. Approaches for meeting the sound management of chemicals and hazardous waste

6. The background paper at hand is based on the discussions during the third meeting of the Consultative Process held in Pretoria, South Africa in January 2011 and seeks to outline the roles for industry as a key stakeholder within any action planning to deliver the sound management of chemicals and hazardous wastes.
7. The paper has benefitted from the input of the International Council for Chemicals Associations (ICCA). It is a starting point for the continuing discussions in the context of the consultative process on the roles of industry in the sound management of chemicals and hazardous wastes and should be considered as work in progress.
8. Its aim is to provide input to the forth meeting of the consultative process on financing options for chemicals and wastes, which is to be held from 4 to 5 May 2011 in New York by outlining existing and innovative approaches that show a vast potential to either directly or indirectly impact the sound management of chemicals and hazardous waste at the national, regional and international levels.
9. Such approaches, as outlined hereafter, can either be industry-led or be implemented by other key stakeholders in the chemicals waste management field in close collaboration with industry and business.
10. The chemicals industry is experiencing a shift in production of chemicals from OECD to non-OECD countries. This increases the stakes and the challenges of managing chemicals safely in the developing world. For example, WHO estimates that about 3% of exposed agricultural workers suffer from an episode of acute pesticide poisoning every year. The overwhelming majority of fatalities take place in developing countries.

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11. Chronic effects of exposure to toxic chemicals most often go unreported, particularly in the developing world. Industrial compounds such as methylmercury, lead, PCBs, and other neurotoxicants cause neurodevelopment disorders with very serious societal implications: studies in the past decade have shown that low-level prenatal exposure to methyl-mercury is correlated with decreased IQ, leading to downward shift in IQ at the population level.
12. The costs associated with lost productivity due to the loss of IQ of children exposed to mercury through seafood consumption of their pregnant mothers were estimated at \$8.7 billion annually in the US. Healthcare costs due to lead poisoning are estimated at \$43 billion per year in the same country.
13. The effects of toxic exposure on wildlife and ecosystems are also well documented, although cause and effect relationships can be difficult to ascertain. For instance, pesticides have been implicated in the decline of amphibians worldwide; DDT metabolites have been known for decades to induce egg-shell thinning and were responsible for the decline of populations of fish-eating birds; coral reefs were recently shown to be under threat from pesticides run-off, compounding the effects of climate change.
14. Amongst the number of persistent toxic substances (PTS) and chemicals of concern, one category of chemicals, Persistent Organic Pollutants (POPs), poses great risks to the global environment because of their persistence and potential for bio-accumulation and long range transport. As a consequence, they are at the core of the strategy of the Global Environment Facility (GEF) for chemicals.
15. The realization of the risks to human health and the environment posed by the unsafe production and use of chemicals has led nations to indicate their support for sound chemicals management globally, as expressed via various regional and international agreements on chemicals. These include the Stockholm Convention and the Montreal Protocol (for both of which the GEF is a financial mechanism), as well as the Basel Convention, the Rotterdam Convention, the Strategic Approach to International Chemicals Management (SAICM), the Kyoto Protocol, a variety of marine conventions focused on protection of the environment from toxic and hazardous wastes, and the International Labour Organization (ILO) chemicals conventions pertaining to worker safety.
16. Sound chemicals management at the national level, as underpinned by these regional and international agreements, brings many global economic, social and environmental benefits

Approaches with direct impact on the sound management of chemicals and hazardous wastes

A) Allocation of responsibilities

Division of responsibility between government administration and industry

17. Modern legislation on chemicals risk management specifies the responsibilities and obligations of enterprises and public institutions. Enterprises and other actors handling chemicals are in some region allocated the main responsibility for ensuring that the use of chemicals does not affect human health or the environment in an unacceptable way.
18. Dialogue between governments and industry is important to develop a common understanding of roles and responsibilities, and ensuring of acceptance by industry is essential to ensure acceptance and to secure efficient implementation.
19. In certain regions the chemicals legislation regulating marketing of chemicals is based on a model where the producers and importers in a country, the so called primary suppliers, have the main responsibility. They are obliged to provide customers and users with adequate information on hazards and guidance on safe use. The users have to take account of aspects of risk in their choice of chemicals and organize safe use to avoid risks. Exporters may have still other responsibilities. Other stakeholders down the supply chain then have to fulfill their regulated tasks without any specific support from public institutions
20. In many countries as much as 10.000 different substances or more are imported (some countries are also producers, but most are mainly importers) and used by a very large number of downstream users.

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21. When there is no allocation of obligations it becomes by default the responsibility of the public authorities to ensure that all these various uses of all these 10.000 substances are done in a way that does not harm human health or the environment.
22. The allocation of responsibilities between national administration and industry conducts whether costs mainly fall on the administration or on industry. Before such basic allocation of responsibilities is sorted out and decided, as any chemicals management system requires, there is no rational ground to consider ways of calculating and financing costs for national systems for chemicals control.
23. The degree or extent to which responsibility is allocated to one actor or the other might differ between countries and regions.
24. If there are no clear allocations of responsibilities, the public authorities are facing a too demanding and costly task of ensuring risk assessment and risk management of a very large number of chemicals that are used in many different ways.
25. Clarity and coherence in the allocation of mandates between public bodies and the importers and producers is a key to efficiency and cost-effectiveness in implementing the sound management of chemicals. For any infrastructure for chemicals control to be efficient and financed in the longer term, there is therefore a need to clearly identify the mandate of public bodies involved in any related activities, at every stage of chemicals life-cycle, as well as to ensure a clear allocation of responsibilities between national administrations on one side and producers and importers on the other side.
26. Such delineation of responsibilities will improve the use of existing resources (finance, technical/technological means, information, expertise), provide the necessary flexibility to the legal infrastructures, and make the system easier to understand and access for regulated entities.
27. Allocations of cost needs to be based on what might be considered as the common elements of sound chemical management, providing information, risk assessments and risk management, and safe use, and in certain cases remediation.
28. Governments and public bodies have a key role to play, but have their competence mainly in a different field, i.e. supervising the risk and management activities being carried out, by issuing legislation, providing general information on chemicals risks and enterprises' responsibilities, and by enforcing and monitoring compliance.
29. The core competence of different stakeholders might serve as the basis for the division of responsibilities. In most cases industry has the best knowledge of their products, the proprieties, dissemination of relevant information and ways of handling the product, while governments have their competence in areas such as policy making, enforcement and monitoring.
30. Development of National infrastructures with an aim to clarify core competences in the area of SCM, the responsibilities as well as associated costs might be a useful step for establishing long term sustainable financing of sound chemical management.

ICCA input:

31. ICCA contributes financially to the WSSD Global Partnership for Capacity Building to Implement the Globally Harmonized System of Classification and Labeling of Chemicals (GHS). GHS is an important new tool that countries can draw upon to develop national chemical hazard communication systems by providing a basis for the establishment of comprehensive chemical safety programs. It represents an important step in harmonizing national chemical hazard communication systems worldwide and has a great potential to improve chemical safety across all relevant sectors.
32. In addition for many sectors (e.g., autos, electronics, paints, plastics, etc.) there are recycling schemes whereby the producers of products that contain chemicals contribute financially to the recovery of those chemicals.

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Extended corporate responsibility

33. Extending corporate responsibilities 'downstream', beyond immediate sales relationships is increasingly an objective of civil society where products contain increasingly complex 'cocktails' of chemical ingredients. Mechanisms (such as Chemical Leasing), to refocus the industry from sales income towards service provision that does not transfer the ownership and responsibility of the chemical itself have proved successful in certain industries, driving down chemical consumption and reducing environmental releases.
34. Other concepts of extended corporate responsibility encompass the concept of sustainability, a key concept that was prominently featured in the Brundtland Report published by the United Nations World Commission on Environment and Development in 1987. In 2002, the WSSD Johannesburg Plan of Action called for establishment of the Marrakech Process, which is a global multi-stakeholder process to promote sustainable consumption and production. The process particularly focuses on reducing the environmental footprint across the entire life-cycle of products and services, including all supply and value chains.
35. The close involvement of business and industry is vital for the implementation of the Marrakech Process, since companies are at the very core of the production of goods and services and are important players that are likely to shape markets and business behavior due to their thorough understanding of the economic rationale of introducing resource efficiency and waste reduction measures.
36. Corporate social responsibility (CSR) and, likewise, the concept of corporate citizenship (CC) are business models that aim at incorporating public interest into corporate decision-making. Both concepts encompass corporate self-regulation through monitoring to ensure compliance with legal and ethical standards as well as international norms. Their main objective is to encourage positive impact of business activities on the environment, consumers, employees and the broader public. At the same time, both business models seek to promote sustainable development and economic growth and to eliminate practices that harm civil society and the environment.
37. In addition, the triple bottom line accounting in the public sector expands the traditional reporting by taking on board, beside the economic performance, also the ecological and social spheres when measuring organizational success. With the ratification of the United Nations and ICLEI standards for urban and community accounting in early 2007, triple bottom line accounting became a common approach to public sector full cost accounting. For the private sector, a commitment to corporate social responsibility and other key approaches as outlined above could be seen as an efficient and effective means of moving towards triple bottom line reporting.

B) Government-private sector relationships

38. Government-private sector relationships that promote the environmentally sound management of chemicals and hazardous wastes require a more constructive and comprehensive engagement than is implied by the narrow roles of regulator and tax-payer.
39. Coherent reporting and benchmarking, for example, provides an efficient basis for raising awareness of pressing issues and action planning by both Government and industry, identifying key sectors or processes that require attention. Furthermore, collaboration between governments and the private sector can be an efficient means of designing workable regulation with which industry can comply and which is cost-effective when considered against costs of remediation and loss of environmental and health services.
40. The implementation of the chemicals and waste conventions and other national, regional or international legally binding and non-legally binding instruments, are likely to require a high level of cooperation and collaboration between the public and private sector, particularly when determining cost-effective and efficient strategies to address the obligation under these instruments.
41. A field of particular importance for possible government-private sector relationships is the reporting to national, regional and international regulatory bodies. Coherent reporting provides an efficient basis for raising awareness of pressing issues and action planning by both Government and industry, identifying key sectors or processes that require attention. Governments thus can focus their limited monitoring capacity and industry can plan necessary investment.

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42. Pollutant release and transfer registers (PRTRs) are, for example, an efficient and effective means to meet these objectives. The administrative burden of reporting separately to a variety of regulatory bodies can be replaced by a single reporting portal – efficient for both Government and industry. Furthermore, the PRTR reporting framework can provide a vehicle for joint working and confidence building between the parties and with civil society so that longer term economic planning can incorporate sustainable development objectives, including both supply- and demand-side resource actions, and the sound chemicals and waste management.
43. With the firm understanding that collaboration on reporting and development planning does not replace the establishment of regulatory frameworks, such collaboration nevertheless can be an efficient means of designing workable regulation with which industry can comply and which is cost-effective when considered against costs of remediation and loss of environmental and health services.

ICCA input:

44. During the ICCM-2 meeting, ICCA was presented with a Bronze Award by the United Nations Environment Programme (UNEP) for its “valuable in-kind contribution”. ICCA has provided financial contribution towards the SAICM Quick Start Programme, the objective of which is to support initial enabling capacity-building and implementation activities in developing countries, least developed countries, small islands developing States and States with economies in transition.
45. Below are further company specific examples for PPPs – a few out of many - which constitute a significant investment to improve sound chemicals management globally:
46. Promoting Safer Operations and Emergency Preparedness in the Value Chain of the Chemical Sector: This project brings together UNEP, the Ministry of Environmental Protection (MEP) in China and The Dow Chemical Company in a joint effort to promote safer production, chemical safety and emergency preparedness in the chemical industry value-chain in China. The Center of Environmental Emergency Response and Accident Investigation (EERC) is the affiliated institution of MEP. This multi-stakeholder chemical safety project supports the development of a safer production and chemical safety management system in China’s chemical industry value-chain. It enhances the institutional capacity of MEP and relevant organizations on the improvement of safer production; and elevates local level awareness and preparedness for industrial environmental emergencies.
47. Bayer and UNEP operate a successful youth environmental education. Launched in 2004, the partners run a dozen projects for young people with the focus on capacity building in environmental protection and sustainable development. As well as contributing the expertise of its own employees, Bayer gives financial support to the joint activities, providing over 1 million euro each year to fund regional workshops and conferences in Asia-Pacific, West Asia, Latin America, Africa and Eastern Europe.
48. The Strategic Alliance for the Fortification of Oil and Other Staple (SAFO) is being co-financed by the German Federal Ministry for Economic Cooperation and Development (BMZ) and realized by BASF and GTZ. The purpose of Safo is to provide low-income population groups in currently six selected emerging and developing countries (Bolivia, Brazil, Tanzania, Indonesia, Cambodia and Uzbekistan) at low cost with staple foods fortified with vitamin A.

C) Capacity building

49. Voluntary capacity building activities, implemented internally for members of the respective industry sectors or externally for the broader public, seek to ensure that chemicals and hazardous wastes are managed soundly.
50. It is vital to disseminate information about these industry-led activities since they are undertaken by a group of stakeholders for whom chemicals and waste represent core business activities. Moreover, there is vast potential to draw on key technical and managerial capacities and capabilities that are needed both to deliver continuing economic returns and key environmental and human health advances.

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51. A prominent and recent example for an initiative, which is jointly implemented by industry and the United Nations, is the recent MoU signed by the International Council of Chemical Associations (ICCA) and UNEP. Activities planned under this MoU seek to pursue joint projects for the sound management of chemicals and hazardous wastes and focus particularly on capacity building of key stakeholders in the public and private sector in identified priority areas.

ICCA input:

52. The Responsible Care Global Charter (RCGC) and the Global Product Strategy (GPS) are programs developed by the International Council of Chemical Associations (ICCA) as part of its commitment to the Strategic Approach to International Chemicals Management (SAICM). The aim of the Global Product Strategy (GPS) is to promote the safe use of chemical products and work within the context of Responsible Care to focus on enhanced product stewardship throughout the value chain. GPS is intended to reduce existing differences in the safe handling of chemical substances between developing, emerging and industrialized countries and to ensure that chemicals are not handled incorrectly due to a lack of information or incorrect assessments, thus endangering people and the environment.
53. ICCA is continuously engaging in longer-term capacity building efforts to improve the competency of SMEs and governments in developing countries; such as by conducting Responsible Care workshops and GPS training sessions. Product safety specialists from leading chemical companies are available during the workshops for training and knowledge transfer. Since 2008 a total of 28 workshops have been conducted in Asia, South America, Europe and South Africa and approximately 1400 participants from SMEs and authorities have been trained in chemical risk assessment
54. In addition ICCA has developed a comprehensive set of guidance materials for risk assessment and risk management as part of its GPS implementation efforts. This guidance particularly addresses small and medium sized enterprises in developing economies which may need assistance in the assessment of chemicals regarding their hazardous and exposure potential and to develop risk management measures for safe handling of substances throughout their life cycle (incl. value chain activities).
55. Within the global chemicals sector, capacity building involves activities as diverse as working with stakeholders such as regulators and the authorities to prevent illegal traffic, developing emergency response programs, training distributors on safe handling, and promoting technology transfer. Below are company specific examples – a few out of many - which constitute a significant investment to improve sound chemicals management globally:
56. Small and medium sized companies are the focus of BASF's "1+3" project, launched in China in October 2006 as part of its corporate social responsibility (CSR) activities. BASF forms a team with three types of business partners in the supply chain – a customer, a supplier and a logistics service provider – with the aim of promoting CSR and giving guidance through sharing best practices and expertise. The process involves inspections carried out by expert teams to assess the environmental and safety management standards of the project partners and, when necessary, working out possible solutions. Self assessment training and performance assessments are conducted with the partners, enabling them to implement processes for continuous improvement. The concept has been rolled out to over 55 companies in the past two years.
57. In 2006 the "Braskem + Partners" program in South America focused to support partner companies' efforts to become safer and more competitive. These activities have helped suppliers improve both their EH&S performance and the quality of products and services provided to Braskem. Improvements in the productivity indices of suppliers have risen from 44% in 2006 to 60% in 2008; Reduction in the number of accidents showed improvement of 58% in two years;
58. Sasol in South Africa develop specially tailored, product-specific capacity building programs for customers and other stakeholders such as authorities. The Sasol division trains about 1,000 people a year on managing different hazardous chemicals, such as high risk products used in South Africa's gold mining industry. Sasol provides detailed training programs on handling, use and disposal. Training materials include information on long term health effects, accidental release measures and disposal considerations.
59. Arch Chemicals is using its expertise in water treatment to help provide clean drinking water to people in developing countries from Ghana to Guatemala through the supply of water treatment systems that are economically,

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technically and socially feasible. The company for several years has provided funding, training and education via a non-profit group (New Forests Project) working in three Central American countries – Honduras, Guatemala and El Salvador.

D) Sustainable investment and technology transfer

Industry as a capital investor

60. As a capital investor, industry invests in establishing new facilities and in replacing or upgrading technologies in developed and in developing countries within the normal capital investment business cycle.
61. The consideration of sound management of chemicals and hazardous wastes at this field can serve to minimize incremental costs of avoiding releases and pollution by introducing and transferring improved management and process techniques, introducing and transferring higher standards of production, improving raw material efficiency and product quality.
62. Incremental costs may further be minimized if several environmental benefits act in concert, such as combining the implementation of pollution control measures with measure to reduce emissions of green house gases, unintentional POPs, mercury or particulates.

ICCA input:

63. The chemical industry plays a significant role in contributing to sustainable development and technology transfer. This is an important part of the chemical industry's capacity building activities: Technology transfer also leads to further cost reductions through improved management of production, quality and distribution and creates employment in the country receiving the transfer.
 64. To support the Roll-Back Malaria (RBM) global partnership between WHO, the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP) and the World Bank. Sumitomo Chemical has implemented a cost reduction program for malaria nets and provided a royalty free technology license for local manufacture in order to increase production capacity. The transfer of this technology to Africa has reaped tremendous results and shows how innovative partnerships can produce sustainable benefits for public health.
 65. In cooperation with the United Nations Industrial Development Organization (UNIDO) and the United Nations Environmental Programme (UNEP), BASF developed software aimed at introducing eco-efficiency to small and medium sized enterprises (SMEs) operating in the textile dyeing industry. This technology is not only more environmentally friendly but also enabled users to save costs and resources. Since its launch in 2002 in Morocco, the technology has been introduced to North Africa and Egypt through UNIDO National Cleaner Production Centres.
66. Industry as a capital investor may also be required to bear the costs of chronic or catastrophic pollution events at considerable cost both financial and reputational. Balancing the returns on invested capital against liabilities and reputational risks by requiring appropriate risk assessment and management based on precaution and preparedness may be an important driver for ensuring the sound management of chemicals and hazardous wastes.

ICCA input:

67. During the past 15 years, industry has participated in over 25 multi-stakeholder projects in 20 countries, in collaboration with over 30 organizations, leading to the safe disposal of an estimated 10,000 tons of obsolete products. Via CropLife chemical companies are actively contributing to the Africa Stockpiles Program, a partnership that includes the World Bank, FAO, WWF, the Pesticide Action Network and CropLife, which seeks to safely dispose of an estimated 50,000 tons of obsolete stocks and associated wastes across the entire continent of Africa in a fifteen year timeframe and to put in place measures to prevent re-accumulation of obsolete stocks.

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68. The PVC industry represented by their European associations (ECVM, ECPI, ESPA, EuPC) signed a voluntary commitment to deliver the concept of responsible cradle to grave management. The voluntary commitment addresses different impacts of PVC on the environment, and includes a plan for the various actions envisaged (reduction of emissions at the production stage, limitations on the use of cadmium, progressive implementation of recycling targets), as well as financial commitments involving the creation of a fund designed to finance relevant research projects. Results are evaluated by an independent third party.

Industry as a voluntary contributor

69. As a voluntary contributor, industry in developing countries and countries with economies in transition could play a significant role in community financing by supplementing government social service provision with support for schools and clinics, culture and conservation, housing and utilities provision.

70. The role of industry as a voluntary contributor may particularly be an important aspect for the environmentally sound management of chemicals and hazardous wastes in those cases, in which industry is located away from main centres of population. In such circumstances, industry and business may be an important contributor to the sustainable consumption and use of natural resources and for measure on pollution control and waste management actions.

ICCA input:

71. Below are company specific examples – a few out of many - which constitute a significant investment to improve sound chemicals management globally:

72. Dow actively supports the social and economic aspirates o communities and enables their success by forging alliances with non-profit organizations through educational programs, training and multicultural exposure. The Thokomala project, which is based on the simple yet effective model of community-based child care. The non-profit organization uses a holistic approach to provide shelter, food and a family environment for orphans and vulnerable children affected by HIV/AIDS. Dow became a sponsor of the KwaZulu Natal based organization in 2006. Dow contributes to operational costs but has also set up an education fund to enable children raised at Thokomala to pursue tertiary education. The first beneficiary of the fund is completing her second year studying Social Work at Westville University. The Rehoboth project is a non-profit organization that provides institutionalized care for children orphaned by HIV/AIDS. Also based in KwaZulu Natal, Rehoboth has been supported by Dow since 2002. Osizweni is an education and development program in Secunda, Mpumalanga. The program focuses on tutoring students in Mathematics and Science, two subjects identified by the national Department of Education in South Africa as critical to the countries economic and skills development. Early in 2008 Dow donated a mobile lab to help facilitate practical science experiments to underprivileged students

73. BASF and the German Center for Technical Cooperation and Development are conducting a joint project (“Public Private Partnership”) to manage waste separation in Mexican municipality. The Municipality of Altamira is located in a very important hydrologic region shaped by lagoons, rivers and swamps, making it difficult and costly to deposit adequately the 136 tons of waste generated daily by its 250.000 inhabitants and rendering this issue the most pressing environmental problem of the region. A pilot project informed about the process of waste separation while at the same time, the municipality set up the infrastructure to guarantee the right collection, afterwards the project is extended to the whole community. The partners have identified major challenges and developed plans to reduce the amount of waste generated and increase recycling.

74. In 2002, PETRONAS Chemicals, launched an annual initiative to clean up the Balok River in Gebeng, which adjoins the site. Along with employees, local residents and community representatives from Kuantan and Balok take part in the project, which is aimed at increasing awareness for the environmental significance of mangrove swamps.

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Industry as a purchaser of utilities

75. As a purchaser of utilities including environmental services, industry may contribute to the provision of, for example, electricity, water and waste services.
76. In many countries, utility priorities focus on supply side factors; contributing to the exploitation of resources at unsustainable rates rather than on balancing supply and demand management actions that husband scarce resources. National capacities to define, plan and control the exploitation of environmental resources may be limited. Furthermore, resources may be undervalued and supplied free of charge or below economic cost as part of pro-poor policies but without balancing measures to ensure that larger users pay appropriate rates that encourage their careful management of resource use. In some countries, uncontrolled exploitation by industry has led to the rapid degradation of resources used by all sectors of society, elsewhere, industry has been able to negotiate discounted rates for services.

E) Resource efficiency and process optimization

Green Economy - increasing resource efficiency

77. The concept of Green Economy seeks to improve human well-being and social equity, while at the same time reducing environmental risks and ecological scarcities. It seeks to promote economic development and fully incorporated the principle of sustainable development. At the core of the concept is the direct valuation of natural capital and the internalization of external effects.
78. At individual enterprise level, management has a continuing interest in maximizing production value whilst minimizing costs. Wastage of input resources and the costs of waste management represent important considerations so that industry has a vested interest in reducing releases of materials that might otherwise be recovered and reused. While 'end-of pipe' solutions might be most commonly used, resource minimization and the optimization of processes through production cycle improvements may be more cost-effective as they build resource-use efficiency, exploit existing production skills within the workforce, and can often be implemented progressively in steps that are tailored to available investment allocations and have relatively quick returns on capital.

Implementation of Cleaner Production

79. The concept of Cleaner Production includes the continuous application of an integrated environmental strategy to processes, products and services to increase efficiency and reduce risks to humans and the environment. There is broad consensus that the transition towards more sustainable industrial systems is critical for ensuring a more efficient use of resources, which is a key element of the transitions towards Green Industry and Green Economy.
80. Cleaner Production continuously applies integrated and preventive strategies to processes, products and services with a view to increase efficiency and to reduce risks to human health and the environment. In order to minimize of the adverse impacts of industrial production systems on nature and the environment, Cleaner Production particularly aim at increasing the efficiency of production through optimization of productive use of natural resources at all stages of the production cycle, improving environmental management procedures. It also seeks to minimize the risks to people and communities and support their development.
81. While Cleaner Production and environmental considerations have been mostly externalized and considered as an impediment for sustainable economic and social development in the past, there are a growing number of cases in which industry is implementing innovative strategies that meet the goals of sustainable development by, at the same time, ensuring that environmental goods and services are not exploited or despoiled at unsustainable rates and at costs below their regeneration or protection values.

Implementation of Green Chemistry and integrated approaches

82. Green Chemistry encourages the design of products and processes that minimize the use and generation of hazardous substances and, taking into account the precautionary principle, seeks to reduce and prevent pollution at its source.

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83. Green Chemistry favors the design of processes to maximize the amount of raw material that ends up in the product and encourages the use of safe, environment-benign substances, including solvents, whenever possible. It also promotes the design of energy efficient processes and incorporates the principle of waste reduction and avoidance at all stage of the process.
84. Green Chemistry and other integrated approaches may be employed in production to maximize molecular efficiency, to define eco-efficient products and the most cost-effective production pathways. In this regard, unwanted reaction products generated at intermediate stages in a particular production cycle are not regarded as waste but as the starting points for a further production chain.
85. Where unwanted intermediate products cannot be used, consideration of alternative production routes is prompted. In this approach, waste – comprising unwanted molecules, is inherently inefficient and to be avoided.

F) Economic instruments

86. Activities of the private sector that generate negative externalities are likely to result in social costs that are not covered by the private costs of the activity.
87. In order to internalize those costs, some economic theories suggest that the entities responsible for generating the negative externalities should cover all costs, including the social costs. The underpinning concept in the field of environmental law that responds to this approach is the polluter pays principle.
88. As an alternative to direct regulation, strategies to internalize negative externalities can also include the introduction of taxes, such as the Pigovian tax.
89. In praxis, taxes and levies have been applied to industry, to transactions along the supply chain, and to consumers to meet environmental costs that would otherwise be externalized. Such economic instruments can be effective and have the potential to lower cost and to raise revenue for government programmes that otherwise would encounter difficulties in mobilizing financial resources.

ICCA input:

90. Industry is supporting national governments in the countries in which we do business by corporate taxes as a direct mechanism to financially support administrations to further improve chemicals management. These taxes can be allocated towards activities to improve sound chemicals management. While the private sector might be a supplementary source of funding, it cannot replace government financing and commitment.
91. The global chemicals industry is a major employer in many of the countries in which companies operate and supply a vast range of products to down-stream users, also with significant employees, who themselves convert the chemicals into products. These complex value chains are an important and critical part of the economies of most countries participating and contribute to income and purchasing power for the overall economy as well as supporting the governments financially. Such financial support to governments through corporate and income taxes in turn provides the means to employ government officials including regulators who provide the governance role over manufacturing industries, such as chemical production, on a national level.
92. Investments of the chemical industry to implement regulatory compliance (including downstream users) are substantial cost of doing business and not easy to accurately quantify since each company has its own administrative system
93. Below are company specific examples – a few out of many - which constitute a significant investment to improve sound chemicals management globally:
94. Dow and The Nature Conservancy Announce Collaboration to Value Nature: Dow and The Nature Conservancy collaborate to help Dow and other companies recognize value and incorporate nature into global business goals, decisions and strategies. The global organizations will work together to apply scientific knowledge and experience to examine how company operations rely on and affect nature. The aim of the collaboration is to advance the incorporation of the value of nature into business, and to take action to protect the earth's natural systems and the

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services they provide people, for the benefit of business and society. One of the major objectives of this collaboration is to share all tools, lessons learned and results publicly and through peer-review so that other companies, scientists and interested parties can test and apply them. Dow and its foundation are committing \$10 million to this collaboration over the next five years.

G) Investment in Research

ICCA input:

95. ICCA and its member companies invest significant funding into toxicological and eco-toxicological testing of products, monitoring of the environment and the work place and implementing protective measures for risk management to ensure that exposure to chemicals is at a safe level. Bearing significant cost to ICCA member companies globally, nevertheless the investment is considered a very necessary and important cost of doing business and maintaining industry's license to operate.
96. Furthermore the ICCA's Long Range Research Initiative (LRI) aims to identify and fill gaps in our methodology and understanding of the potential risk posed by chemicals and to improve tools available for risk assessment, thereby enabling industry and regulators to make informed decisions based on high quality information. Launched in 1999 and implemented under the responsibility of three regional centers (US, Japan, and Europe) more than US\$200 million have been invested so far.
97. Via the Business and Industry Advisory Committee (BIAC) the global chemical industry supports the activities of OECD by providing financial contributions as well as by providing expertise and facilities for testing. Industry supports the development of chemicals management and assessment guidelines, guidance, manuals and data systems, and free dissemination and availability of materials under the OECD program.

Approaches with indirect impact on the sound management of chemicals and waste

H) Industry as a tax payer

98. As a taxpayer, industry contributes to government services through taxation but is not responsible for the disbursement or priorities set for the use of these revenues. Only rarely are such revenues allocated by governments to alleviate industry impacts. Furthermore, industrial development as a result of inward investment may be subject to commercial taxes that have been set at discounted rates as governments choose to encourage industrial development by substituting commercial tax revenues for 'downstream' taxes, for example, employee taxation and value added taxes, or for foreign exchange from export revenues.

I) Trickle-down effects

99. Changing requirements at enterprise level can have impacts along the whole supply chain of that industry. In the past, manufacture and retail sales may have been integrated within a single enterprise but in recent decades, the move to vertically distinct enterprises has required major retailers to impose and monitor close quality, health and environment controls on their 'upstream' suppliers.