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Open-ended Working Group of the International Conference on Chemicals Management
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Item 5 (c) of the provisional agenda *
Implementation of the Strategic Approach: New and emerging policy issues

Submission by Switzerland on Nanotechnologies and manufactured nanomaterials

Note by the secretariat

The secretariat has the honour to circulate, for the information of participants, additional information on the Swiss proposal to complement the SAICM Global Plan of Action with activities in relation to the environmentally sound management of nanotechnologies and manufactured nanomaterials in document SAICM/OEWG.1/8. The information contained in the annex to the present note has been transmitted by the Government of Switzerland and reproduced as received without formal editing.

* SAICM/OEWG.1/1/Rev.1

Additional information on the Swiss proposal to complement the SAICM Global Plan of Action with activities in relation to the environmentally sound management of nanotechnologies and manufactured nanomaterials

The annexes to this information paper illustrate the steps that lead to the proposal from the government of Switzerland to Complement the Global Plan of Action of the Strategic Approach to International Chemicals Management with the creation of a new work area and associated activities in relation to the environmentally sound management of nanotechnologies and manufactured nanomaterials.

Nanotechnologies and manufactured nanomaterials were not yet an issue at the first session of the International Conference on Chemical Management. It was addressed as an emerging issue under SAICM beginning with the second session of the International Conference on Chemical management (ICCM2) in 2009, and discussions were informed by a background information document (SAICM/ICCM.2/INF/34), prepared by the United States of America and Switzerland.

At ICCM2, a discussion on the inclusion of activities related to manufactured nanomaterials and nanotechnologies in the SAICM GPA took place based on a Conference Room Paper (CRP) presented by Switzerland. This CRP included a preliminary table of proposed activities to be added to the GPA. ICCM2 concluded that this issue should be pursued at the third International Conference on Chemical Management (ICCM3). Pursuant to this decision, Switzerland consulted with relevant stakeholders, and prepared a formal proposal to add a new work area to the Global Plan of Action, with new activities for the sound management of nanotechnologies and manufactured nanomaterials, at the third International Conference on Chemical Management (ICCM3) in 2012. This proposal dated April 3rd was sent to all regional and national SAICM focal points and posted on the SAICM secretariat website for consultation and was the object of additional regional consultations during workshops on nanotechnology and manufactured nanomaterials organized by UNITAR back to back with SAICM regional meetings.

Both the ICCM2 Conference Room paper and the Swiss proposal dated 3 April 2011 are attached below.

Annex 1

SAICM/ICCM.2/CRP.6
11 May 2009

English only

International Conference on Chemicals Management
Second session
Geneva, 11–15 May 2009
Item 4 (f) of the provisional agenda*

Implementation of the Strategic Approach to International Chemicals Management: emerging policy issues

Complementing the Global Plan of Action by including specific activities on nanotechnology and manufactured nanomaterials: submission by Switzerland

Note by the secretariat

The annex to the present note contains a paper submitted by Switzerland on emerging policy issues: complementing the Global Plan of Action by including specific activities on nanotechnology and manufactured nanomaterials. The paper is being circulated as submitted, without formal editing.

* SAICM/ICCM.2/1.

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Annex

Conference Room Paper by Switzerland on Emerging Policy Issues:

Complementing the Global Plan of Action (GPA) by including specific activities on nanotechnology and manufactured nanomaterials:

The use of nanotechnology and manufactured nanomaterials has evolved rapidly since 2006. Today, this new technology is broadly used in many countries. It offers the potential for both, societal benefits and environmental, health and safety risks. Nanotechnology and manufactured nanomaterials were not yet an issue at the first session of the International Conference on Chemicals Management. The Strategic Approach for International Chemicals Management thus does not address nanotechnology. Switzerland proposes to complete the GPA by including the attached activities relating to nanotechnology and manufactured nanomaterials.

1. Background

Nanotechnology and manufactured nanomaterials are an important new and emerging issue. It offers the potential of societal benefits and socio-economic, environmental, health and safety risks. International activities to address the implications and applications are taking place in the OECD and ISO while UNESCO started mapping ethical, legal and social implications (ELSI) of nanotechnologies. Switzerland takes the view that it is important to share this work with countries not involved in the OECD and ISO work and make sure that a global cooperation framework adequately addresses ELSI. In this context, additional activities, including international cooperation, may be desirable to help ensure that nanotechnology and manufactured nanomaterials are used in a sustainable and beneficial manner and in particular, to help to develop a better common understanding of the potential benefits to human health and the environment as well as the challenges posed by nanotechnology and manufactured nanomaterials, including for developing countries and countries with economies in transition.

SAICM consists of the Dubai Declaration, the Overarching Policy Strategy, and the Global Plan of Action (GPA). The Overarching Policy Strategy recognizes that SAICM objectives are to "ensure that existing, new and emerging issues of global concern are sufficiently addressed by means of appropriate mechanisms;" (§14.g). SAICM does not yet address this increasingly important area of chemicals management. The GPA is a "voluntary toolkit" that outlines possible activities that countries can chose to undertake to address areas that they have identified as a priority. SAICM should provide a supportive international framework for GPA implementation, including by helping to support developing countries and countries with economies in transition to develop and implement concrete policies and activities according to their priorities.

The Dubai Declaration recommends the use and further development of the GPA to address current and ever-changing societal needs, as a working tool and guidance document for meeting the commitments to chemicals management. In this regard, Switzerland takes the view that the GPA should be complemented to include activities on nanotechnology and manufactured nanomaterials.

Complementing the GPA by including the proposed additional activities on nanotechnology and manufactured nanomaterials would:

- build on the activities undertaken within the OECD, ISO, UNESCO and other intergovernmental and international bodies,
- ensure that SAICM continues be a responsive and comprehensive overarching policy framework for chemicals policy and sound chemicals management,
- help countries to identify nanotechnology and manufactured nanomaterials as a priority,

- help countries to address this issue,
- help countries to develop and implement appropriate policies,
- help countries to access support for such policies, and
- help support countries in their activities towards a safe, beneficial and sustainable use of nanotechnology;

Therefore, Switzerland proposes that the GPA be complemented by including the attached activities relating to nanotechnology and manufactured nanomaterials.

2. Comments received on inclusion of nano activities in the GPA

Proposed guidelines for the inclusion of new activities in the GPA are currently before the Conference (SAICM/ICCM.2/INF18). Switzerland has followed the procedure proposed in these guidelines by sending the proposed GPA addition on nanotechnology and manufactured nanomaterials to regional SAICM focal points, representatives of NGOs, business representatives and the IOMC for comment. All have been invited to inform the countries of their region, the other NGOs, and Intergovernmental Organizations respectively, to comment on this proposal.

All comments received supported the proposed inclusion of activities relating to nanotechnology and manufactures nanomaterials into the GPA. And, it was generally agreed that the proposed new activities reflect the most urgent needs with regard to nanotechnology and manufactured nanomaterials.

The GPA is structured according to the five categories of objectives of the Overarching Policy, namely, risk reduction, knowledge and information, governance, capacity-building and technical cooperation, and illegal international traffic. The GPA identifies for each objective work areas with specific activities. During the consultations with the regions and stakeholders, it was highlighted that the proposed new activities relating to nanotechnology and manufactures nanomaterials could be included in the GPA:

a) either as a new work area,
b) or by integrating the new nano-related activities into existing work areas of the GPA.

Establishing a new work area under objective 2 "Knowledge and Information" is consistent with the current GPA structure. Moreover, grouping nano-related activities in a common work area on nanotechnology and manufactures nanomaterials would facilitate the overview over these activities.

Integration of the new activities in existing work areas would help to integrate nano-related activities into similar ongoing work in chemicals management and reflect existing structures and processes.

Complementing the Global Plan of Action
Option A): Including a new working area on nanotechnology related activities

WORK AREAS ADDRESSING KNOWLEDGE AND INFORMATION (OBJECTIVE 2)					
Work area	**Activities**	**Actors**	**Targets/ Timeframe**	**Indicators of progress**	**Implementation aspects**
Nanotechnology and Manufactured Nanomaterials	1. Increasing the understanding of the environmental health and safety (EHS) implications, promoting responsible development of health and environmentally beneficial applications, increasing the understanding of ethical, legal and social implications (ELSI) and developing and promoting consensus standards on nanotechnology and manufactured nanomaterials.	National Governments, intergovernmental and international organizations, academia, industry, NGO.	2009 - 2015	Harmonized and validated methods for testing and assessment are available. Applications which are beneficial to health and the environment are available are available. Governments and public are aware of EHS issues and ethical, legal and social implications (ELSI) and such implications are adequately addressed.	Coordination of the different modules by IOMC.
	2. Support and, where feasible, Increase funding for research on nanotechnology implications, as well as for applications that may be useful in meeting the actions called for in the Johannesburg Plan of Implementation of the 2020 WSSD goals, including such actions in developing countries and countries with economies in transition.	National Governments, intergovernmental and international organizations, academia, industry.	2009 - 2020	Environmental health and safety implications of manufactured nanomaterials are better understood. Applications which are beneficial to health and the environment and applications useful in meeting the WSSD goals are available.	It is important that risk assessment and risk management strategies are incorporated into this effort.
	3. Take measures to prevent or minimize unintended exposure of workers, consumers and the general public, and releases to environment, particularly for hazardous manufactured nanomaterials or where there is uncertainty around the environmental or human health impact.	National Governments, intergovernmental and international organizations, academia, industry.	2009 - 2012	Manufacturers and downstream users of nanomaterials are informed about hazardous nanomaterials. Measures to prevent or minimize exposure are in place.	Steps to inform downstream users through the whole supply chain via Material Safety Data Sheets (MSDS) or other means should be taken where appropriate.

Complementing the Global Plan of Action
Option B): Integrating the new nanotechnology related activities into existing work areas

Existing Work area	New Activities	Actors	Targets/ Timeframe	Indicators of progress	Implementation aspects
Hazard data generation and availability	Increasing the understanding of the environmental health and safety implications. Support and, where feasible, increase funding for research on nanotechnology implications, and promoting consensus standards on nanotechnology and manufactured nanomaterials.	National Governments, intergovernmental and international organizations, academia, industry, NGO.	2009 - 2015	Environmental health and safety implications of manufactured nanomaterials are better understood. Governments and public are aware of environmental, health and safety implications. Harmonized and validated methods for testing and assessment are available.	Coordination by IOMC.
Promote industry participation and responsibility	Promoting responsible development and environmentally beneficial applications. Support and, where feasible, increase funding for research for applications beneficial to health and the environment, including such actions in developing countries and countries with economies in transition.	National Governments, intergovernmental and international organizations, academia, industry, NGO.	2009 - 2020	Applications which are beneficial to health and the environment and applications useful for the completion of WSSD goals are available.	It is important that risk assessment and risk management strategies are incorporated into this effort.
Social and economic considerations	Increasing the understanding of the ethical, legal and social implications (ELSI) of nanotechnology and manufactured nanomaterials.	National Governments, intergovernmental and international organizations, academia, NGO.	2009 - 2015	Governments and public are aware of ELSI and such implications are adequately addressed.	
Formulation of preventive and response measures to mitigate environmental and health impacts of emergencies involving chemicals	Take measures to prevent or minimize exposure of workers, consumers and the general public, and releases of nanomaterials to environment, in particular for hazardous manufactured nanomaterials or where there is uncertainty around the environmental or human health impact.	National Governments, intergovernmental and international organizations, academia, industry, NGO.	2009 - 2012	Manufacturers and downstream users of nanomaterials are informed about hazardous nanomaterials. Measures to prevent or minimize exposure are in place.	Steps to inform downstream users through the whole supply chain via Material Safety Data Sheets (MSDS) or other means should be taken where appropriate.

Annex 2

DRAFT April 3rd 2011,
Proposal from the government of Switzerland

Justification document for the inclusion of nano-related activities in the SAICM Global Plan of Action

Complementing the Strategic Approach to International Chemicals Management Global Plan of Action with the creation of a new work area and associated activities in relation to the environmentally sound management of nanotechnologies and manufactured nanomaterials.

The use of nanotechnologies and manufactured nanomaterials has evolved rapidly since the first session of the International Conference on Chemical Management in 2006. Today, these new technologies are broadly used, and heavy research and development is underway in many countries. Nanotechnologies and manufactured nanomaterials offer potential societal and economical benefits as well as potential environmental, health and safety risks.

Nanotechnologies and manufactured nanomaterials were not yet an issue at first session of the International Conference on Chemical Management, but they were addressed as an emerging issue under SAICM beginning with the second session of the International Conference on Chemical management (ICCM2) in 2009. The SAICM Global Plan of Action (GPA) thus does not yet address this issue. Switzerland is proposing to add a new work area to the Global Plan of Action, with new activities for the sound management of nanotechnologies and manufactured nanomaterials, at the third International Conference on Chemical Management (ICCM3) in 2012.

The proposed new work area includes activities to:

- Encourage the generation and sharing of hazard and risk data in relation to nanomaterials and nanotechnologies;
- Support technical, legal and institutional information sharing and capacity building for the management of nanomaterials;
- Integrate the management of nanomaterials to ongoing and projected chemical management programs;
- Support the development of adequate risk management tools and mechanisms, including information schemes such as certification systems.

See table 1 below.

In accordance with the procedure adopted during ICCM2, this draft document describes how the activities of the proposed new work area are relevant to protecting human health and the environment; its contribution to national, regional or global commitments, objectives, priorities, and needs; how it will reflect best practices and be effective; and, means of implementation at the country or participant level.

Background information, including relevance of the activity to protecting human health and the environment

The background information (SAICM/ICCM.2/INF/34) in relation to the emerging policy issue of nanotechnology and manufactured nanomaterials document, that was prepared to guide the discussion on this emerging issue and provide rationale for proposed cooperative action during ICCM2 noted that "while SAICM is aimed to providing the overarching policy framework for chemicals policy and sound chemicals management, it does not yet address this increasingly important area of chemicals management"[1].

The same document mentions that some of the same unique properties that make manufactured nanoparticles suitable for certain applications also raise questions about the impacts of nanoparticles on human health and the environment. Toxicity and fate of nanoparticles depends on a variety of physicochemical properties such as size and shape, as well as surface properties such as charge, area, reactivity, and coating type on the particle. These factors also influence the uptake and distribution of nanoparticles in the human body.In addition to particles themselves, the potential human health and ecological impacts of their breakdown products, as well as their interactions with other contaminants, should also be considered.

Once in the bloodstream, studies have shown that some nanoparticles can be transported around the body and are taken up by the liver, spleen, bone marrow, the kidneys, the heart, the reproductive organs, soft tissue and skeleton.[2] Furthermore, placental transfer is supported by a recent study, which demonstrated the ability of some nanoparticles to transfer from pregnant mice into the brain and testes of their offspring[3]. A number of studies have also demonstrated that some nanoparticles may be transported directly from olfactory neurons into the central nervous system, crossing the blood-brain barrier.

With respect to the genotoxicity of nanomaterials, studies have shown the ability of nanomaterials to penetrate sub-cellular compartments containing DNA that are usually impervious to man-made chemicals. The intracellular mobility of nanomaterials is especially concerning when viewed in light of studies showing that nanomaterials can, directly and/or indirectly (through oxidative stresses), damage DNA, RNA, and/or histones.[4]

In addition, there is evidence that some nanomaterials may be toxic for ecosystems. For example, nanoscale titanium dioxide can cause mortality or behavioral or physiological changes in environmental indicator species such as water fleas, fish, or algaeand have been

[1] Background information in relation to the emerging policy issue of nanotechnology and manufactured nanomaterials, note by the secretariat, SAICM/ICCM.2/INF/34, available at http://www.saicm.org/documents/iccm/ICCM2/meeting%20documents/ICCM2%20INF34%20nano%20background%20E.doc

[2] SCENIHR, *Risk Assessment of Products of Nanotechnologies*, pgs 24-29 (2009) (citing several science-based studies) available at http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_023.pdf.

[3] Takeda *et al.*, *Nanoparticles Transferred from Pregnant Mice to Their Offspring Can Damage the Genital and Cranial Nerve Systems*, Journal of Health Science, Volume 55, number 1, February 2009

[4] *Id.*, pg 32 (referencing Gonzalez et al 2008 and Landsiedel et al 2008).

shown to stress photosynthetic organisms, potentially leading to the disruption of nitrogen and carbon cycles in aquatic ecosystems.[5]

When chemicals bioaccumulate, tissue concentrations increase over time despite low background environmental levels of the chemical. The U.S. Environmental Protection Agency (U.S. EPA) acknowledged that "[b]acteria and living cells can take up nanosized particles, providing the basis for potential bioaccumulation in the food chain."[6] Further research has shown that earthworms can absorb copper nanoparticles present in soil.[7] Biomagnification, the increase in concentration of a specific toxic from prey into predator, was also evidenced for nanomaterials in an aquatic environment, involving microscopic life forms, which comprise the base of all food webs.[8] This evidence of bioaccumulation suggests that the risks of nanomaterials to human health and the environment may increase over time.

Additionally, According to the U.S. EPA *Nanotechnology White Paper*, "[m]any of the nanomaterials in current use are composed of inherently non-biodegradable inorganic chemicals, such as ceramics, metals and metal oxides, and are not expected to biodegrade."[9]

Because manufactured nanomaterials are already on the market in a growing number of products including paints, cosmetics, clothing, household appliances, food packaging, etc. countries should give due consideration to potential health or environmental implications of such use of nanomaterials during their whole life cycle; e.g. the potential effects of production of the nanoscale materials, as well as the disposition of nanomaterials that may, for example, require new hazard communication programs to recyclers or new concerns for disposal.[10] In this context, according to ICCM2 preparatory documents, SAICM should provide a supportive international framework to support developing countries and countries with economies in transition to develop and implement concrete policies and activities[11].
The new GPA activities in relation to nanotechnologies and manufactured nanomaterials herein proposed by Switzerland could thus help countries to address this issue, to develop and implement appropriate policies, and to access support for such policies.

How the activity would contribute to achieving national, regional or global commitments, objectives, priorities and needs

SAICM's general objectives are detailed in the Overarching Policy Strategy (OPS) and Dubai Declaration. These overall objectives include risk reduction, knowledge and information, Governance and capacity building and technical cooperation. The GPA is the evolving tool

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5 *See e.g.* Carla Cherchi and April Z. Gu, *Impact of Titanium Dioxide nanomaterials on Nitrogen Fixation rate and intracellular Nitrogen storage in Anabaena Variabilis*, 2010, *Environ. Sci. Technol.*, 2010, 44 (21), pp 8302–8307, available at http://pubs.acs.org/doi/abs/10.1021/es101658p.

6 U.S. EPA, *Nanotechnology White Paper*, at p. 50 (2007), available at http://www.epa.gov/OSA/pdfs/nanotech/epa-nanotechnology-whitepaper-0207.pdf (citing Biswass and Wu, 2005).

7 Jason M. Unrine, Olga V. Tsyusko, Simona E. Hunyadi, Jonathan D. Judy, Paul M. Bertsch. *Effects of Particle Size on Chemical Speciation and Bioavailability of Copper to Earthworms Exposed to Copper Nanoparticles.* 2010, *Journal of Environment Quality*, 2010; 39 (6): 1942, available at 10.2134/jeq2009.0387.

8 R. Werlin, J. H. Priester, R. E. Mielke, S. Krämer, S. Jackson, P. K. Stoimenov, G. D. Stucky, G. N. Cherr, E. Orias, P. A. Holden. *Biomagnification of cadmium selenide quantum dots in a simple experimental microbial food chain.* Nature Nanotechnology, 2010; DOI:10.1038/nnano.2010.251, available at http://dx.doi.org/10.1038/nnano.2010.251

9 U.S. EPA, *Nanotechnology White Paper*, *supra* note 15, at p. 50.

10 See supra note i.

11 See supra note i.

that identifies work areas and associated activities that may be undertaken by stakeholders in order to pursue the commitments and objectives expressed in the SAICM OPS and the Dubai Declaration. The proposed new work area aims at providing an implementation path to reach the OPS objectives in relation to nanotechnologies and manufactured nanomaterials.

During ICCM2, a resolution on nanotechnologies and manufactured nanomaterials was adopted. This resolution called on SAICM stakeholders to provide support to countries in development and countries with economies in transition to enhance their capacity to use and manage nanotechnologies and manufactured nanomaterials responsibly (operational paragraph 1), and on the wider dissemination of human health and environmental safety information in relation to products containing nanomaterials (operational paragraph 7). The resolution also requested the promotion of appropriate actions to safeguard human health and the environment (OP 2), recognized the role of regulatory, voluntary and partnership approaches for the responsible management of nanotechnologies and manufactured nanomaterials (OP3) and recommended the establishment of multi-stakeholder dialogues (OP 6). New GPA activities proposed for inclusion in the new work area relating to nanotechnologies and manufactured nanomaterials would support the realization of these objectives.

At subsequent SAICM regional meetings, in Africa and Latin America and Caribbean regions further elaborated on specific national and regional needs in relation to the safe management of nanotechnologies and manufactured nanomaterials through specific resolutions. Those needs relate to the establishment of partnerships and collaborations; to the necessary funding for research on potential risks to human health and the environment; to the development of legal provisions to ensure safe practices with regards to the production, use, transport and disposal of manufactured nanomaterials.

The new activities that Switzerland proposes to add to the SAICM GPA, are designed to support the fulfillment of those needs and priorities, as adopted unanimously by the African and GRULAC regions.

For example, in order to satisfy the demand for the set up and enforcement of legal provisions to ensure safe practices with regards to all stages of nanomaterials life, Switzerland proposes to include activities to assess the gaps in existing regulatory and institutional frameworks, promote and enhance information sharing on national and regional policy and regulatory initiatives, identify, strengthen and enforce legal and regulatory provision for the environmentally sound management of waste containing nanomaterials, and promote consensus standards.

Similarly, to meet the needs expressed by those regions and countries for better information regarding potential human health and environmental impacts of manufactured nanomaterials and, Switzerland proposes to add activities to increase the understanding of the environmental health and safety implications through further information sharing and research of manufactured nanomaterials.

Ways in which the activity reflects the best practices and will be effective

The activities included in the proposed new work area on nanotechnologies and manufactured nanomaterials intend to facilitate the sharing of best practices, including by facilitating the

exchange of information on existing regulatory and voluntary initiatives, for example in the area of protection of workers manufacturing, using or disposing of manufactured nanomaterials.

Furthermore, by promoting sharing of technical and regulatory information, it would allow countries less advanced to benefit from knowledge developed by most advanced countries, arising in particular from existing regional initiatives such as the OECD Working party on Manufactured Nanomaterials and definition efforts from the European Union and International Standardization Agency.

Means of implementation of the activity at the country or participant level (Setting out examples)

Activities proposed, such as promoting private/public partnership, including nanomaterials and nanotechnology in existing chemical management programs, refining guidance for such inclusion and developing pilot projects in developing countries and countries with economies in transition, developing nano labeling schemes based on best practices, could provide appropriate means of implementation at the country or participant level.

Proposal for inclusion of new activities under a new work area relating to nanotechnologies and manufactured nanomaterials:

Work Area	New Activity	Actors	Target/Time frame	Indicators of progress	Implementation aspects
Nanotechnologies and Manufactured nanomaterials	1. Increasing the understanding of the environmental health and safety implications through further information sharing and research of manufactured nanomaterials.	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Number of publicly available research paper on hazards and risks, significantly increase. All stakeholders are informed of risks and hazards of nanomaterials.	Coordination by IOMC
	2. Support and where feasible, increase funding for research on nanotechnologies health and safety implications	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2020	Number of publicly available research paper on hazards and risks, significantly increase.	
	3. Promote public and private sectors partnerships for the environmental sound management of nanomaterials	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Number of public/private partnerships signed.	
	4. Establish partnerships, with consideration of financial support, to assist developing countries and countries with economies in transition to build scientific, technical, legal, and regulatory policy expertise related to the risks of manufactured nanomaterials.	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Number of partnership established.	
	5. Further refine existing guidance on incorporation of nano in chemicals	National governments,	2012 – 2015	Nanomaterials are included in increasing number of	

Work Area	New Activity	Actors	Target/Time frame	Indicators of progress	Implementation aspects
	management programs, and identifying where gaps exist.	Intergovernmental and international organizations, industry, NGO		chemical management programs	
	6. Incorporate nanomaterials and nanotechnologies in national chemicals management program	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Nanomaterials are included in increasing number of chemical management programs	
	7. Assess gaps in existing legal and institutional framework addressing nano specific issues. Establish national policy and institutional coordination plan.	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Reports on regulatory and institutional gaps;	
	8. Enhance information sharing on national, and regional policy and regulatory initiatives	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	All stakeholders are informed of risks and hazards of nanomaterials. All relevant stakeholders have access to available relevant information	
	9. Identify, strengthen and enforce legal and regulatory provision for the environmentally sound management of waste containing nanomaterials	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Relevant legislation or/and best practices are in place and implemented in all relevant sectors.	
	10. Consider legislation to protect workers and the public, covering	National governments,	2012 – 2015	Relevant legislation is fully implemented in all relevant	

Work Area	New Activity	Actors	Target/Time frame	Indicators of progress	Implementation aspects
	the entire spectrum of work situations in which nanomaterials are handled	Intergovernmental and international organizations, industry, NGO		sectors.	
	11. Promoting consensus standards on nanotechnologies and manufactured nanomaterials	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2017	Standards are developed.	
	12. Develop nano labeling schemes	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	Nano product labels developed	
	13. Development of a global certification schemes	National governments, Intergovernmental and international organizations, industry, NGO	2012-2020	Certification scheme is developed.	
	14. Improve existing information management system to include nano specific information	National governments, Intergovernmental and international organizations, industry, NGO	2012 – 2015	MSDS includes relevant nano information. Databases are developed.	