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at the Federal Ministry of Food and Agriculture

Activating Consumers for the Conservation of Biodiversity in Agriculture!

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Lead Authors

Ulrich Hamm, Peter H. Feindt, Frank Wätzold, Volkmar Wolters

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Secretariat of the Advisory Board on Biodiversity and Genetic Resources at the Federal Ministry of Food and Agriculture

Federal Office of Agriculture and Food (BLE)
Information and Coordination Centre for Biodiversity (IBV)
Deichmanns Aue 29
53179 Bonn

Tel.: +49 (0)228 6845-3272
Fax: +49 (0)228 6845-3787
E-Mail: johanna.wider@ble.de
Internet: https://www.genres.de/de/fachgremien/wissenschaftlicher-beirat-fuer-biodiversitaet-und-genetische-ressourcen/

The challenge

Agricultural production has increased significantly in Germany over the last decades, due to **intensification and rationalisation. As** this process has also taken place in other countries and global trade expanded, the **competitive position** for agricultural businesses in Germany has not changed significantly. Many farmers complain that low market prices for agricultural produce make it impossible to attain a sufficient level of income. At the same time, German farmers are increasingly confronted with **societal criticism** , regarding intensive production methods**.** At the forefront of this critics are methods for animal husbandry, often taking little account of animal wellbeing, with high levels of use of antibiotics; the growing level of import of genetically modified feedstuffs; the heavy burden placed on ground water and surface water by nitrate and pesticides; the effects on climate change; and, not least, the loss of biodiversity.

In an often cited review study from 2009, Rockström *et al.* elaborated nine planetary boundaries that should not be transgressed to avoid unacceptable environmental change of the earth. . They established that the threshold in terms of biodiversity loss has already been significantly transgressed – and much more dramatically than with regard to climate change or other planetary boundaries. **The loss of biodiversity – from the gene to the ecosystem – is by far the greatest environmental threat to the further existence of human civilisation. Therefore,** it makes good sense that, since 2015, conservation of biodiversity forms part of the UN Sustainable Development Goals (for agriculture: primarily Goals 2.5, 15.1, 15.5). However, although climate change occupies a large space in discussion within society, the grave loss of biodiversity and especially ecosystems, scarcely draws any attention.

Many studies (e.g. Sala 2000; Gossner *et al.* 2016) show that expansion and intensification of agriculture constitute the main causes for the loss of biodiversity. This affects not only very remote regions, such as the rain forests of the Amazon or in Borneo, but also our immediate surroundings. Consequently, the loss of biodiversity is advancing in dramatic strides: farm animal breeds and crop varieties that are threatened with extinction, wild farmland birds, wild weeds on arable land, the soil's fauna and microflora, wild aquatic organisms. This is mainly due to inadequate sanctioning of harmful behaviour, and because the market does not appropriately remunerate the services that agriculture renders to conserve biodiversity (market failure).

This raises the question of which **measures Germany can take** to stop the ongoing loss of biodiversity. In agriculture, such steps are at present essentially directed at the agricultural producers. The aim is that governmental laws and regulations on governing agricultural practices, together with premiums for environmental services, are designed to initiate behaviour that either safeguards biodiversity or fosters it.

To date, little attention has been given to the development of **new business models, rewarding** particular services directed at conservation and promotion of biodiversity via the market. The Scientific Advisory Board on Biodiversity and Genetic Resources sees **major market opportunities** for **a quality orientation** in Germany's food and agriculture sector, aimed at **biodiversity-based business models** – if the particular services associated with this are communicated to the consumers in a credible way. Ultimately, the goal is to nurture a greater willingness to pay among consumers via **product and price differentiation** for foods that entails particular activities to conserve or promote biodiversity in their production. Such a product and price differentiation strategy would lead to the businesses involved being rewarded by the market; the strategy serves as an accompanying measure to support state support; simultaneously it means that a consciousness of the need to conserve biodiversity is more firmly anchored within society.

Biodiversity has three aspects in this context:

- The **diversity of genetic resources of farmed species (genetic diversity)** is important, to be able to use particular characteristics of individual varieties and breeds with respect to their capacity to adapt to environmental changes – for instance, regarding new illnesses or climate change.
- The **diversity of the species farmed** gives agriculture and breeding a greater number of options for responding to new social and environmental challenges. For instance, the re-emergence of interest in long-neglected species of cereal, such as spelt and emmer, offer alternative tastes for consumers. Buckwheat and millet provide alternatives for consumers suffering from gluten allergy. The cultivation and further development of several plant species also reduces the risk of supply bottlenecks, if very widespread diseases lead to the collapse of production of one of the three globally-predominant cereal species – maize, rice and wheat. The availability of many different species of farmed plants and animals would also serve as a basis for more multi-faceted nutrition.
  This applies to wheat, plants rich in oil and protein, or fruit and vegetables, as well as to production of foods from the broadest range of land animals and aquatic organisms.
- The **diversity of ecosystems in which agricultural products are cultivated (associated biodiversity)**, i.e. the diversity of organisms that are not directly used contributes crucially to the safeguarding of environmental services that agricultural ecosystems render. This so-called associated biodiversity, i.e. flora and fauna that accompanies agricultural processes, serves to maintain long-term stability in agricultural production systems. A decline in this diversity of species can dramatically alter the ecological balance, e.g. by placing limits on significant services provided in the ecosystem, such as pollination of fruit if pollinating insects die off, or soil fertility if organisms in the soil are adversely affected. Thus, associated biodiversity is a part of production systems capable of withstanding and adapting to environmental influences.
  Beyond this, richly diverse ecosystems secure in turn the diversity of our cultivated landscape, for now and for future generations.

The approach: biodiversity as a basis for differentiating food products and prices

The Advisory Board sees a great **opportunity for German agriculture** in making **biodiversity the basis for product differentiation** and for a more strongly developed quality orientation in its production. Interlocking biodiversity with particular regional features and food specialities opens up highly promising opportunities to make distinctions, distancing one's own product from the 'standard product,' traded under fierce competitive pressure on world markets. In this way, higher prices can be attained in the market via **creation of consumer preferences**.

However, most consumers know little about the three levels of biodiversity (see above) and their benefits. Engaging communication of easily understood connections between biodiversity and consumer benefits would enable these shortcomings in knowledge to be eliminated and would also convey a positive attitude to biodiversity. To name a few examples:

- **Genetic diversity** within the species used is scarcely recognised by the consumer.

Yet, consumers directly benefit from the products improved on the basis of this diversity, e.g. rapeseed oil without bitter substances, or milk with a higher protein content.
In addition, consumers' interest can be awakened or reinforced in products made by farmers who contribute, for instance through sustainable breeding strategies, to conservation of genetic diversity. However, it is a challenging task to **communicate the advantages of the conservation and further development of diverse varieties and breeds.** Up to now, such communication is successfully practiced only on a very fragmented basis. Agriculture has additional opportunities in marketing typical regional breeds or varieties. For instance, the EU, with its 'Protected Geographical Indication' label, is offering a tool for this purpose that so far has been comparatively little used in Germany. Use and consumption of regional varieties or regional farm-animal breeds can also generate a conceptual benefit if they help in shaping the regional identity.

- **The number of species used** is somewhat more visible for the consumer than genetic diversity is; so this is what is mostly equated with biodiversity as such. For instance, the number can be increased by developing or reintroducing products based on relatively rare or less-used plant species. This can result in a consumer benefit in various ways:
  - **New products** with characteristics that consumers prize (e.g. valuable ingredients; absence of allergens; taste-related or aesthetic characteristics);
  - **Conceptual benefit** (e.g. the conscious contribution to conserving a rare species, a distinction value resulting from consumption of a rare product);
  - **Diversification of nutrition habits,** through using different species, including older and (in some instances) forgotten species (e.g. the parsnip, a vegetable now increasingly being used);
  - The use of various plant species in production can also have very **positive effects on the production systems** themselves and the surrounding ecosystems. An example is multi-element crop-rotation systems: these increase the soil fertility, make savings possible in terms of plant-protection activity, and provide greater possibilities for the associated biodiversity to thrive.
- As regards consumers' attitudes, a connection could be established between a **high level of associated biodiversity** and a rich **diversity of ecosystems,** on the one hand, and **process quality of products** on the other hand**.** In this context, a benefit emerges from consumer awareness, in purchasing foods from a production system that enables biodiversity to be conserved and even improved. Appreciation for organically produced foods serves as a good example of such an approach.
  Yet, there are also examples of the nurturing of individual habitats that merit conservation, e.g. the marketing of lamb sourced from juniper heath, of carp from pond areas, or of apple juice and honey from meadows consisting of naturally scattered fruit trees.

Up to now, in **consumer communication,** the advancement of biodiversity through agricultural products is mentioned only rarely or incidentally. More frequently, the focus is on other aspects. Examples are **particularities specific to the taste** (from old varieties or breeds, for instance), **regional specialities,** or the product's **origin in particular production procedures** (e.g. organic farming). Significant consumer groups discern a particular benefit, especially in regional specialities and organic foods.
Thus, price-mark-ups, even substantial ones, can be attained in the market for such products. So, the **challenge** is to use these trends in food demand in order to **develop concepts that more strongly place biodiversity at the forefront,** and communicate the advantages effectively.

The task: to effectively communicate the benefit of biodiversity for consumers

Based on the three levels of biodiversity, a whole spectrum of concepts can be developed for the consumers; quality-oriented marketing strategies and new business models can be built up on these.

- There is already public discussion about **genetic diversity within farmed species**. For instance, this applies to the range of varieties of fruit and vegetable, or the diversity of breeds among farm animals. Value-creation chains that attach importance to a high level of genetic variability, and systematically support this, could integrate this aspect into the 'brand core' and communicate it accordingly.
  A good example is the diverse range of wine-grape varieties that provides the basis for communicating added-value in the realm of wines and spirits. By now, similar approaches can be found among other food and drink items, such as chocolate or beer. In this context, it will always be a feature of such markets that they remain structurally small (i.e. in a niche). Yet, the sum of many small niche markets can contribute substantially to the conservation of regional special characteristics of plant varieties and animal breeds.
- Concepts of benefit, based on **less-used or neglected species of animal or plant,** can adopt a whole range of forms. These likewise tend to develop in niche markets. Yet, some of these markets have very substantial growth potential (e.g. due to dietary reasons), for instance the rediscovery of neglected species of cereal, such as emmer or spelt, which can also lead to a richer range of varieties of bread.
- Benefit concepts based on **associated biodiversity** require a systematic approach to management of the environments affected, as well as convincing communication, for instance through a label for products from habitats that particularly merit protection (e.g. biosphere reserves). Similarly, regions could devote their efforts to promoting typical, familiar and well-loved principal and characteristic species, such as the common hare, in addition to the partridge and other selected bird species. Via a label, commitment to such so-called 'flagship' species could then be used for marketing a whole series of different foods from the given region.

To create an added value built upon biodiversity, it is necessary to have communication that activates consumers and is characterised by credibility. In the absence of further information, consumers have no possibility to recognise whether the production of a given food is linked with the conservation or advancement of biodiversity.

Overarching aspects of communication

The following approaches are highly promising for communicating the benefit of biodiversity:

1. **Understanding of terms used and consciousness of problems involved:** Up to now, often terms are used which many consumers either do not know or they misunderstand.
   Thus, terms such as use of the Anglicisms '*Biodiversität*' and, in particular, '*Agrobiodiversität*' ('agro-' denotes 'agriculture') are unfamiliar to many German-speaking consumers. Indeed, the terms 'genetic diversity' and 'genetic resources' are often even misunderstood – some survey respondents connected them with genetic engineering (Bantle

and Hamm, 2014). By contrast, the term 'biological diversity,' (in German 'biologische Vielfalt') is substantially more present in consumers' minds; it should thus be used on a preferential basis. Beyond this, consumers' consciousness of the dangers posed by loss of biodiversity should be heightened.

2. **State labels, based on knowledge:** In identifying the various aspects of biodiversity – for instance the rareness of certain animal species – as a general principle, messages from state authorities are perceived to be more neutral and credible than messages by market actors who have economic motives, or motives specific to their world-view, ascribed to them. Therefore, state labels are substantially more effective than those from market actors. On the one hand, the competition among private labels that signalise environment friendliness shows that effective consumer demand exists. On the other,
the result is now a confusing flood of labels without overarching minimum standards. Other examples are the realms of fair trade and regional produce. This carries the danger of misleading significant elements of consumer demand that have purchasing power – when bad behaviour comes to light, this leads to disappointment and also reticence in purchasing. By contrast, as an example, a basis for a reliable label could come from a systematic assessment of dangers posed by genetic resources, through the National Specialist Programmes run by the Federal Office for Agriculture and Food. A particular challenge faced is labelling in the realm of conserving complex ecosystems; this is because such systems do not relate to individual plant and animal species, directly and with perceived impact. Yet here too, some successful approaches have been introduced. For instance, this is true of the labelling of foods from types of landscape that are under threat (e.g. orchards consisting of scattered trees; mountain pastures; heath). Labels for a given type of grassland-use also deserve mention here (e.g. hay products or pasture milk products). There is an urgent need to fill the gaps in research, either into the foundations for state labels for biodiversity or into monitoring these labels' efficiency and effectiveness.
3. **Communicating the individual and societal benefit of ethical consumption:** Numerous studies on so-called ethical consumption (e.g. eco-foods or fair-trade foods) show that two levels of usage should be addressed respectively: the level of the individual and that of society. In terms of individual (hedonistic) benefit, this could be the particular taste experience, for instance. Conversely, when talking of benefit to society, altruistic values are highlighted - for instance, the ecological benefit of resistance genes in modern plant varieties, the conservation of biodiversity for future generations, or support to small initiatives aimed at preserving a region's cultural identity. It is important to address consumers as individuals, so that responsibility is not passed off onto third parties (politics, agriculture, retail, etc.) The core of such messages should always answer this question: what benefit does a consumer have if he or she buys a product (meat, milk, wool, etc.) sourced from a threatened breed of animals or a rare farmed plant? In this context, the benefit to society can also be communicated as an individual benefit if it generates a 'feel-good' factor, or if the consumer can thereby profile themselves as a responsible consumer within their personal environment (demonstrative sustainable consumption). Yet such efforts to communicate are successful only if the consumers have understood and embraced the principle of 'conservation through use,' regarding rare plant varieties and breeds of farm animal (Bantle and Hamm, 2014).
4. **Increasing individuals' willingness to pay – an added-value for the value-creation chain:** The aim in communicating the advantages of use is ultimately to achieve greater consumer willingness to pay for specialities; this enables farmers to achieve an economically viable use for their products, connected with protection of biodiversity.
Among the predominant multi-level marketing chains, other market actors (e.g. processing, trading, catering)) benefit economically from this offer. For instance, this can be through a product differentiation, making a comparison with competitors that have uniform product offerings, or through

communicating that a company shares a responsibility for society's concerns (e.g. as part of Corporate Social Responsibility concepts). If consumers know about the threat facing plant species and breeds, as well as breeds of animal, then they usually also advocate a responsibility for conserving them (Bantle and Hamm 2014). Conversely, many consumers are unaware of the contribution that they themselves can make with regard to their individual food-purchasing behaviour. While it is relatively easy to engender such an awareness for conservation of old varieties of fruit, vegetable or potatoes, it is a lot harder with regard to breeds of farm animal that are under threat. Lots of consumers cannot directly make sense of the principle of 'conserving a breed of animal by using (i.e. eating) it.' This is because, as regards wild animals, they have internalised the principle that they should not buy products coming from species under threat (Bantle and Hamm, 2014).

5. **Combined channels of communication:** Among the channels of communication, the classic media (especially television) continue to exercise a decisive role in awakening interest and in creating awareness of problems. Other important information sources are farm businesses engaged in direct marketing, botanical gardens, information centres on biodiversity, school farms, zoos and 'ark farms.' Yet, consumers do need to actively go and visit such places. The internet is suitable for more targeted and more in-depth information that can be put across simply, using apps or QR codes. The internet's huge advantage is that information can be processed and imparted on a modular basis, in a target-group-specific way and at various levels of depth. Social media have already become an important communication channel for distributing packages of information about biodiversity, suitable for given target groups.
By contrast, the targeted use of social media to promote biodiversity in agriculture still has a lot of scope for further development.

Conclusions: tasks faced by politics

Biodiversity constitutes a **public asset,** one that is increasingly **under threat** in the agricultural production systems that predominate today. Politics must deal with the task of creating the framework for participants in the economy, through production-based and usage-based requirements or incentive systems, in a way that protects and safeguards that public asset. In the past, politics was almost exclusively preoccupied with the framework for agricultural production. By contrast, there was inadequate use of the **possibilities** offered by advancing the **marketing** of products that contribute significantly to conservation and promotion of biodiversity, in their production. The same applies to c**ommunicating** with the population about the benefit that biodiversity offers. The agricultural and food production sector, like other involved parties, has also given little attention to this topic.

Therefore, the Scientific Advisory Board on Biodiversity and Genetic Resources, based at the Federal Ministry of Food and Agriculture, recommends to the Federal Government and to the food and agriculture sector an **industry-wide-initiative** on **'Biodiversity'**.

The following **goals** should be at the forefront:

- Raising the general level of knowledge about the significance of biodiversity, and the appreciation of it, throughout all groups within society;
- Securing biodiversity in its capacity as an anchor for the agriculture, forestry and fisheries sectors, as they direct their efforts at quality;
- Providing support to the marketing efforts of companies that render special services for advancement of biodiversity;

- Mobilising private willingness to pay to conserve public assets.

These **measures** are essential:

- Ascertaining assessment criteria for biodiversity in marketing;
- Elaborating product concepts and value-creation chains based upon particular services that advance biodiversity;
- Developing transparent and credible designations for products that render special services for conservation of biodiversity in the process of them being produced;
- Communication campaign on biodiversity; until the label is launched, the campaign is directed at knowledge and at cultivating positive attitudes; thereafter it concentrates on raising the awareness level that the label achieves.

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