

Dear colleagues and friends,

I like to share with you for very few minutes what are the emerging trends in the global Bioeconomy. Please take my words only as an “appetizer “, the more as I also cannot prejudge the results of the 14 workshops which by their topics chosen represent also such emerging trends worldwide.

I will not talk to you about the sometimes “inflationary“ increase in national, regional and international conferences, Fora, wokshops etc. on the Bioeconomy, nor about a strong increase in its specialized scientific, economic and political literature, nor will I refer to a growing number of excellent Bioeconomy portals and information platforms. I will also refrain from giving details on a steadily growing number of academic Master and recently also national Bachelor courses on the Bioeconomy, sometimes in connection with the circular economy, sustainable chemistry and green growth. An example: only in Europe now in more than 2 dozen Universities Master courses are held. And I will refrain on details on the impressive number of new states, regions and international organizations, developing either dedicated or closely biobased oriented strategies, policy statements, road maps and action plans in the last 30 months or developing them in a pipeline. All these details, facts and figure you can read in part 3 of the update report of national strategies around the world prepared for this conference by Beate El-Chichakli and Christin Fund from the Secretariat of the

German Bioökonomierat, peer reviewed by their 2 chairs, Joachim von Braun and Christine Lang.

I will focus on three different groups emerging policies:

- Within the fabric of trends to offer solutions coping with the so-called grand challenges,
- Within the content of the Bioeconomy as such, from a scientific, technological and economic perspective
- And with regard to potential side-effects, like education, training, international collaboration, communication, business-models and funding schemes.

Group 1 with 4 trends:

Number One:

Within the larger context of the global strategic discussions to give responses to the grand challenges of today and tomorrow the Bioeconomy as a concept has developed to be an acknowledged strategic partner on similar footing like Sustainability, Circular Economy, Resource Efficiency etc.

This is also due to the results of the 1<sup>st</sup> GBS in November 2015 in this city. I only mention Jeffrey Sachs unforgettable pleas for combining SDGs with the potentials of a stronger use of biological resources. Hardly any international conference today is missing the famous chart on the various SDGs and the reference to the undoubtedly essential role the biobased economy is playing to reach them. But, this is regrettably very often a one-way street, that those who implement biobased

activities refer to it, but not those, who deal with the SDG's in first instance. Science and Academia might think about the elaboration of corresponding BDG's, Bioeconomy Development Goals, to correct these phenomena, Bioeconomy Development Goals, which you do not find within the SDG family, like the special features of renewability, of circularity, or the creation of innovative advantageous functions in new materials, like longer life, stronger robustness, non-toxicity etc.

Trend number 2: also good news!

With respect to circularity, more and more the attribution circular is added to the notion of bioeconomy, for example by the European Commission, in Scandinavia and the Benelux countries, in the European Forest Institute's publications.

Trend 3: Result is mixed:

When looking on the important agenda of the COP conferences dealing with our world climate, we have to state however, that the role of biological resources within the IPCC process and within the COP Mechanisms is far from being satisfactory: When COP 23 took place in Bonn half a year ago, out of the almost 1000 side events only 2 dealt with the potentials of the Bioeconomy to achieve the goals of the Paris Agreement: one from the Nordic Council, and one by Brazil in the context of the Biofuture project. Katowice, COP 24 offers a good opportunity to change this.

And last but not least, Trend 4: Health aspects, Biodiversity, in particular also functional biodiversity, and the blue Bioeconomy are lately becoming more and more additional priorities in national policies, thus expanding the strategic application fields of the bioeconomy.

So summing up this first group: the strategic role of the Bioeconomy in the concert of ideas for the future is stronger than 2015, but not satisfactory.

Second group (within the Bioeconomy as such) 4 trendings again:

Trend 1 :

We note a strong wave of new biobased products and also processes all over the world which can hardly be traced back and accounted for, ranging from new platform chemicals like FDCA to biobased acrylic or levulinic acids, from protein production over biobased aniline to the inclusion of Co<sub>2</sub> as a new natural resource for materials of damming foams, mattresses etc. One can hardly follow these pipeline developments. Construction, textile, Biocities and more recently in particular products for daily care and health are expanding the field of industrial application. I call it an expansion trend.

This leads to the Trend number 2:

Industry will do it, if it pays off, and the question for public authorities is, what and whom to support in RTDI, how to regulate or prejudge developments like the large

Biopreferred Program in the US, with other words how to cope with new requirements for building markets. Coping with such developments is a second trend.

Trend 3:

Biorefining is apparently on the right track, today with many more pilot and demos than 3 years ago, but still in many cases waiting for industrial breakthroughs. My personal impression is, that many more activities in particular in Asia are happening, but we know too little about it in spite of globalization and the existence of our world as a global village! Changing this deficit is another trend.

A fourth and last emerging trend against this background, for me the most interesting one, is combining the advantages of biological resources with the potentials of the digital developments, artificial intelligence and synthetic biology. The driving but also complementary role of the Bioeconomy in this fabric needs quickly to be identified and demonstrated, in areas like food and medical packaging, in advanced manufacturing, in 3 or 4 D printings materials, for neuronal nets, advanced orthopedian implantates, for self-repairing coatings or self-healing medical devices. Some even start to talk about the biological transformation, corresponding to the digital one!

Thus, to sum up: On one hand we see a consolidation of industrial biobased products and processes, often still in niches, but lucrative, approaching commercial and economic

application, as a kind of business as usual agenda, which forces public authorities to rethink their role. On the other hand, unknown, unexpected new perspectives by joining forces in and among the digital, the artificial intelligence and the bioworld which offer new opportunities we were even not dreaming of a few years ago. This requires even more openness and preparedness than before accepting and digesting diverse streams of knowledge and integrate them.

And this brings me to the 3<sup>rd</sup> group, the potential side effects of the Bioeconomy development: education, training, intern. collaboration, communication, funding, some also call it the soft skill side of the Bioeconomy. Here again 4 trends:

Trend one and 2, closely related, or intermingled:

An emerging trend per se is a stronger role these side effects evidently play during the last years. To deal with new ways of education in Master and Bachelor courses, to introduce new curricula etc. plays here an overriding role.

A 3<sup>rd</sup> trend:

Involving also many stakeholders along the various value chains, in particular end-customers, namely industrial or other business companies, and consumers in these areas as well as in the area of communication and financing jointly in PLATFORMS, among manufacturers, technology holders, logistic and retailing entities, consumers etc. with their own rules and code of conduct sharing their results, sometimes even if forms of S.A's, Aktiengesellschaften etc. is Trend 3.

Here we urgently need exchange mechanisms for best practices, dialogue formats, personnel exchange and points of departure for common endeavors.

And a last trend Trend 4 against this background: a macro economically relevant growing role of regions and sub regions with new ways of collaboration is evolving, in all continents, combining the idea of cooperatives and platforms, of clusters and hubs, a fascinating side effect we did not think about 10 years ago.

Dear colleagues and friends:

Summing up all 3 groups of emerging trends: We are amidst a process of consolidating growth. Future is not going to be simpler and easier, but the traffic lights are green. I wish you all a very pleasant, interesting, personally rewarding conference, rich in personal and professional experiences.

Thanks

Christian Patermann

Berlin, 19<sup>th</sup> of April 2018