3rd Stakeholder Forum

of the

International Sustainable Chemistry Collaborative Centre

Event Report

ISC3

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We transform chemistry

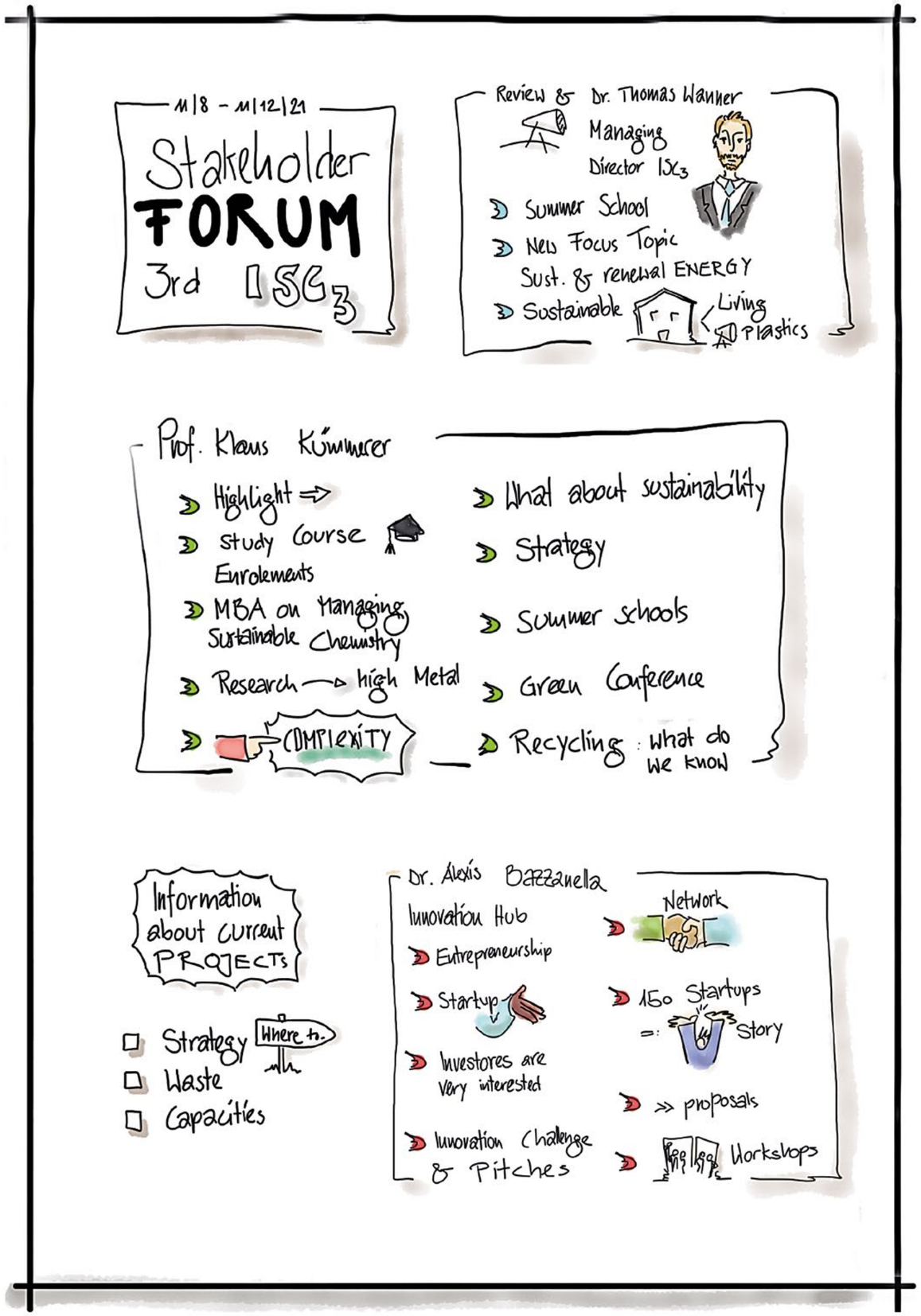
Content

1st Day of the Stakeholder Forum,

8th November 2021

Opening & Welcome

Welcome by the host of the Stakeholder Forum, the Managing Director of ISC3 Dr. Thomas Wanner. He briefly introduces himself to the audience and gives an overview of the ISC3 history that is now in its second phase and that is implemented by and supported by the GIZ in equal partnership with DECHEMA and Leuphana University.



Directors Dialogue – Review & Outlook on the ISC3

At the beginning Dr. Wanner refers to the goal of ISC3 in promoting international breakthroughs in the field of Sustainable Chemistry. He then reports some of the highlights of ISC3 achieved in the previous phase like the publication of the results of the workstream topic Sustainable Building and Living with Focus on Plastics and the ISC3 Research and Education Hub's Summer School. Looking ahead to the next phase, he mentions the new focus project on Green Hydrogen and announces that important activities will be professional education and advisory services to partners.

Prof. Kümmerer, director of ISC3 research and education hub, reports that the previous activities will be continued, as it has been shown that there is a demand for this. A new MBA study course on Sustainable Chemistry Management will be launched in addition to the already existing Master of Science in Sustainable Chemistry. In the area of research, the topic of metals continues to be significant. Activities ahead include the engagement for the European Union's Chemical Sustainable Strategy and the Safe and Sustainable by Design Strategy. Furthermore, a series of Summer Schools and a Green and Sustainable Chemistry Conference are planned. Further additional educational training formats will be explored.

Dr. Alexis Bazzanella, director of ISC3 Innovation Hub highlights the achievements of the Global Start-Up Service, the core activity of the Innovation Hub, with emphasis on entrepreneurship. The GSS is still in the consolidation phase, seeking partners with similar goals on a regional and global level. Currently more than 150 start-ups are supported, and more than 100 start-ups have already benefited from different matchmaking and showcasing events. Investors are showing a growing interest in the topic of Sustainable Chemistry. In the future, Mentors and Expert Programs are planned to support the activities of start-ups in collaboration with the Research & Education Hub and together with small and medium sized enterprises (SME).

The directors expressed their expectation, that the third Stakeholder Forum will be instructive to raise awareness on Sustainable Chemistry, to identify and initiate further international cooperation and partners to jointly enhance Sustainable Chemistry, and to gain critical and helpful feedback from the attending stakeholders.

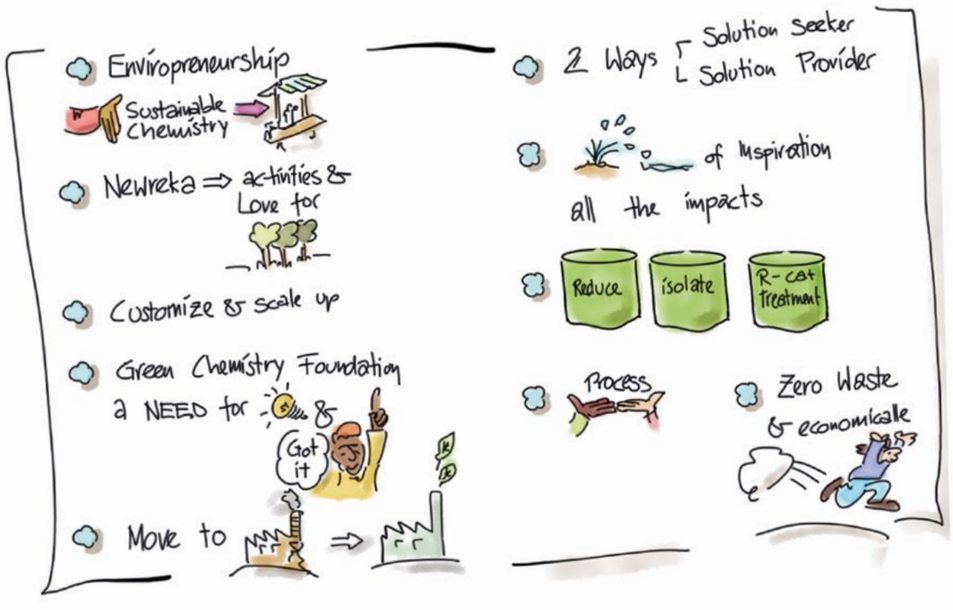
Guest Keynote:

“Enviropreneurship to bring Sustainable Chemistry Innovations to Market – Our inspiration and learning”

Speaker: Nitesh Metha,

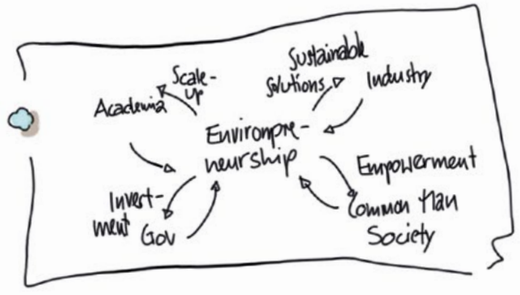
Co-Founder and Director of Green ChemisTree Foundation and Newreka GreenSynth Technologies, India

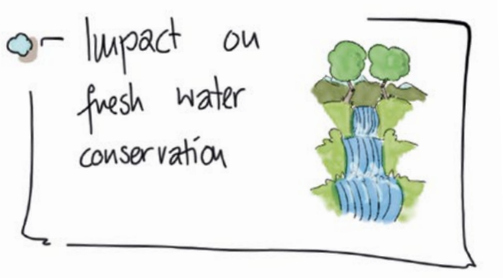
In his inspiring and energetic keynote, Nitesh Mehta took us on his own journey as Enviropreneur and what he has learned in this journey. Firstly, he explained that the source of inspiration in his work are the positive impacts that are created by Sustainable Chemistry solutions, and he reports some of those impacts like an inherently safer process, zero waste and complete water recycling and decreasing costs.

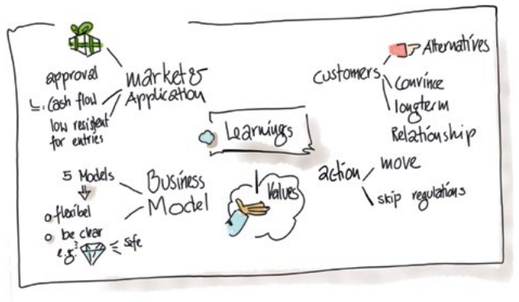


Main messages

- An important barrier to strengthen Sustainable Chemistry is the gap between the different stakeholders like academia, industry, government and civil society. While all these stakeholders are committed to Environment and Sustainability, they work quite a lot in isolation.
- The enviropreneur can play a catalytic role in overcoming the gap and in developing an “ecosystem of partnerships”.
- The term “Enviropreneurship” is composed of environment and entrepreneur and describes an attitude or a mindset, a way of thinking. This thinking includes seeing an environmental challenge as an opportunity, having the passion for environment and the adventurous spirit of an entrepreneur, seek for long term sustainable solutions and pursue the goal of creating value for all, including the environment.
- Key lessons he learned during his journey as enviropreneur are among others the relevance of identifying the application that would create more returns and value and the market that offers the least resistance. He mentioned the importance of sticking to our own value system, developing staying power (patience & perseverance) and fine tune and customise your service to the customer’s reality. It also highlighted the importance of customising business model based on market/ customer’s mindset, value addition being offered, competition, your own & customer’s realities, etc. According to him building long-term “Relationship” with all stakeholders is the most critical job & should be the focus for an enviropreneur.







Discussion

In the following lively exchange between speaker and audience various topics were raised like the question of mainstreaming Sustainable Chemistry in the value chain (not easy to answer in general) or the role of government and regulation for Sustainable Chemistry (definitely very relevant).

Key Activities and Milestones in 2020/21

Education – M.Sc. SC 2020 and MBA SC 2022

Dr. Myriam Elschami, coordinator ISC3 Research & Education Hub at Leuphana University describes the current Master Programme Sustainable Chemistry (M.Sc. SC) running since March 2020 and introduces the new MBA Sustainable Chemistry Management, to be launched in March 2022. She explains the difference between the study programs (teaching about chemistry vs. the teaching of chemistry). Teaching and learning formats include module online learning as well as on-site sessions and practice work. The pool of participants is diverse ranging from junior to senior professionals coming from different regions and diverse sectors of industry, from national authorities, consulting, or start-ups. Both programs were recognised as SDG Good Practices.

Dr. Katia Simon, Regulatory Prototyping and Business Relationship Management Expert, Merck KGaA and Participant of the M.Sc. SC 2020 provided insights in her motivation and experiences as participant of the study program.

Feedback

A comment in the chat refers to the importance of teaching students the interface between science and policy to enable the graduates to speak the language of regulators and to use science to make regulatory decisions. This is currently addressed in the study programs by combining different modules in an interdisciplinary approach.

Innovation: The ISC3 Global Startup Service (GSS) and Innovation Challenge

Dr. Alexis Bazzanella, Director of the ISC3 Innovation Hub, presents the status and activities in supporting innovation for Sustainable Chemistry. The Start-Up Toolbox of the Global Start-up Service has already supported 150 companies with general as well as customised support.
The start-ups come from different regions and the Spiderweb Partner Network with its partners (e.g. YouThinkGreen Egypt, ANII Uruguay, GreenChemisTree Foundation India, Dutch Brightlands Chemelot Innovation Centre) is crucial to reach out to new start-ups. New Partnerships are in the pipeline, e.g. with SENAI Brazil, Science and Technology. Furthermore, a GSS Changemaker LinkedIn Group has been established and GSS Workshops and regional activities with partners, like the Global Actors in Sustainable Chemistry Open Labs Brazil Pilot Project, have been conducted. The Mentors and Experts Program has been started.
The second Innovation Challenge is coming to an end with the topic of Sustainable Chemistry and Renewable Energy. 100 applications or proposals have been submitted. Workshops and Trainings for start-ups are offered and 20 start-ups have already participated in the master classes.
Dr. Bazzanella states that Sustainable Chemistry Innovation is not restricted to start-ups, so that in the future the activities are extended, including the engagement of large corporation and SMEs (integration of networking/matchmaking in our events, corporate challenges).

Research: Report and Reflection on the Research Topics

Ann-Kathrin Amsel, research associate, and Prof. Klaus Kümmerer, director, both from ISC3 Research and Education Hub present the four research topics that ISC3 is still investigating, namely Chemoinformatics as versatile tool in Green and Sustainable Chemistry, entropy change as a measure for chemical sustainability, electrochemical synthesis of chemicals and metals as non-renewable, critical resources.

Feedback

The Mistra SafeChem in Sweden is mentioned, a project that seems similar to pursue similar goals.

Sustainable Chemistry and Renewable Energy – Subtopic for 2021: Power to X (PtX) and green Hydrogen

The subtopic is devoted to the nexus of Renewable Energies and explores the question how Sustainable Chemistry (SC) can contribute to sustainable, renewable energy systems and vice versa and under which conditions?

Oleg Ditkovskiy, Focus Topic Manager, Team Science & Innovation from the Head Office explained the Focus Topic approach of ISC3, gave examples of the former topic – the workstream on Plastics in Sustainable Building and Living and its different formats. He further introduced the new Focus Topic, reported on workshop results and activities, and invited participants to actively engage in the discussion and to provide feedback.

Green hydrogen refers to the production of H2 through renewable energy sources. The main advantage is the de-fossilization of the sector. For assessing sustainability, the input, the process and the output phases have to be considered. A lot of rare and precious metals for electrolyzers as well as big amounts of water and CO2 are needed to produce H2 and PtX products.

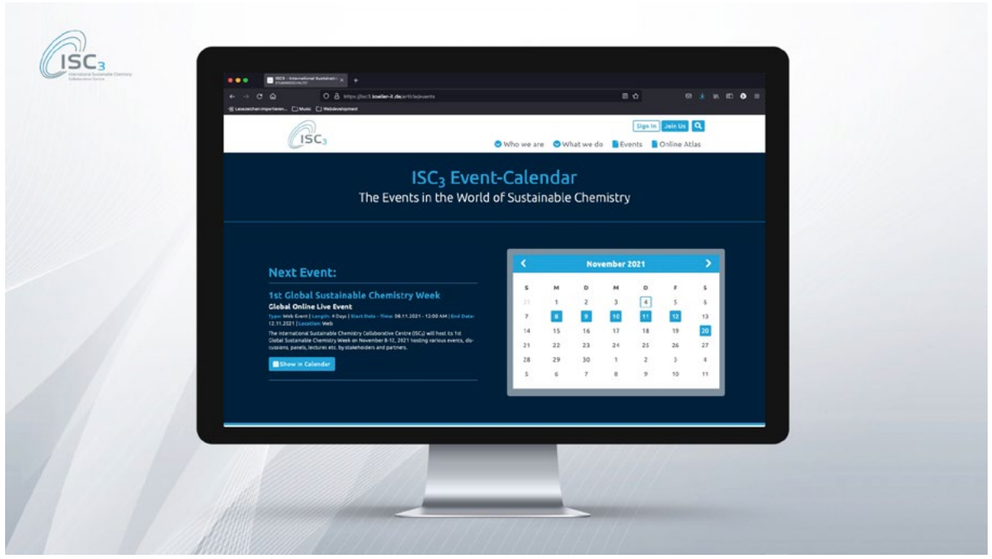
Discussion Points

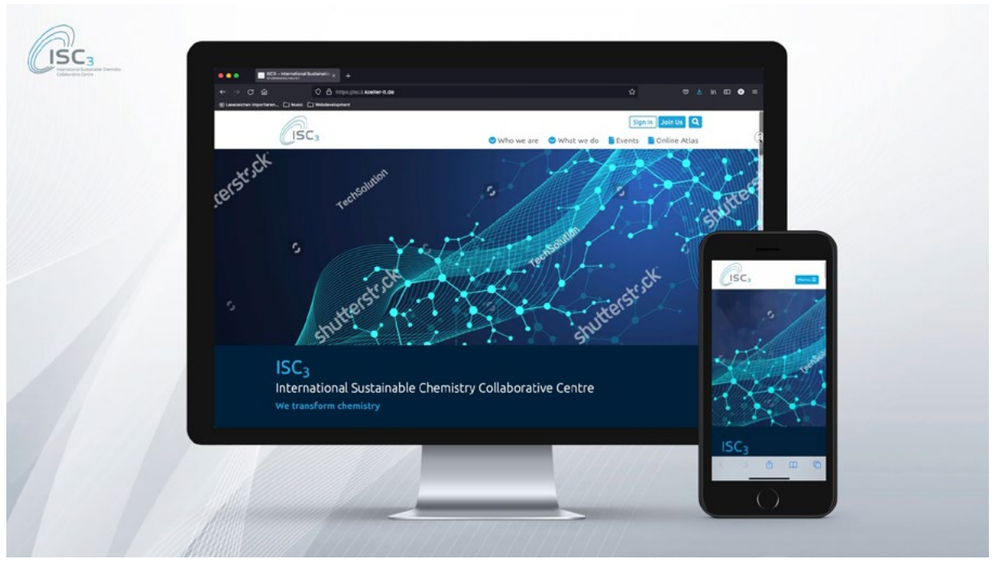
Question raised: How dependent is the supply chain of electrolyzers and infrastructure from countries that mine rare metals? What are the sustainability impacts? Some options to enhance sustainability are to raise CO2 prices, to focus on regional energy markets and to re-use and recycle rare metals.

However, it was concluded, that due to metal scarcity and the dependence on supplier countries, PtX does not seem to be the “silver bullet” i.e. the only good option. Research on alternatives for rare metals and its re-use and recycling is required, audited fair-trade certifications should be introduced to monitor the working conditions in mining countries. Different PtX-products should be compared and accurately chosen for specific environment and infrastructure.

Closure of the 1st day of the Stakeholder Forum and presentation of the new ISC3 website

Dr. Thomas Wanner introduced the new website with a short video. Closing the 1st day of the Stakeholder Forum he invited all participants to engage in the other events taking place during the first ISC3 Global Sustainable Chemistry Week, for example the Investor Forum, where start-ups and investors mix and match. And he invited all stakeholders to join the second day of the Stakeholder Forum and to share feedback and ideas for further cooperation.





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3rd ISC3 Stakeholder Forum

2nd Day of the Stakeholder Forum,
12th November 2021

Introduction

Managing Director Dr. Thomas Wanner welcomes the participants and opens the 2nd day of the Stakeholder Forum which at the same time is the closing event of the 1st Global Sustainable Chemistry Week.

Panel EU Chemicals Strategy on Sustainability (CSS)

Chair: Prof. Klaus Kümmerer, Director ISC3 Research & Education Hub @Leuphana University, Germany

Discussants:

- Ann Chloé Devic, European Chemical Industry Council (CEFIC)
- Dolores Romano, Deputy Policy Manager for Chemicals at the European Environmental Bureau
- Prof. Nineta Hrastelj, European Chemical Society (EuChems)
- Prof. Eugenia Walsami-Jones, University of Birmingham

Statements from different perspectives:

- Ann Chloé Devic (research and innovation perspective): CSS can boost innovation, generate growth and guide the development of new products in accordance with society's expectations. There is a community within EC working on it, and ongoing study in the commissi on level. She calls to action for all to participate in this process to achieve a common goal, because we will not succeed if we do not collaborate together

- Prof. Nineta Hrastelj (academic and industrial background): The implementation is challenging, esp. reaching a harmonised implementation in entire EU. For this the EC has initiated a high-level round table. The science-policy-interface is key in this process, also on regional level. EU policy must be strategically independent. Education and lifelong learning for adequate skills on all levels is key. Concludes: there are many challenges and opportunities related to the implementation. Biggest opportunity: get citizens as consumers enthusiastic on what the topic entails.

- Prof. Eugenia Walsami-Jones (Academic perspective): the UN SDGs and the recent COP26 show, that what we discuss is very relevant for society and sustainability. With the CSS it is the rare case that policy has preempted science. Nano particles are very unpredictable and the policy of „safety first" is a big challenge here. Important: safety is not identical with sustainability.

- Dolores Romano (regulator perspective): One of the key objectives and features of the strategy is a toxic free environment. Innovation for a green transformation must consider the existing regulations, e.g. to reduce the carbon footprint of chemicals, as the industry is very energy intensive.

Biggest hurdles or obstacles

- Challenge at the high-level roundtable (top down) is to listen and understand each other, there are many different backgrounds and the risk of not being heard or being misunderstood.

- We must find a common language and for this we must organise us in a community (bottom up). We need to develop a structure to talk, similar objectives and criteria for sustainability.

- Sustainability is a much more multifaceted problem. We have no metrics yet. We struggle for 30 years with its definition. What we can easily measure is safety.

- Increasing complexity und time pressure: We must include the communities affected by pollution to bring in their views, but managing until 2024 won't be possible, deliver on the safety side is in focus.

- Substitution of hazardous substances is an important point, but not sufficient. CO2 Emissions must be reduced.

- We must define what exactly is meant by toxic free environment/future, only products or also business models?

Conclusion:

We are all embedded in a journey, and it depends on the motivation of the actors what we can achieve in the next 3-4 years.

Anchoring Sustainable Chemistry in International Chemicals Management:

Presentation of preliminary results and a discussion of experts in the field of Sustainable Chemistry

Presentations

Christopher Blum (German Environment Agency)

- The idea, tasks and team behind the project “Development of indicators for International Chemicals Management beyond 2020”

Esther Heidbüchel (CSCP) and
Henning Friege (N³ Thinking Ahead):

- Requirements, criteria, examples: “Indicators for approaches to Sustainable Chemistry: Assessment and Examples”

Panel Discussion:

Sustainable Chemistry as a pacemaker for international management for chemicals and waste?

Moderator: Achim Halpaap
(Independent consultant)

Participants:

- Sandra Averous-Monnery (UNEP)
- Vania Zuin Zeidler (University of Sao Carlos, Brazil)
- Xenia Trier (European Environment Agency)
- Hans-Christian Stolzenberg (German Environment Agency)

Take aways:

- We need indicators for sustainability in chemicals management – i.e. production of chemicals, manufacturing of goods, applications, and waste phase (preferably including material recovery), but also to identify business models and financial incentives that support the sound management of chemicals in regards to circularity and systems thinking.
- Meet the need of the users (including developing countries): e.g. safe and non-regrettable alternatives for chemicals of concern, promoting and ensuring health and safety as well as fair, inclusive, and emancipatory labour conditions, complying with human rights and justice, sustainable management of resources, materials, and products (raw materials extraction, production, application & logistics, end-of-life / recycling) and energy (power sources, power consumption), to enable circularity without contamination throughout the entire life cycle. For developing countries, a sound and solid financing is of special importance.
- Identify solutions towards more sustainability and communicate them as high-level messages to decision makers to create political momentum and call to action.
- Refer to green and responsible investments and other financial incentives as opportunities to stimulate transformation.

UNEP: Development of the Specialized Manual on Green and Sustainable Chemistry Education

Moderator:

Monika MacDevette –
Head, Chemicals and Health Branch, UNEP

Presenting the Manuals

- Achim Halpaap, Lead Author: Overview of the 10 Objectives and Guiding Considerations for Green and Sustainable Chemistry and of the Specialized Manual on Education
- Colin Hannahan, Consultant, UNEP: A deep dive on green and Sustainable Chemistry learning at each stage of formal education

Take aways

- Two main target audiences: Educators & Teachers and Strategic Change Agents
- Designing effective Green and Sustainable Chemistry learning
- Identify learning opportunities and needs for specific target groups
- Determine the desired competency level
- Determine learning objectives and design learning interventions
- Assess learning outcomes and impacts
- Green and Sustainable Chemistry outside of formal education:
- Advance brought Green and Sustainable Chemistry education.
- New chemistry is embedded in system thinking
- Resources are provided, capacity building of teachers (examples from Malaysia)
- Students making the connection between sustainability and chemistry (e.g. experiments)
- University is the new class of professionals – strengthening interdisciplinary learning is crucial
- Learning methods through the classical learning formats, also using social media to teach Sustainable Chemistry
- Keeping in mind and focusing of R&D

Panel Discussion and Audience Exchange – Action on Green and Sustainable Chemistry Education

Guiding questions:

- Key inspiring actions to transform and scale up education for GSC
- What remains to be done, and how can the UNEP 10 objectives and education manual on Green and Sustainable Chemistry support filling these gaps?

Panelists:

- Amy Cannon, Executive Director/Co-founder, Beyond Benign - Promoting Green and Sustainable Chemistry Education through Curriculum reforms and fostering learning communities
- Nydia Suppen, Director, Centro de Análisis de Ciclo de Vida y Diseño Sustentable (CADIS) - Illustration of non-formal and informal learning to advance Green and Sustainable Chemistry
- Rovani Sigamoney, Engineering Programme Specialist, UNESCO - UNESCO's contribution to Green and Sustainable Chemistry education through Basic Sciences.
- Claudio Cinquemani, Director of Science and Innovation, ISC3 - Using the Green and Sustainable Chemistry: Framework Manual as a tool to guide capacity building activities.

Main points

- Many actions together can impact change in chemistry education. Involvement is invited for the Green Chemistry Learning Institute, a platform for the growing community starting in 2023. Create momentum together.
- Manual is a complementary endeavor to UNESCO's activities e.g., The Internatinal Year of Basic Sciences for Sustainable Development; let's combine top down und bottom-up approaches to spread the UNEP manual.
- ISC3 expands the study programs to non-academic capacity building e.g., the Innovation hub supports start-ups through master classes.
- Developing countries are key players and interactive workshops help to see sustainable questions from different perspectives and to include indigenous and local knowledge.
- Teachers as learners: The teachers need to understand why we need the green and sustainable teachings, only then they will be able to fully help students to get inte rested in the field

Wrap up

There is the need for continuation of fostering education on different levels and in diverse formats from formal to informal. Chemistry is extremely important in our world. The manual comes at the right time because we are all seeking for sustainable solutions. Interdisciplinarity is key as well as the ability to speak in different contexts. Industry has a role to play in research and development as well as in education.

Examples of ISC3 Capacity Building

Input and chair

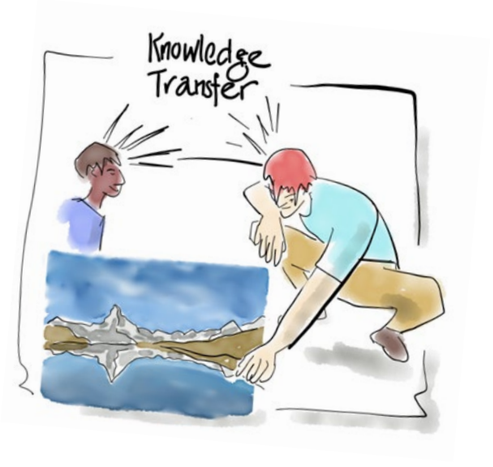
- Claudio Cinquemani, ISC3 Director of Science and Innovation
- Jens Krol, ISC3 Project Manager Capacity Building

Guests

- Cecilia Wandiga, Executive Director Center for Science Technology Innovations (CSTI), Kenia
- Achim Halpaap, Consultant UNEP

Main points

- Capacity is defined as „The ability of people, organisations and societies as a whole, to manage their affairs successfully and to continuously adapt in response to changing conditions“ (OECD-DAC).
- Focus of ISC3: „Strengthening of partners in Emerging and Development Countries through professional education, educational events, such as seminars and workshops and advisory services“
- Example on Capacity Building regarding Plastics in Sustainable Building with partners in Kenia demonstrates the mutual value of the collaboration among CSTI and ISC3.
- Entry points for ISC3 capacity development: Advancing Sustainable Chemistry in key sectors; application of management Inst ruments and business models; Sustainable Chemistry solutions for certain chemicals and materials of interest.
- UNEP Manuals on Green and Sustainable Chemistry education overlap with ISC3 Capacity Building mission and need to be disseminated.
- The momentum at the international level to advance sustainable chemistry is growing provides opportunity to scale-up the ISC3 offer and activities for capacity development based on lessons learned.



Closing of the 3rd ISC3 Stakeholder Forum

Closing of the Event by Dr. Thomas Wanner.

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