In Editorial Note: Breaking through doctrines

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This new issue of 'Tailoring Biotechnologies' contains a number of thought-provoking articles on governmental policies, doctrines, and efforts to develop new research trajectories. In *'Regional GM opposition as multilevel challenge? The case of Upper Austria',* **Franz Seifert** refers to the emergence of a protest network composed of various European regions contesting the European Commission's co-existence policy. The liberal doctrine of the European Commission's current policy to ensure the viable co-existence of GM and non-GM types of production is challenged by these campaigning regions which stipulate the right to self-determination and to completely rule out the unwelcome agro-industrial biotechnology. Franz Seifert considers the European regulation of Genetic Modification as a provisional result from the efforts both to come into accord with global free trade doctrines and to realize a high level of environmental precaution and consumer transparency in order to accommodate popular reservations against biotechnology in the various *regions.*

Seifert discusses the emergence of various multi-level governance tensions and emphasizes that in view of the politically unequal strength of the (global) liberal and (regional) self-determination doctrines, a new regulatory framework is emerging focused on defending the *freedom of choice* of consumers and producers. He also states that this liberal framing of the co-existence policy may even be increasingly elaborated through the regions opposed to the policy which are increasingly inclined (forced) to play the game of the supranational rules. Seifert also refers to the practical situation, that in general the pursuit of regional policies is still coordinated by federal administrations that reduce the room for maneuver of the opposing regions.

While the first article discusses how the invigorated precautionary principle as well as strict labeling and traceability provisions are well in accordance with product policies of major retailers and popular attitudes, the second article deals with the question why such a popular request for traceability appears in modern society. In his article *'Biotechnologies, Alimentary Fears and the*

Orthorexis Society', Guido Nicolosi searches for a possible interpretation of this widespread resistance in public opinion to agro- and food biotechnologies, arguing that diffidence towards biotechnologies is a manifestation of a much deeper structural phenomenon. His thesis is that this diffidence is a social manifestation of a rather significant anxiety-inducing syndrome expressive of the particular symbolic relationship we have established to food and the body in contemporary society. According to Nicolosi the diffidence towards biotechnologies and the anxiety about the traceability of food are related to three processes set in motion by modernity. He refers to the erosion of the culinary order, parallel to a more general decline of the cultural order; to the distancing of the food producer from the food consumer leading to what he terms the 'opacity of food', and to a shift from a social towards an individualistic alimentary incorporation of the anonymous food (components).Through these transformations people have taken the concept of healthy eating to such an extreme that it has become an obsession.

Elaborating the classical dichotomy in sociology (Gemeinschaft-Gesellschaft), Nicolosi stresses the change in the symbolic meaning of eating. While in traditional society eating was a collective and rigidly codified activity, in modern society the act of eating has become an individual action of incorporating the external world, such that eating unknown artifacts may mean losing the deepest sense of the (social) self. In this context *orthorexia nervosa* arises, the fixation on correct eating, and hostility to the novel biotech foods, made of components of unknown origin. *Orthorexia nervosa* as the metaphoric representation of the epoch-making psycho-cultural syndrome of the individualized body in late modern society also implies that increased labeling and transparency of production chains will not reduce the perceived fear of risks, but on the contrary can even contribute to an increased perception of *potential risks.*

Nicolosi emphasizes that man's relation with food is complex and cannot be reduced to a simplistic reading. He argues, indeed, that there are three dimensions: food as substance of physical-biological maintenance, as a pharmacological remedy, and as a cultural object able to channel important symbolic meanings. The technocratic and rationalist drift of Western modernity has led to a slow but inexorable reduction and modification (to which hegemonic scientific discourse has strongly contributed) of the immaterial, symbolic spirit of food to the gain of the material sphere of food. However, this does not mean that food is no longer in a position to produce meaning, on the contrary. What has changed is the gradual shift of a communitarian and prescriptive incorporation of food toward today's largely individualistic (anomic) approach, one that creates feelings of insecurity and an obsession for healthy food and diets, in particular in those social environments where the local cultural diet patterns are vanishing.

Nicolosi convincingly argues that the widespread fears and consequent resistance to innovations in the biotechnological field will never be understood without first a serious reflection on the changing symbolic importance of food. He also emphasizes that dealing with the material (life, health, energy) and immaterial (symbolic projection) spheres of food can be done in a conservative or innovative manner: protecting either the body (physical identity), the Self (symbolic identity) or neither or both. In this respect his final call for the need of a biotechnology which does not contribute to the production of food as unknown artifacts - and in so doing contribute also to the state of mind called *orthorexia nervosa* - but instead contributes to a reconnection of agriculture, food production and consumption, may be considered an attempt to introduce and attune food sciences and technologies to sustainable developments.

In *'Breeding strategy for mixed production systems in Africa',* written by **Prem Bindraban, Niels Louwaards, Huub Löffler, Theo van Hintum** and **Rudy Rabbinge,** a concrete effort is made to reflect on the possibilities for attuning breeding and biotechnological approaches to mixed cropping systems in Sub-Saharan Africa. The authors challenge the widely assumed hypothesis that the best varieties for sole cropping could be equally well used for other cropping systems. Although they recognize that improved varieties developed for sole cropping systems may also enhance the agricultural yield of the mixed cropping systems, the authors do make a plea for the development of a specific breeding and biotechnology approach in which a reversion of research priorities takes place.

Instead of placing emphasis on single issues, as contemporary biotechnological approaches are increasingly tending to do - such as developing insect and disease resistance, herbicide tolerance, increased nutritional content and reduced allergenicity, etc. - the authors propose that the identification of these single characteristics ought to *follow from* a broad perspective, one that complies with the local specificities of the mixed cropping system. Indeed, many illustrative examples of characteristics of mixed farming systems are given that may be strengthened by an attuned designing of new plant types. This reversion of the breeding approach, giving priority to the modification of crop characteristics within a wider system rather than single issue perspective, may

make an effective contribution to enhance the productivity of African, particularly sub-Saharan, agriculture. Productivity enhancing approaches to mixed systems is essential. This is particularly the case insofar as the rural poor are being pushed into ever more marginal areas, because of population growth, habitat destruction and claims by wealthier and foreign farming communities on the better lands. The authors argue that the development of such an attuned breeding and biotechnology approach for mixed cropping may be realized through a multidisciplinary modeling system based on a participatory approach with farmers in order to identify the required crop characteristics.

While Bindraban et al shows the relevancy of shifting the breeding and biotechnology approach from a single issue towards a systemic orientation, **Janet Grice** and **Geoffrey Lawrence** emphasize the relevance of leaving behind stigmatizing doctrines about scientific reductionism. In *'Misreading Mindsets: Paradigms of genetic engineering among Australian scientists',* Grice and Lawrence criticize the criticism of the well-known writer, Mae-Won Ho, that the training and mindset of currently-plasticizing geneticists are based upon scientific reductionism. Referring to their study of Australian geneticists, the authors argue that these geneticists are not working within an exclusive paradigm of scientific reductionism, but already accept and work with many elements of the assumed, complex and fluid genome paradigm. Indeed, something like a hybrid research approach is already emerging. The authors criticize attempts to understand paradigms of genetic engineering in a dichotomous, oppositional manner, and make a plea for an empirically analysis of new scientific developments so as to comprehend the development of the new scientific approaches rather than merely representing and reproducing oppositional paradigms.

In *'Plant Breeder's Rights (PVR's) room for maneuver'* **Steve Hughes** and **Eric Deibel** explore new opportunities for facilitating equitable access to and dissemination of plant breeding diversity in the global context. The authors argue that although Plant Breeder's Rights (PBR) are often pooled within the institutional regimes of intellectual property, still important philosophical and practical differences exist. The doctrine of PVR/PBR represents an inclusive mechanism, while patents and copyrights support a system of exclusion. Furthermore, they argue, PVR and patients stand in very different relationships with respect to innovation processes, concluding that a constructive re-evaluation of PVR might offer an opportunity to overcome the current disconnection between modern plant science and community actions.

Hughes and Deibel's main argument is that input germplasm, its intermediate breeding products and the output varieties, may be re-considered as common properties within a new research operating framework based on open-source modalities. They propose to consider plant varieties as existing in a public space and to consider them as a form of communal property from which all aspiring breeders can draw. This also implies that the individual breeder can be (re)viewed as a temporary custodian of a part of the freely available pool of germplasm and an almost seamless actor in the breeding community. The emphasis on new potentialities for an open-source operating breeding system is based on the communal principles of the PVR in relation to the common pool of varieties as breeding resources. However, the authors also emphasize that this idealistic vision of plant breeding as a distributed but communal activity based on an open source (genetic variation), which is a form of common property, is also confounded by a more recent convergence with the patent system. On the other hand, they also emphasize that the presence of new genomic tools may support the introduction of novel diversity in plant breeding and facilitate equitable access to and dissemination of that diversity in the global context under the provision that exclusionary rights and sovereignties are surmounted.

The final article of this volume concerns a country case study in which the biotechnology policy in India is discussed. In *'India's endeavors in biotechnology'* **A. S. Ninawe** presents some general backgrounds on biotechnology in India, mainly in comparison to other countries in Asia and the United States. Biotechnological developments are discussed in relation to particular sectors (the healthcare and pharmaceutical sector, food and non-food sectors), themes (biomining, bioinformatics), regulatory frameworks (biosafety, regulatory authority) and policies (technology transfer, biotechnology parks and bioclusters, institutes of excellence). The author concludes that although India holds a small share of the global biotech market, it has all the capabilities to become a dominant player since its industry is booming and the domestic consumption of biotech products is expected to experience a rapid growth. Ninawe also argues that the Department of Biotechnology (DBT) of the Indian Ministry of Science and Technology (S&T), in close interaction with the state governments and in particular through the S&T Councils, should develop specific biotechnology application projects in different state territories.

The above summarized articles in this volume reflect critically on the presence of dominating doctrines and policies while also paying attention to various efforts of developing tailored research strategies. These two themes, the

criticism of hegemonic doctrines and creation of space for the development of other scientific and technological trajectories along with policies and regulatory frameworks which may be considered as the basis for an ongoing process of democratizing biotechnological developments together form the core concerns of the continuing debates in this journal.