Fostering Synergies between Biodiversity Conservation and Food Security

Project Report

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We hope that this publication contributes to better foster synergies between biodiversity conservation and food security.

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Executive Summary

Global food security is one of the major challenges for society now and in future. Food availability of individuals is influenced by a limited supply, unequal allocation and also by an increased global demand of food. While the supply side faces negative effects of climate change on agricultural production, the demand side is strongly influenced by population growth but also by changing consumption habits especially in transition economies like China. Bad agricultural practices have negative effects on the environment, as well as on long-term agricultural productivity. In this light, the IAASTD (2008) indicated that a sustainable increase of agricultural productivity will be the main challenge for the coming decades. At the same time the conservation of biodiversity, especially agricultural biodiversity, needs to be ensured, as it plays a vital role in farming. It is the origin of all species of crops and domesticated livestock and the variety within them; and is also the foundation of ecosystem services essential to sustain agriculture and human well-being.

The German Federal Agency for Nature Conservation, BfN, aims to provide knowledge and policy guidance at the interface between biodiversity conservation and food security efforts. Therefore, this study was commissioned to more specifically outline the potential synergies between food security and biodiversity conservation as well as to develop specific actions that might be undertaken by German government agencies (especially BfN; BMU; BMZ; BMELV). The study provides a review of recent scientific publications, and the ongoing political debate at international and European level. In addition, recommendations were identified through expert interviews which were developed further during an international workshop.

Synergies between biodiversity conservation and agriculture are manifold and have potentials to contribute to ensuring food security. In particular, agricultural biodiversity performs essential ecosystem services such as nutrient cycling, rehabilitation of degraded soils, water conservation, maintenance of soil fertility and biota, pollination, and regulation of pests and diseases. These functions bear the main opportunities to increase productivity with less pressure on natural systems. Diverse agricultural systems are more resilient to shocks and changes. Synergies exist especially between biodiversity conservation and multifunctional, small-holder farming, agro-forestry systems, organic farming or other forms of ‘low-input’ farming. These agricultural systems are particularly able to create ecological niches and habitats for wild plants and animals alongside food production. On the other side biodiversity plays an important role in providing a nutritious and beneficial diet.

Actions at different levels (local, national and international) need to be undertaken to foster the above-described synergies. The national level in developing countries was identified as the most important and potential one to implement strategies and actions. The German federal government should support activities to foster synergies at all levels tackling the challenges to:

- Increase production in a sustainable way
- Foster Sustainable Land Management practices at the local level
- Stop / slow down genetic erosion of agricultural biodiversity
- Stop the loss of biodiversity and ecosystem degradation
- Develop economic incentives and financial mechanisms for biodiversity conservation
- Enhance international cooperation and implementation of international treaties
- Address research gaps and innovation needs
1  The project ‘Environmentally sound Food Security’

Objectives

The main goal of the project was to identify current approaches and instruments that strengthen the synergies between biodiversity conservation, sustainable land use and global food security. Thereby the focus was on developing countries. Leading questions addressed the possible contribution of biodiversity conservation to food security and ways to achieve an increased agricultural production while, at the same time, sustaining biological diversity.

We define sustainable and environmentally sound land use in this context as a form of land management which contributes to the conservation, protection and recovery of biodiversity and ecosystem services.

Expected results of the project included the drafting of recommendations for policy makers at national level on strategies and tools to foster mutual benefits between biodiversity conservation and global food security. The outcomes of the project should further contribute to the international discussion such as CBD Programme of Work on Agricultural Biodiversity, EU Agricultural Policy etc.

Methodology

The project ‘Environmentally sound Food Security’ started in December 2009 and lasted till the end of April 2010. It has been based on the following components: a short literature review, expert interviews, a workshop with international experts, and the report at hand as final documentation.

Literature review:

The duration of the project did not allow for a comprehensive inventory of all issue-related literature. Hence, a focussed analysis of selected relevant studies, based on the core topic of fostering approaches and tools for an environmentally sound land management was carried out.

Expert interviews:

The expert interviews aimed at gaining qualitative information and were carried out by means of a semi-structured questionnaire developed in the course of this project (see annex).The experts covered relevant spheres and levels of action (global, Europe, international, national) as well as representatives from research, policy and civil society. We conducted a total of nine interviews, most by phone and some face-to-face. (The list of interviewed experts can be found in the Acknowledgement.)

The results of the interviews were compiled according to the topics defined in the key questions of the questionnaire:

- Main challenges for biodiversity conservation and food security
- Synergies between biodiversity conservation and food security (and climate change)
- Best practice examples for an environmentally sound food production
- Overarching factors of success
- Suitable strategies / tools for an environmentally sound food security
- Necessary actions (at different levels)
- Research needs
Workshop ‘Fostering synergies between conservation and food security’:

On 25 February 2010, a workshop with 27 international and national experts representing research, policy and civil society, took place at the Federal Agency for Nature Conservation in Bonn. The workshop was based on the results of the expert interviews and aimed at drafting policy recommendations, suitable to strengthen the mutual benefits between conservation of biological diversity, sustainable land management and global food security.
2 Background – a literature review

Food security today and tomorrow

Food security has been defined by the World Food Summit (WFS, 1996) as the situation ‘when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life’.

FAO (2008) estimates the number of undernourished people at 923 million in 2007. The goal of the WFS to halve the number of people suffering from hunger by 2015 is becoming more difficult to reach for many countries. About 80% of these people depend on their own food production and on land as a vital resource. The share of small-scale farmers who are not in the position to produce enough aliment for their own supply adds up to 50% (De Schutter, 2010).

According to estimations, the global population will reach 8 billion by 2025, and 9 billion in 2050. In particular, the cultivated area in developing countries will not be sufficient to nourish a growing population (DSW, 2008). FAO (2008) states that strengthening the agricultural sectors of developing countries and expanding food production in poor countries through enhanced productivity should be one important cornerstone of policies and programmes aiming at a sustainable solution for food security. A sustainable increase of agricultural productivity will be the main challenge, indicates the IAASTD (2008). Agricultural knowledge, science and technology are needed that maintain productivity while protecting the natural resource base and ecological provisioning of agricultural systems.

The FAO provides a useful analytical framework by distinguishing four dimensions of food security: availability, access, utilisation, and stability. Food availability refers to the availability of sufficient quantities of food of appropriate quality. Individuals need to have access to adequate resources for acquiring appropriate foods for a nutritious diet. The utilisation of food needs to be ensured through adequate diet, clean water, sanitation and health care; to reach a state of nutritional well-being. Last, stability is crucial in order not to risk losing access to food as a result of sudden shocks or cyclical events. Thus, the concept of stability refers to both the availability and access dimension of food security. This study focuses on the natural-environment related aspects of food security, namely the availability and stability dimension of the concept. However, it has to be mentioned that only if all four dimensions are covered food security is existent.

In this context the concept of ‘food sovereignty’ should be mentioned, which has been defined by the IAASTD (2008) as ‘the right of people and sovereign states to democratically determine their own agricultural and food policies’. This term also highlights the right of access to land, water, and seeds (Blessin, 2009).

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Factors affecting global food security

The causes for food crises are manifold and interrelated in a complex system. While natural catastrophes and political unrest have led to food insecurity in the past, the recent crises are aggravated by drastic increasing commodity and food prices. Food availability and access of individuals is influenced both by a limited and unequal supply, but also by an increased global demand of food.

On the supply side climate change is having negative effects on overall agricultural production through changes of local climatic conditions, including water availability and loss of biodiversity. Food security depends to a large extent on water availability. According to Kreul (2009) the amount of food produced globally through irrigation is growing continually and today uses about 70% of the world’s fresh water supply available to mankind. Furthermore, the increasing production of crops for bio-energy generation, encouraged through the rising oil prices and policy shift, is competing with food production for agricultural land. Growing land consumption for built-up areas and degradation of agricultural land are further limiting the availability of land for food production. Some countries have started to compensate land shortage for agricultural production in their own country through purchase of land in other countries, mainly in Africa.

On the demand side, population growth is the most prominent factor leading to food shortages. However, not only the number of people to be fed but also the consumption habits are relevant. Changing consumer behaviour in transition countries like China have led to a much higher share of meat and dairy products in the diet of people, causing increased competition for agricultural land for animal production, thus reducing the overall energy efficiency of the food produced.

Food security and climate change

The relationship between climate change and agriculture is double-sided. In many different ways agriculture adds to climate change. Agriculture, for example, contributes about 60% of anthropogenic emissions of CH₄, and about 50% of N₂O emissions. Climate change affects agriculture and its effects on crop yields, fisheries, forestry and livestock is expected to vary from region to region (IAASTD, 2008).

According to the fourth assessment report of the IPPC (2007) moderate warming will benefit crop and pasture yields in mid- to high-latitude regions, but even slight warming decreases yields in seasonally dry and low-latitude regions. Projected changes in the frequency of extreme climate events have significant consequences for food and forestry production. Smallholder and subsistence farmers, pastoralists and artisanal fishermen will suffer complex, localised impacts of climate change. As a consequence, food and forestry trade is projected to increase in response to climate change, with increased dependence on food imports for most developing countries (IPPC, 2007).

Agricultural strategies seeking food security will also need to include limiting emissions of greenhouse gases, adapting to human-induced climate change and increase variability (IAASTD, 2008).

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Food security and biodiversity

‘Biodiversity is the basis of agriculture, is the origin of all species of crops and domesticated livestock and the variety within them. It is also the foundation of ecosystem services essential to sustain agriculture and human well-being’ (CBD Secretariat, 2010).

The term ‘agricultural biodiversity’ includes all components of biological diversity relevant to food and agriculture and constituting the so-called agro-ecosystems: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes (COP decision V/5 appendix, CBD). Agricultural biodiversity is the result of the interactions among the environment, genetic resources and the management systems and practices used by farmers.

Agricultural biodiversity performs essential ecosystem services such as nutrient cycling, rehabilitation of degraded soils, water conservation, maintenance of soil fertility and biota, pollination, and regulation of pests and diseases. In addition, genetic diversity of agricultural biodiversity provides species with the ability to adapt to, for example, high temperature, drought and water deficiency, as well as to particular diseases and pests (CBD, 2010). Diverse agro-ecosystems provide niches for wild biodiversity to coexist with crops and livestock and opportunities for people to harvest a variety of biodiversity-based products alongside (Treweek et al., 2006).

Agriculture contributes to the conservation and sustainable use of biodiversity, and is at the same time a major driver of biodiversity loss mainly through agricultural expansion, both in area farmed and intensity of management. Agricultural biodiversity itself is under threat: the diversity of animal breeds, and plant/crop varieties are declining (genetic erosion) and the genetic vulnerability of specialised crops and livestock are increasing (Treweek et al., 2006).

Ecosystem degradation, often characterised by loss of biodiversity jeopardises this nature-based income. The Millennium Ecosystem Assessment (MA, 2005) focused for the first time on impacts of ecosystem service changes for human well-being. Substantial net gains in human well-being have been achieved at growing costs in the form of many degraded ecosystem services, and the aggravation of poverty for some groups of people. This degradation is a barrier to achieving the Millennium Development Goals. ‘Very often, it is the poor who suffer the loss of services caused directly by the pressure put on natural systems to bring benefits to other communities, often in different parts of the world’ (MA, 2005). So far, there is little recognition of the ecosystem functions and their degradation which constraint agricultural production and may limit the ability of agricultural systems to adapt to environmental and global changes in many regions (IASSTD, 2008).

Agricultural expansion in area is closely linked with the fates of forest. Furthermore, the basic need for food in future means that agricultural production will extend into marginal productive land where conservation stakes are often higher (IUCN, 2008). The TEEB-study (2008) estimates that with a ‘business as usual’ scenario, by 2050 eleven percent of the natural areas remaining in 2000 could be lost mainly as a result of conversion for agriculture, the expansion of infrastructure, and climate change. In addition, almost 40% of the land currently under low-impact forms of agriculture could be converted to intensive land use, with further biodiversity loss.

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7 CBD Secretariat (2010); http://www.cbd.int/agro/
10 IUCN (2008): The IUCN Forest Conservation Programme Newsletter, Issue 37
In relation to biodiversity agriculture faces two main challenges: to sustain agricultural biodiversity (including the related ecosystem services) and to mitigate the negative impacts of agricultural practices on biodiversity not directly used (CBD-Secretariat, 2010). A huge task will be to increase agricultural production in a sustainable way, whilst addressing the needs of small-scale farms in areas where the potential for improved productivity is low and where climate change may have its most adverse consequences (IASSTD, 2008).

FAO (2009)\(^{12}\) highlights the importance of well-managed ecosystems as a resource for sustainable intensification. Consequently, farming practices have to shift away from dependency on non-renewable inputs and chemical-based intensification and should move toward forms of intensification that rely on natural processes and biodiversity. This ‘Sustainable Crop Production Intensification’ (SCPI) at local level increases the productivity of agro-ecosystems and maintains or enhances ecosystems health (in terms of pest regulation, pollination and soil biological processes).

There exist (many) synergies between biodiversity conservation and agricultural production, some of them previously unrecognized. McNeely & Scherr (2001)\(^{13}\) show in their comprehensive report that there are ways to manage the coexistence of wildlife and agriculture, and present examples of synergies that lead to increased food productivity and conservation gains. In its research report WWF (2006)\(^{14}\) demonstrates that protected areas can play a role in in situ conservation of agricultural genetic diversity, and are important in maintaining stability in agricultural systems. But at present, the location of protected areas and often the way they are managed are shortcomings to fulfil this task.

The concept of ‘multifunctionality’, which has been increasingly implemented for example in EU agricultural policies, recognises agriculture as a multi-output activity. Main products are on one side commodities such as food, feed, fibre etc., and on the other side non-commodities, so-called public goods, like environmental services, landscape amenities and cultural heritage (COM, 1999)\(^{15}\). The IAASTD (2008) calls for a shift towards increased importance to the multifunctionality of agriculture. In this concept farmers play a key role as producers and custodians and managers of agricultural biodiversity, and local and traditional knowledge of farmers is considered an integral part of this approach.

The conservation of biodiversity can also contribute to mitigating the impacts of climate change on food security. Genetic diversity enables crop and livestock adaptation to drought and water deficiency, particular pests and diseases etc. Sustainable agricultural practices and land management (such as conservation tillage, agro-forestry systems, organic farming etc.) have the potential to reduce emissions of greenhouse gas and increase the sequestration of carbon.

The importance of biodiversity conservation is reflected in the recommendations of the High-Level Conference (HLC) on World Food Security (June 2008, Rome), namely ‘to maintain biodiversity and increase the resilience of food production systems to challenges posed by climate change’ (FAO 2008). The German ‘Strategy of Adaption to Climate Change’ stresses the conservation of agricultural biodiversity as a means to adapt agricultural land use systems to changing conditions. Appropriate management systems should be strived for, which enhance the synergies between agricultural pro-


duction, nature conservation, soil protection of water and soil, and climate protection (BMELV, 2008)\textsuperscript{16}.

**Stakeholders in the context of food security and biodiversity conservation**

A broad range of stakeholder organisations are concerned with aspects of global food security, biodiversity conservation and development. Starting from a German perspective, organisations at the national, European and international level are identified and categorised into governmental/international organisations, research institutions, and civil society organisations including professional associations. The following table provides a first selection, not claiming to be complete. Other stakeholders like the business and financial sector are not included, although they might have interests in different aspects of the study topic.

<table>
<thead>
<tr>
<th>National</th>
<th>Europe</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Governmental / International Organisations</strong></td>
<td>BMU, BfN, BMELV, BLE, BMBF, BMZ, DED, GTZ, KiW</td>
<td>EU COM DG Agri, DG Env, EuropAid</td>
</tr>
<tr>
<td><strong>Research and Development</strong></td>
<td>Uni Hohenheim Kompetenzzentrum Ernährungssicherung, vTI, ZEF</td>
<td>SCAR (EU COM), ESF, IEEP</td>
</tr>
<tr>
<td><strong>Civil society, professional organisations</strong></td>
<td>BfdW, BUKO Agrar BUND, DBV, DVL Germanwatch, Welt hungerhilfe</td>
<td>Alliance 2015, CONCORD, COPA</td>
</tr>
</tbody>
</table>

Selected Stakeholders in the field of food security and biodiversity conservation

**International initiatives and treaties at the interface of food security and biodiversity conservation**

The importance of biological diversity for food security was reconfirmed in the Rome Declaration on Food Security made at the World Food Summit (1996, FAO) and has been a subject matter in many international initiatives and treaties.

The United Nations Millennium Declaration (2000) formulated 8 Millennium Development Goals (MDGs) for the year 2015 of which MDG1 (Eradicate Extreme Poverty and Hunger) and MDG7 (Ensure Environmental Sustainability) directly relate to biological diversity and food security. Other examples are the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS) as part of the WTO system, the UN Convention to Combat Desertification (UNCCD), and the United Nations Framework Convention on Climate Change (UNFCCC).

The Convention on Biological Diversity (CBD), adopted in 1992, is dedicated to the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of bene-

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fits arising from the use of genetic resources. With its Programme of Work on Agricultural Biodiversity it addresses the challenges to sustain agricultural biodiversity and ecosystems services as well as to mitigate the negative impacts of agricultural systems and practices on biodiversity. Much of the work on agricultural biodiversity under the Convention has been undertaken in cooperation with FAO. The Conference of the Parties (COP) to the CBD has recognised the leading role of FAO in agricultural biodiversity, including leading support to the programme of work on agricultural biodiversity (Decision V/S Nairobi 2000).

The FAO Commission on Genetic Resources for Food and Agriculture (CGRFA) is a permanent forum for the negotiation of international instruments and codes of conduct, and is co-ordinating policy related to the conservation and sustainable use of genetic resources relevant to food and agriculture. It is the only inter-governmental body specifically dealing with all components of biological diversity for food and agriculture.

International conventions and codes of conduct concerning biodiversity relevant to food and agriculture initiated by FAO Conference are:

- **International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)**
  It entered into force in 2004 and aims for the conservation and sustainable use of plant genetic resources for food and agriculture and the fair sharing of benefits arising from their use in harmony with the CBD.

- **International Plant Protection Convention (IPPC)**
  This multilateral treaty for plant protection has been in force since 1952 and was amended in 1979 and 1997. Its purpose is to secure common and effective action to prevent the spread and introduction of pests of plants and plant products and to promote measures for their control.

- **Code of Conduct for Plant Germplasm Collecting and Transfer**
  Adopted in 1993 it aims to promote the rational collection and sustainable use of genetic resources, to prevent genetic erosion, and protect the interests of both donors and collectors of germplasm.

- **Code of Conduct for Responsible Fisheries (1995)**

- **Global Plan of Action for Animal Genetic Resources & Interlaken Declaration (2007)**

- **Global Plan of Action on the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture (1996).**
3 Expert viewpoints

Biodiversity conservation in the light of food security: synergies and challenges

The following results from our expert interviews underline and supplement main findings from the literature review.

A range of synergies related to biodiversity conservation and food security were mentioned by our interview partners which can be summarised as ‘(agricultural) biodiversity sustains agriculture’. Services provided in particular by agricultural biodiversity include genetic resources, pollination, and soil biodiversity maintaining the functioning of soils and soil fertility. New approaches try to use the underlying biological processes in order to increase the efficiency of agricultural systems with less pressure on natural systems.

In addition, biodiversity plays an important role in providing a nutritious and beneficial diet to people by expanding the range and quality of food. According to the experts interviewed, socio-economic impacts of biodiversity should not be neglected. A diversity of agricultural systems is more resilient to shocks and changes and leads to benefits for more people. The experts also identified very strong linkages and synergies between cultural values, traditional knowledge and the conservation of agricultural biodiversity.

According to our interview partners and literature review, synergies between biodiversity conservation and agricultural production can be found especially in multifunctional, small-holder farming, agro-forestry systems, organic farming or other forms of ‘low-input’ farming. These agricultural systems are particularly able to create ecological niches and habitats for wild plants and animals alongside food production.

In contrast to the essential synergies between biodiversity conservation and food security, also existing challenges (and underlying conflicts) have been identified in our inquiry. The interview partners reinforced that ‘achieving food security while at the same time reducing the foot print of agriculture on environment and biodiversity’ is one of the main challenges. This has to be accompanied by forcing up the efficiency of agricultural systems with respect to more efficient use of water, fertilisers and land; thereby reducing pollution, competition of land use etc.

Loss of biodiversity is seen as an overarching problem relating to the whole productive system that depends on biodiversity. In comparison with, for example, water shortage, the loss of biodiversity can have short-term impacts on food security, like the collapse of pollination because of losses of bee colonies. According to the estimation of experts, many impacts will occur more in the long term as consequences of genetic erosion and the degradation of ecosystem services.

The concentration on few high-yielding crops and the resulting loss of traditional varieties and habitats of their wild relatives is seen as another challenge to tackle. So far, the conservation of local agricultural biodiversity is often overlooked and not addressed properly in rural development and agricultural programmes. This loss needs to be slowed down by in-situ and ex-situ conservation. Especially, in-situ conservation is a challenge, and more efforts are needed to ensure that local varieties can further develop and adapt to changing environmental conditions.

There is a rising tendency to intensify agricultural production in developing countries including the expansion of monocultures and high input of agrochemicals. The challenge is how to increase the productivity and market orientation of particularly family farming systems without causing loss of biodiversity and environmental damage. The experts underline a strong demand for training of farmers, agricultural extension services and farmer cooperation. A change of farmers’ self-image is
needed from ‘only’ food producers to managers of natural resources and biodiversity. This implies developing mechanisms of compensation and incentives for biodiversity conservation.

Recommendations from key reports and expert interviews

This section summarises recommendations from key reports and expert interviews with special relevance to promoting synergies between food security and biodiversity conservation. They address different levels of policy making; international initiatives, as well as national governments in developing and developed countries.

The underlying notion mentioned by our interview partners is that there is not one strategy or blueprint. Different characteristics of ecosystems, institutional, financial and human resources require multiple adapted strategies for different regions worldwide. Most of the interviewees consider national-level actions the most needed ones, accompanied by international efforts as well as local initiatives.

Changes to institutional frameworks are a prerequisite in many countries to successfully implement policy instruments. The policies at national and international level have to move towards integrated approaches through an improved cooperation between different sectors and levels. Especially at the national level there is a high potential to integrate biodiversity conservation and natural resources management into rural development policies and other policy areas. Governance quality should be improved through more transparency and the participation of stakeholders like farmers’ associations in the development of national agricultural policies (IAASTD, MA). A better collaboration between national governments and private sectors as well as civil society is requested alongside the need to form partnerships on all levels (FAO, 2008).

To implement policies and encourage behavioural change, institutions have the option to apply different kinds of policy instruments: regulatory approaches (e.g. laws, standards), market-based instruments (like subsidies, taxes, or tradable permits), and suasive activities (e.g. provision of information, extension services, research) and others. Regulatory policy instruments like laws to protect farmers’ rights to seeds, access to water, and intellectual property rights are proposed to be improved in the report of the IAASTD (2008). In this context secure land tenure by land registration and land titles is an important precondition according to the interviewees. These regulatory instruments are targeted at increasing sustainable productivity of agriculture (in developing countries) while reducing price volatility. On the other hand, regulative measures should be introduced to extend the ‘polluter-pays’ principle to cover up for agricultural practices that harm the environment and negatively impact on biodiversity.

Regulative instruments should be accompanied by investments into development and infrastructure of local and regional markets. This should further be supported by measures to diversify farm holdings and thus increasing farmers’ income and reducing risks while ensuring conservation of biodiversity. This especially encompasses the development of markets for products from sustainable agriculture.

The implementation of planning instruments like Land Use Planning enables regional and integrated approaches to foster synergies between food security and conservation. A well-established area-based instrument in developed and developing countries is the designation of biosphere reserves, in which the Man and Biosphere approach of the UNESCO is able to link nature conservation with human development. In order to improve the livelihoods of the rural population, options to provide benefits from conservation areas and ecotourism to local people should be further developed.

Interviewees see a necessity to increase the pace of CBD implementation at national and international level. Besides the CBD, the synergies between food security, biodiversity conservation and climate change can be fostered at international level through the integration of sustainable land
management on non-forested land into the Clean Development Mechanism (CDM) and into the Reducing Emissions from Deforestation and Degradation mechanism (REDD).

In terms of **market-based instruments** different reports like the IAASTD (2008), the recently published TEEB report 17 (2009) and others (MA, 2005; NSB, 2007; McNeely & Scherr, 2001) emphasise the importance to introduce incentives to provide environmental services through agriculture, e.g. maintaining the diversity of domesticated plants and animals. These so-called payments for ecosystem services (PES) could be introduced at local level as well as up to global level. Our interview partners see high potentials in the introduction of PES, but point to the fact that the poorest countries hardly have the financial resources to implement them. Complementary to PES are measures like green public procurement or certification schemes. Alternative financial mechanisms such as ‘debts for nature swaps’ (NSB, 2007) or creating new markets like habitat banking and endangered species credit to compensate for negative effects of business activities are currently being tested in some countries. In addition, non-market values of ecosystems need to be considered in decision making on investments and resource management (MA, 2005; BfN, 2008). A way of controlling agricultural pollutants is suggested through the creation of ‘emission markets’ (McNeely & Scherr, 2001). At the same time a general reform of policies that disposes subsidies harmful to the environment or biodiversity is necessary (TEEB, 2008, MA). At the interface of national and international activities and of bilateral cooperation, the interviewees opt for a removal of trade distortions through modifying perverse incentives.

Further recommendations concern **suasive activities** fostering behavioural changes through provision of information, extension services, research and development. IAASTD (2008) recommends developing Agricultural Knowledge, Science and Technology (AKST) especially with respect to agricultural ecology, environmental problems and increasing productivity (FAO, 2009; BMELV, 2008). Building local capacity to promote sustainable land use systems and manage biological processes for intensification of crop production is a recommendation formulated by FAO (2009) and our interview partners. This includes training and participatory extension processes as well as the building up of local institutions or cooperatives. These institutions can also play a key role in stimulating farmers’ self-image as ‘biodiversity managers’.

Measures to improve access to markets for farmers and their products from agricultural diversity should be accompanied by activities to raise awareness among consumers. At all levels should awareness-raising be implemented to convey the importance of biodiversity conservation and ecosystem services.

In the view of the German government (BMELV, 2008) intensification of national and international agricultural research is required, which should channel research aid on projects aiming at sustainable and environmentally sound food security (BfN, 2008). As a means of knowledge transfer and exchange the IAASTD requests Farmer Field Schools and farmer-scientist research circles. This goes along with the need to better acknowledge the knowledge, skills and experiences of women.

**Research gaps and future needs**

Several research needs were formulated by the interview partners such as the complex interactions between ecosystems and agricultural production and the spatial dimensions of processes that lead to biodiversity loss. Soil biodiversity and understanding of soil functionality is under-researched and should gain more importance. There is a general request for more investment in research into mitigation and adaptation strategies for agriculture to climate change. Knowledge is needed on measures to reduce greenhouse gas emissions through agriculture. Further demand is expressed in the

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field of sustainable agriculture, to identify sustainable agricultural systems and to learn how best to support these. A stronger research focus should therefore be on the adaptation of successful systems to changing circumstances. Also social aspects like the linkages between cultural identity and biodiversity are not understood well so far. At the policy level, research should address a better understanding of the reciprocity between development cooperation, food security, poverty reduction and biodiversity conservation.

Besides the thematic foci of research, different interview partners raised the issue to reform research implementation in order to ensure better and more efficient approaches. It was general consent that more research should be undertaken not only in but together with developing countries. On-farm research and knowledge exchange with farmers are important tools to improve the appropriateness of research. Research findings and best practice examples have to be communicated and capacity building needs to take place to ensure better management and policy making. Research into future scenarios based on actual and past experiences are suggested as a tool to inform decision makers. It was further mentioned that scientific evidence in many aspects related to biodiversity conservation and food security is lacking, and that there are difficulties of getting quantified information on good practices.
4 Workshop Documentation

The PowerPoint presentations held during the workshops can be found in the Annex.

Welcome and introduction

Prof. Dr. Beate Jessel, President of Federal Agency for Nature Conservation (BfN)

The speech was documented by Kerstin Lehmann.

Content: High levels of poverty and economic pressure often lead to a negative downward spiral of unsustainable agriculture and a persistent decline in biodiversity especially in developing countries, which are often also biodiversity hot spots. But agricultural production is directly dependent on the goods and services provided by ecosystems and nature’s diversity, and therefore essential for providing food to humans as a basis of food security.

Therefore synergies between biodiversity conservation and food security have to be identified and integrated in international, national and local policies to achieve an environmentally sound food production. The UN Convention on Biological Diversity as well as the German national strategy on biological diversity include several concrete targets and measures, which strengthen the conservation and sustainable use of biological diversity in the context of agriculture. Furthermore, actions in development countries to eradicate poverty and hunger are demanded.

Key message: Mainstreaming biodiversity in strategies for food security is an important contribution to the conservation of biodiversity and securing sufficient food for a growing global population.

Sustainable Land Management – a Key to Conservation and Food Security

Keynote speech held by Luc Gnacadja, Executive Secretary United Nations Convention to Combat Desertification (UNCCD)

The speech was documented by Nadja Kasperczyk.

Content: Sustainable Land Management (SLM) has potential to enhance ecosystem services and to sustain food production. Important is the restoring of degraded land instead of land clearing. UNCCD works on the integration of SLM into relevant cooperation programmes.

Failures are so far:

- missing upscale of good practices;
- insufficient diffusion of available information;
- lack of mainstreaming at national level;
- lack of monitoring;
- required resources are not mobilised.

Key message: ‘Enhancing soils anywhere enhances life everywhere!’

Discussion: The discussion started with the question of the potential synergies between the ‘three conventions’ (climate, desertification and biodiversity) at country level. Mr. Gnacadja pointed out that there is a substantial overlap. A national action plan is in place for each convention, which often exceeds the resources of developing countries. A harmonisation of the three national plans and cooperation could result in synergies. With respect to international cooperation it was emphasised that
cooperation should include a wider audience such as FAO and CGIAR, since not only the conventions address the topic of biodiversity and food security, there are additional treaties and initiatives. Access to land and land property as well as broader land governance were also raised as an essential issue in the course of the discussion. It was mentioned that the attitude towards farmers needs to be changed from ‘recipients of subsidies’ to ‘smallholder investors’. Another topic was research at grassroots level and the need to transfer research findings to policy makers.

New Approaches to Linking Food Security and Biodiversity Conservation

Keynote of Prof. Dr. Joachim von Braun, Centre for Development Research, University of Bonn (ZEF)

Content: The relationship between biodiversity and food security has improved since the 1996 World Food Summit in Rome. However it is still a love-hate relationship and requires a lot of counselling to make this marriage function. Biodiversity is of intrinsic value, but also has to be seen as an insurance instrument. The insurance value is particularly important for food security, which actually depends on biodiversity, e.g. to deal with known and unknown pests and crop diseases.

Three strategic actions need to be followed for enhanced food security: 1) prevention of risks and readiness for uncertainties through Research & Development, 2) social protection, 3) insurance. Biodiversity serves especially the first and the third, as it equips us with options that reduce risks and uncertainties, and strengthens insurance. Ill-designed food security strategies undermine biodiversity. Due to the fact that not much land is left, we need sustainable increase in productivity.

Key message: ‘The poor countries are the guardians of biodiversity and the rich countries benefit. The unfair burden and benefit sharing of biodiversity conservation and utilisation must be overcome.’

Discussion: A discussion evolved around the issue of ‘biodiversity serving as an insurance’. In this context valuing biodiversity is a problem, because of the uncertainty related to the impact of biodiversity loss.

Environmentally sound food security: results of expert interviews

Presentation by Nadja Kasperczyk and Simone Schiller, Institute for Rural Development Research at the Johann Wolfgang Goethe University Frankfurt am Main (IfLS)

Content: The methodology of the study was briefly introduced and the results of the literature review and expert interviews were presented according to the following topics:

- Challenges for food security and biodiversity conservation;
- Synergies between food security and conservation of (agricultural) biodiversity;
- Required actions at local, national and international level;
- Research needs.

Discussion: The first subject of the discussion focussed on agricultural productivity. Based on the fact that there is not much land left there is a need to increase agricultural productivity and to use water and land in a sustainable way to ensure worldwide food security. Agricultural biodiversity is the key factor to address the main challenge of a sustainable intensification of production. There is a need for research on sustainable growth of food supply and sustainable agriculture. However, the following discussion focused on the question whether increasing yields can be achieved with high input only or also with low inputs and which role biodiversity plays in this context.
The second part of the discussion concentrated on the role and value of agricultural biodiversity, including strategies and instruments to maintain it. It was stated that agricultural biodiversity is often neglected by the biodiversity community. If biodiversity is treated as a global public good, it implies to spend money where we can conserve the most. The question arose if we could use development money for biodiversity conservation. This is in principle possible and happens sometimes. As conservation requires compensation there is a need for establishing financial mechanisms. The diversification of farmers’ incomes is one opportunity to aid in-situ conservation. There is an agreement, that we need a market for ecosystem services.

Afternoon session with working groups and plenary discussion

Levels of action to foster synergies: local, national and international practice examples

As entry point for the group work during the afternoon, three participants were asked in advance to give a short input to illustrate the diversity of initiatives at local, national and international level:

Heinz Peters (Welthungerhilfe): Local Actions – potentials for farmers and businesses

At local level exists a lot of potential for actions related directly to biodiversity and food production. Since farmers are the main drivers at that level, their interests need to be considered as a precondition. Actions correspond to integrated resource management, community forest management, buffer zone management, disaster preparedness, coastal protection and many more. Programmes directly aiming at biodiversity conservation are, for example, propagating the use of neglected crops like the false banana, conservation and propagation of land races through farmers’ (seed breeders) networks, promotion of under-researched plants like Fonio (a millet variety). In summary, the situations of people in the area need to be considered, and there needs to be a benefit for them in any activity aiming at biodiversity conservation – through additional income opportunities, higher harvest, better prices or special subsidised programmes. It is also important to institutionalise activities to secure sustainability and scaling-up.

Michael Brüntrup (DIE): National Policies – what governments can/should do

Mr. Brüntrup illustrates the national requirements with the help of two examples from Namibia. Both examples deal with bio-energy resources, one on the basis of local species of encroaching bush, the other one on the basis of Jatropha cultivation. The different impacts on environment / biodiversity, local people etc. were outlined and the national policies and laws in place presented. First attempts to encourage national bio-energy production were introduced, such as allowing feeding electricity gained through biomass into the national grid (though not regulating the price) and a national bio-fuel road map. However, this proved to be insufficient. Different policies like bio-energy, biodiversity, forestry, labour policy have to work together and have to be aligned, especially at the national level but also at local level where projects have to be implemented together with many local stakeholders.

Frank Begemann (BLE/IBV): International treaties/conventions: towards a global strategy – the role of the FAO

The Food and Agriculture Organization of the United Nations (FAO) as a normative organisation is in charge of setting rules, standards and regulations. The FAO is home to several international conventions/treaties such as the International Treaty of Plant Genetic Resources for Food and Agriculture...
(ITPGR) or the International Plant Protection Convention (IPPC). FAO also hosts the Global Crop Diversity Trust. FAO’s Commission on Genetic Resources for Food and Agriculture (CGRFA) launched the Multi-Year Programme of Work (MYPOW) in 2007, a 10-year work plan on biodiversity for food and agriculture (the so-called agro-biodiversity). The MYPOW covers plant, animal, forest, aquatic and microbial genetic resources and cross-sectoral matters such as genetic resources and access and benefit sharing, biotechnologies, indicators or their impact on and opportunities in the light of climate change. It is envisaged to present the first global assessment and action plan for agro-biodiversity conservation by the year 2017. The ‘State of the World’ reports and ‘Global Plans of Action’ have been published already for the sectors of both plant and animal genetic resources. The ‘State of the World’ reports of both the forest and aquatic genetic resources are currently under preparation.

When discussing the relationship of biodiversity and food security it is important to consider these activities at the FAO and other international organisations engaged in agro-biodiversity activities such as the international centres of the Consultative Group for International Agricultural Research (CGIAR) etc. These are key stakeholders at the global level.

Policy recommendations developed in the workshop

The objective of this working session was to formulate policy recommendations for the German government to foster synergies between biodiversity conservation and food security. In the 90-minutes working session, three groups developed recommendations for the local, national and international level respectively. The three guiding questions were:

- Are there any additional actions to those presented before that are important?
- Which are the most important actions to foster synergies? (Ranking)
- What steps need to be taken by the German Government to support the implementation of actions?

The results of the three working groups are documented in the following sections.

International Treaties/Conventions – Towards a Global Strategy

Facilitated by Dr. Brigitte Schuster (BfN), presented in plenary by Dr. Frank Begemann (IBV/BL). Action in order of priority

- Strengthen research in the nexus of food security and conservation following a dual approach (research both on main crops & neglected (endangered) ones)
- Promote food sovereignty in developing countries
- Implementation and better coordination of relevant conventions & initiatives
- Indicator development for agricultural biodiversity and monitoring purposes
- Stronger focus on plant breeding, including participatory approaches: global initiative to mobilise funds; foster local actions & companies for defending monopolisation
- Support to the Global Initiative on Plant Breeding that helps facilitate exchange of information and mobilise funds
- World Agriculture Report should be signed by the German (and Austrian) Government
- Strengthen science-policy dialogue / bridge the gap between science and policy-makers: in this respect ‘bio-diplomats’ (such as Al Gore, Stern) are increasingly instrumental
• Assess the patenting procedure (ongoing process at the international level) and based on the results adjust the procedure
• International support to foster local food security

Additional points of lower priority:
• Design and implement innovative financing mechanisms (e.g. Endowment funds etc.)
• Overcome the sectoral organisation of the range of institutions involved in the topic
• Support the local diversity of breeding companies, i.e. in developing countries
• Increase awareness-raising efforts
• TEEB study could make a change in the discussion → it is necessary for governments to fund large-scale studies (such as the Stern Report)
• Decentralisation of food production & consumption
• Abolish trade distortions (subsidies; liberalisation)

Steps to be taken by Donor (e.g. the German) Government to support the implementation of these activities (here those that are ranked with four and three points):

 Research: BMZ and BMBF should foster research on synergies of food security and biodiversity conservation
 Promote food sovereignty: Change EU subsidy system for farmers (i.e. abolish export refunds) in order to allow the development of sustainable farming systems in developing countries
 Implementation and coordination of relevant conventions & initiatives: Work towards an increased collaboration and coherence between conventions (i.e. FAO, CBD, WTO)
 Indicator development: Support international efforts and initiative to develop specific indicators for agro-biodiversity
 Plant breeding: Promote and fund plant (participatory) breeding projects and programmes in pilot partner countries.

Actions and recommendations at national level
Facilitated by Nadja Kasperczyk (IFLS), presented in plenary by Mr. Meier (BMELV).

There were long discussions about the different level of actions mentioned in the course of the study and the comprehensiveness of actions. After supplementing some of the actions the group decided to cluster them into subgroups/levels.

State of identified actions after the national working group session:
• Identify conflicts between departments, ministries etc.; promote inter-sectoral cooperation; foster the implementation of national action plans.
• Promote capacities of sustainable agricultural sector, promote capacities of environment ministries, increase investment into agriculture (infrastructure, training etc.), provide incentives to farmers for sustainable farming (PES etc.), integrate Biodiversity into Rural Development policies, support an environmentally sound increase/intensification of food production
• Ensure access to land (land registration, land titles), establish land use planning
• Management of genetic resources and development of indicators for genetic resources
• Promote awareness-raising for biodiversity and food security
- Promote Biosphere Reserves as an approach to combining nature conservation with rural regional development

- Counteract trade distortions

The participants could not / did not want to prioritise these actions and started instead to formulate some selected recommendations for German policy (BMZ, BMELV, BMU, BMBF etc.).

**Steps to be taken by the German Government:**

- German policy should establish ‘impacts on biodiversity’ as a criterion for national project funding (and support developing countries to do the same)
- German policy should help governments in developing countries to create national action plan(s) in an integrated, harmonised and participatory way
- German policy should support other countries to implement CBD
- German policy should support governments in developing countries to mainstream the awareness of biodiversity and food security
- German policy should foster the integration of Payments for Environmental Services (PES) into agricultural support strategies from the beginning on instead of ‘end-of-pipe solution’.

**Support of local farmers and communities**

Facilitated and presented by Simone Schiller (IfLS).

Two objectives for the local level were identified, as well as linked actions. Some policy recommendations for the German government were developed, though it was not possible to cover them all in the discussion due to the limited time.

Recommendations to the German Government:

**Objective 1: Diversified farming systems, which ensures sustainable agricultural growth**

- Mainstream biodiversity in local development projects. There is a potential to use certification of biodiversity – friendliness of projects as a tool
- Foster applied research through support for on-farm research in developing countries on adapted technologies
- Conduct pilot projects on adapted technologies
- Improve access to markets, and credits for farmers
- Support initiatives to conserve local agri-biodiversity (varieties), e.g. through local seed banks, in order to enable farmers to benefit from conservation activities

**Objective 2: Diversified (agricultural) landscape**

- Conduct and finance courses in LUP with local stakeholders to increase and ensure of participation in planning
- Facilitate and finance knowledge exchange between experts in and between developing and developed countries
- Support, finance, train local decision making institutions and organisational structures in their implementation capacity – especially those working on biodiversity conservation – especially in conflict management
- Support the increase of local land tenure security, to ensure sustainable land use and facilitate land use planning and long term investments into ecosystem service provision

- Improve necessary infrastructures like markets, roads, information technology to increase farmers’ benefits from agricultural activities

- Support activities to improve farmers’ self-image, provide education and training

**Final Discussion**

In the final discussion it was raised that there is a need to further identify the links and synergies between biodiversity conservation and food security especially at the local level. At the same time it is necessary to identify the conflicts between food security and biodiversity conservation. In addition, there needs to be a better understanding of the influences from different stakeholders, e.g. the role of breeding companies, or private sector interests. Furthermore, more attention needs to be paid to the role of trade in food security and biodiversity.

At the national level there is a need for harmonisation and to implement environmental issues and agricultural initiatives as ‘one package’ from the start. In Africa, for example, the CAADP18 processes should be followed and should involve other ministries like environment, fisheries, agriculture, and forestry. Moving on to the level of development cooperation, the perspective of developing countries should be the starting point for all activities. Environmental and biodiversity aspects should be considered from the beginning of any project. Farmers are central and it is important to make farmers’ organisations fit for dialogue. Awareness-raising through including environmental issues in agricultural initiatives and extension services is a necessary step into that direction. As a sign from the ‘western world’ it was requested that Germany should sign the World Agricultural Report (IAASTD) to commit itself to the food security issue. The principle of food sovereignty should be promoted at the international level.

In terms of research a dual approach focussing on main crops (genetic resources) on the one side, and on flora and fauna diversity on the other was proposed. In this context the question of how to organise adapted research and to scale up positive examples was raised.

Finally, the question came up how the BfN wants to proceed with the results and the topic in future. There needs to be a more narrow focus of the discussion for future activities and one step could be to start with the role of the BfN in this context. An alternative could be to discuss how to bring forward the process, e.g. by organising a series of workshops. Future foci could be on identifying indicators or other more specific issues that came up in the course of this workshop. Another action resulting from this workshop is the development of recommendations for the Programme of Work on Agricultural Diversity at COP10.

Themes that are particularly relevant for the BfN in this context are biosphere reserves, land use planning and mainstreaming at national level. Target institutions and stakeholders for any activities by the BfN are the Federal Ministry of Environment (BMU), other line ministries and NGOs working with crosscutting issues.

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18 Comprehensive Africa Agriculture Development Programme of NEW PARTNERSHIP FOR AFRICA’S DEVELOPMENT (NEPAD) http://www.fao.org/docrep/005/y6831e/y6831e00.HTM
Outlook by the BfN

The project leader of the BfN, Dr. Bettina Hedden-Dunkhorst thanked all participants for their contributions during the workshop. She informed about the possible concrete outcomes of this project. The documentation will be made available to the participants. In addition, there is the possibility to prepare a publication in the BfN Series Nature Conservation and Biodiversity including articles contributed by participants on selected topics. A BfN position paper is also planned and will be used in decision makers’ consultations and links with other initiatives. A new BMBF research programme on food security is planned for the future.
5 Conclusions

The possible synergies between food security and biodiversity conservation (and climate change mitigation/adaptation) are accompanied by key challenges. This study identifies main synergies and challenges; it develops and outlines recommendations for German federal government institutions (BfN, BMU, BMZ, BMELV etc.) with the aim to

a) assist developing countries in achieving food security in a sustainable way (while conserving biodiversity);

b) promote sustainable food production and biodiversity conservation in Germany;

c) foster and contribute to cooperation at international level with regard to food security and biodiversity conservation.

Challenge: Increase agricultural production in a sustainable way

To be able to meet current and future global needs for food, agricultural production has to be increased. In order to simultaneously maintain agricultural biodiversity as well as general ecosystems health, more efficient, sustainable, and resilient agricultural systems are needed.

- Raise awareness of the synergies of biodiversity conservation and food security, and the importance of ecosystem services for sustainable livelihoods at all relevant levels (policy, farmer, consumers);
- Facilitate the adoption of conducive legislation across relevant ministries to implement sustainable land management. Foster the integration of objectives that support sustainable agricultural production into national agricultural development goals;
- Strengthen capacities of ministries in developing countries in order to better design and integrate approaches that support sustainable agricultural production while ensuring the conservation of biodiversity;
- Support national and international investments in agricultural research, the relevant institutions, infrastructure, and training and extension services, directing all efforts towards sustainable agricultural production;
- Foster the approach of Land Use Planning to better integrate nature conservation with agricultural production needs and ensure the participation of stakeholders in the planning processes e.g. through conducting and financing LUP courses with local stakeholders.

Challenge: Foster Sustainable Land Management practices at local level

Current trends to intensify agriculture in developing countries and shift from family farming and mixed agricultural systems increasingly towards monocultures, and the use of agrochemicals have negative impacts on agricultural biodiversity, and increase emissions of greenhouse gases. At the same time farmers need to be market-oriented in order to survive. Therefore, farmers should develop a self-image as producers of food and custodians / managers of (agricultural) biodiversity.

- Identify and remove perverse subsidies in developed countries to enable development of sustainable farming systems;
- Improve access to markets for products from sustainable agriculture for farmers in developing countries through e.g. marketing initiatives etc.;
Build local capacities through extension and participatory technology development to sustainably manage biological processes for intensification of crop production;

Encourage / lobby for the participation of stakeholders in developing countries in the development of national agricultural policies.

**Challenge: Stop / slow down genetic erosion of agricultural biodiversity**

The loss of traditional animal breeds and plant varieties accelerates, and the vulnerability of specialised crops and livestock increases. Genetic resources of agricultural biodiversity are important for future adaptation of agricultural systems to high temperatures, drought and water deficiency, particular pests and diseases as possible consequences of climate change.

- Promote and fund initiatives and programmes to conserve genetic diversity (local animal breeds and plant varieties) with a special focus on in situ conservation in pilot partner countries;
- Contribute to removing international policies and treaties which constrain the free exchange and planting of seeds through intellectual property rights.

**Challenge: Stop the loss of biodiversity and ecosystem degradation**

Agricultural expansion both in area farmed and intensity of management is one major driver of biodiversity loss. The recognition of ecosystem functions has been neglected so far.

- Introduce ‘impacts on biodiversity’ as a new obligatory indicator for national and international project funding to ensure that investments do not negatively affect biodiversity or at least tradeoffs are minimised;
- Mainstream biodiversity conservation in local development projects;
- Support local decision making institutions and organisational structures working on biodiversity conservation in their implementation capacity – and train especially in conflict management.

**Challenge: Develop economic incentives and financial mechanisms for biodiversity conservation**

The aim to conserve biodiversity while ensuring food security will be achieved only if sufficient monetary (and intangible) incentives are available. In addition, non-market values of ecosystems need to be considered in decision making on investments and resource management.

- Foster the integration of Payments for Ecosystem Services (PES) into agricultural support strategies;
- Establish measures like green public procurement, certification schemes and create new markets like habitat banking. In international cooperation enable alternative financial mechanisms such as ‘debt for nature swaps’;
- Extend regulative measures to support the ‘polluter-pays’ principle in order to cover agricultural practices that negatively impact biodiversity.

**Challenge: Enhance international cooperation and implementation of international treaties**

The importance of biological diversity for food security has been a subject matter in many international initiatives and treaties. However, the pace of implementation of these treaties as well as international and inter-sectoral collaboration needs to be improved.
- Work towards an increased collaboration and coherence between conventions (i.e. UNFCCC, CBD, UNCCD, ITPGRFA etc.);
- Assist governments in developing countries to implement CBD and to create national action plan(s) in an integrated and participatory way;
- Advocate for the integration of sustainable land management on non-forested land into the Clean Development Mechanism (CDM) and into the Reducing Emissions from Deforestation and Degradation mechanism (REDD);
- Lobby for a removal of trade distortions through modifying perverse incentives;
- Support international efforts and initiatives to develop specific indicators for monitoring agricultural biodiversity;
- Mainstream biodiversity conservation into rural development, poverty reduction and climate change strategies.

Challenge: Address research gaps and innovation needs

Research agendas often do not meet the needs to emphasise farming systems that are able to foster biodiversity conservation at farm and regional level. The gaps between researchers, practitioners and policy makers are huge and need to be overcome to better design adapted research as well as to valuate findings.

- Support international research on synergies of food security and biodiversity conservation and address a sustainable increase of agricultural productivity;
- Support research on the interactions between ecosystems and agricultural production, soil biodiversity and soil functionality, mitigation and adaptation strategies for agriculture to climate change, and suitable measures to reduce greenhouse gas emissions through agriculture;
- Support on-farm research in developing countries on adapted technologies with a focus on sustainable production systems. Facilitate knowledge transfer through e.g. farmer field schools and farmer-scientist research groups and foster mutual learning through knowledge exchange between experts in and between developing and developed countries.
6 Annex

Presentations

Beate Jessel, BfN: Welcome and Introduction

A future task in good hands

Welcome and Introduction
Fostering Synergies between Biodiversity Conservation and Food Security
Prof. Dr. Beate Jessel
President of the German Federal Agency for Nature Conservation
25th February 2010

Outline
- Introduction of the BfN
- The Role of Biodiversity
- CBD – Convention on Biological Diversity
- NBS – National Strategy on Biological Diversity
- Selected BfN Work Areas
- Aims and Outcome of the Workshop

Area of Operation of the Federal Ministry for the Environment

Main Responsibilities of BfN
- Provide scientific advice: to inform political decision-making processes
- Support conservation initiatives: including research and pilot projects
- Cooperation: with national and international partners
- Enforcement: CITES, marine conservation in EEZ, Antarctic Treaty
- Disseminate information: press and public relations work, publications, International Nature Conservation Academy

The Role of Biodiversity

Biodiversity: International Framework

CBD
- 2010
  - International Year of Biodiversity
  - International Day of Biodiversity
  - Development and Poverty Alleviation
  - 2010 target
  - COP 10 in Nagoya
- National Strategy on Biological Diversity

CBD programme on agricultural biodiversity

Agriculture and hence food security are fundamentally dependent on biodiversity and ecosystem services.
Adopted in November 2007
Prepared under the leadership of the Ministry for the Environment, Nature Conservation and Nuclear Safety
330 targets
430 concrete measures / action areas
Overall goal: to significantly minimise, and eventually halt the threat to biological diversity in Germany

But also: Global efforts to preserve biological diversity

National Strategy on Biological Diversity

BfN Work Areas
Sustainable land management, including agriculture and forestry
Fostering the conservation of agricultural biodiversity
Protection of marine ecosystem and sustainable fisheries
International projects concerning biodiversity conservation, poverty reduction and development

Workshop Background
- Project started in November 2009
- Implemented by IfLS and financed by BfN
- Leading question of the project:
How can we achieve biodiversity conservation while at the same time ensure food security?
Activities so far:
- Analysis of background studies
- 9 Expert interviews were already conducted

Objectives of the Workshop
Objectives:
➢ Provide a forum to discuss synergies between conservation and food security with different stakeholders
➢ Stimulate cooperation and exchange
➢ Develop recommendations for policy and action

Expected Outputs of the Workshop
Expected outputs:
➢ Report that synthesises the results of the project
➢ Recommendations for policy-makers
➢ Inputs to the international debate during the International Year of Biodiversity and for the CBD processes
➢ Inputs for future work of BfN

Thank You for your attention and have a successful workshop!
Prof. Dr. Beate Jessel
President of the German Federal Agency for Nature Conservation
25th February 2010
Key Message

- Biodiversity is essential for agriculture, food security and rural livelihoods, especially for the poor and vulnerable populations
- Biodiversity is threatened by deforestation, land degradation, and the non conversion of wetlands.
- Forestalling land degradation particularly in the Drylands can make a significant contribution to biodiversity conservation and food security
- Sustainable food security requires converging policies on sustainable land management and biodiversity conservation through synergies and effective partnerships among all stakeholders

Some Global Facts

- 2.6 billion people depend directly on agriculture
- 52% of the land used for agriculture is moderately or severely affected by soil degradation
- 4–6 million ha of cultivated land are lost annually due to anthropogenic soil degradation
- Cropland in developing countries decreased from 0.43 ha to 0.26 ha per capita in the period form the 1960s to the 1990s

Global Land degradation & improvement

Land improvement has been identified in some 16% of the global land area, mainly in the Drylands. But the gains remain fragile due to Climate change shocks

Land use types and their challenges

- **Cropland (38% affected by soil degradation)**
  - Expansion of cultivated fields and diminishing of natural vegetation cover
  - Insufficient amounts of organic material and nutrients
  - Burning of organic material (harvest residue, brush fires)
  - Soil erosion (wind and water)

- **Irrigated land (20% affected by salinisation)**
  - Overuse of water resources
  - Inefficient use of water
  - Soil erosion and salinisation

- **Rangeland (73% Affected by soil degradation)**
  - Overgrazing, burning and increase in undesirable plants
  - Insufficient soil organic carbon
  - Soil degradation: erosion, compaction, crusting
  - Free grazing, no clear land use rights
G-8 Summit Declaration on UNCCD & SLM
Aquila, Italy, 10 July 2009

**Responsible Leadership for a Sustainable Future**
*(Cf. the 134 paragraph of the Declaration)*

“We are deeply concerned about desertification and land degradation in drylands, as both causes and consequences of climate change. Acknowledging the substantial impacts of these phenomena on human well-being, poverty, food security and the environment, we recognize the efforts of the UN Convention to Combat Desertification (UNCCD) and call upon the Parties and existing funding mechanisms to strengthen synergies among the Rio Conventions in the implementation of selected projects.”

Furthermore, we will work with developing country partners to integrate effective Sustainable Land Management (SLM) into relevant cooperation programmes and assist them in integrating SLM into national development plans and policies and national climate change programmes. And assist them in integrating SLM into national climate change adaptation and mitigation strategies and programmes.

**SLM & Ecosystem Services**

SLM harbours great potential for preservation and enhancement of ecosystem services in all land use systems

1. **Provisioning services**: Benefits for food, fodder, fiber, fuel and freshwater provision.
2. **Regulating & supporting services**: Soil and vegetation cover – for water, carbon and biodiversity.
3. **Social & cultural services**: Cultural landscapes embody traditional values, proven knowledge, and experience gained over centuries. Cultural landscapes represent the “combined works of nature and of man” (UNESCO).

**SLM & Biodiversity**

Regulating and supportive functions are seriously affected by loss of biodiversity; particularly biomass & water cycles.

- The Biomass cycle: Soil organic matter has an influence on multiple soil functions such as soil biodiversity, soil fertility, carbon storage, regulation of surface water flows and improved water quality.
- The Water cycle: Reduction of soil cover and of soil organic matter are the starting point in a vicious degradation spiral due to a drastic disturbance of the water cycle. As the soil is no longer protected against erratic and often intense rainfall, water cannot infiltrate into the soil. This leads to increased surface runoff and floods as well as erosion during wet periods, but also reduced water storage in the soil and reduced recharge of the groundwater.

**Biodiversity & food security**

- Biodiversity is essential for agriculture, food security and rural livelihoods, especially for those populations living in marginal and harsh environments such as in the Drylands.
- Biodiversity is threatened by deforestation, land degradation, and the non conversion of wetlands.
- Three-quarters of the genetic diversity found in agricultural crops have been lost over the last century, mostly due to agricultural “modernization”. Just 12 crops and 14 animal species now provide most of the world’s food (FAO).
- As biodiversity used in food and agriculture declines, the food supply becomes more vulnerable and unsustainable; and agriculture becomes less able to adapt to environmental changes, such as climate change or water scarcity.
- “The erosion of biodiversity for food and agriculture severely compromises global food security” (FAO).

**Point I. Interlinkages between ecosystem services affect food security**

1. Increasing water scarcity
2. Shrinking of arable land & loss of soil
3. Climate change impacts
4. Agro-fuels impacts
5. Research & investments in agriculture declining worldwide

Most of the LT key constraints to food security are about the sustainable management of the land and its ecosystems.
Land degradation is predictable & reversible

Drought & desertification are predictable
Land degradation is reversible
To a large extend, their severe socio-economic impacts on affected populations livelihood are the result of public and even global policy failures

1. Failure to upscale the good practices
2. Failure to diffuse the available information & knowledge
3. Failure to mainstream at the national level
4. Failure to monitor
5. Failure to mobilize the required resources
6. Failure to converge from the global to the local

Meeting Human Needs

“If human needs are to be met, the Earth’s natural resources must be conserved and enhanced. Land use in agriculture and forestry must be based on a scientific assessment of land capacity and the annual depletion of topsoil.”

In “Our Common Future”, the report of the World Commission on Environment and Development (known as “The Bruntland Report”)

The UNCCD Framework for Action

Assessment & Monitoring of DLDD

To mobilize resources through building effective partnerships between all stakeholders

1. To improve the Conditions of affected Ecosystems
2. To improve the Livelihood of Affected Populations
3. To generate Global Benefits

The UNCCD 2+9 Impacts Indicators

Mandatory
1. The proportion of population in affected areas living above poverty line;
2. The land cover status

Optional
1. Water availability per capita in affected areas
2. Change in land use
3. Childhood malnutrition and/or food consumption/calorie intake per capita in affected areas
4. The Human Development Index
5. Level of land degradation (including salinization, water and wind erosion, etc.)
6. Plant and animal biodiversity
7. The aridity index
8. Carbon stocks above and below ground
9. Land under SLM

Point 5. Progress depends on collective action

- Land & Soil degradation are under-recognized threats to global well-being which are aggravated by climate change.
- They require a global action.

- “Today’s global challenges such as the food crisis, the loss of biodiversity, the water scarcity, the forced migrations, the climate change agenda, are bringing the global community down to earth, down to the land; they are calling for sound and integrated policies including on sustainable land management.”

Enhancing soils anywhere enhances life everywhere
Innovation for Linking Food Security and Biodiversity

Joachim von Braun
Center for Development Research (ZEF), University of Bonn

International workshop on "Fostering Synergies between Biodiversity Conservation and Food Security"
Bonn, Feb. 25th 2010

Rising number of hungry people in the developing world

-1 bil.


New contexts of food security and biodiversity

Price spikes and food riots 2008

Source: J. von Braun based on news reports. Prices are data from FAO 2009.

Land constraints

- May be 10 to 15% more arable land available that isn’t presently forested or subject to erosion or desertification
- Land area in production could be increased, but:
  - Massive loss of forests and of biodiversity and carbon sequestration capacity
  - High marginal costs of investment

Foreign land acquisitions 2006–09

Source: von Braun and Meinzen-Dick 2009, with data compiled from media reports.
Climate induced percentage change in production in 2050: Rain fed maize

Source: M. Rosegrant (IFPRI) 2009.

Soils, biodiversity and climate change

- >3,000 gigatons of carbon currently trapped in soils, >4 times as much as in atmosphere
- Terrestrial ecosystems seem to trap more carbon than they release, but for how long?

Biodiversity in soils a factor and under-researched

17 Megadiverse countries

Countries identified by WCMC, as hosting the majority of the earth’s biodiversity

Different forces at various locations put biodiversity at risk

The sad correlation: Biodiversity is high where poverty is often prevalent (ca. 2005 ($1.25/day)

The poor conserve biodiversity and benefit little while the rich use it and benefit most

Risk patterns that broadly link food security and biodiversity

1. The risk of high and volatile food prices
2. Growing demand for food and energy a burden for land, water, biodiversity
3. Climate change accelerating volatility
4. Risk of crop and livestock diseases make the poor more vulnerable to shocks
5. Political volatilities and fragile states with increasingly reduced capacity to address risks

Concepts and theory
Food security and biodiversity links (*)

- National food availability
- Household access
- Household resources (incl. agric income)
- Care
- Health environment
- Other basic needs
- Dietary intakes
- Nutrition security

Concept: strategic actions for food security supported by biodiversity

- Risk management
- Social protection
- Risk prevention with R&D
- Biodiversity

Concepts do matter (it does not count if it is’nt counted, but it is difficult to count…)

Counting and accounting for biodiversity and it’s change
1. at different levels: Genetics, species, ecosystems
2. for all domains: land, soils, water, forests, etc.

Valuation matters: How much biodiversity will remain under different valuation frameworks?

Theory matters for economic determinants of crop biodiversity

- Household / farm economics theory
- Utility maximization in the presence of imperfections in output and input markets (crops, seeds, labor and credit markets)

Biodiversity is the outcome of choice, not choice itself

Innovation for Linking Food Security and Biodiversity
Direct and indirect linkages between Biodiversity and Food Security
- Genetic and species diversity
- Ecosystems diversity
- in-situ – ex-situ
- risks - uncertainties (unknowns)

The importance of genetic agro-biodiversity
- Agro-biodiversity is generally larger in areas of poverty
- Poor farmers often choose to maintain local crop germplasm to spread risk (Example: conservation of landraces in the Ethiopian highlands as a strategy against food insecurity)
- Genetic diversity of food sources is important for:
  - crop productivity
  - crop nutrition value
  - crop pest resistance
  - crop resilience to climate change

Ex situ diversity: the role of seed banks
- Seed banks in the world aim to guarantee that such genetic information is preserved, albeit ex situ;
- Not a substitute to ecosystem approach to preserve processes, but a complement and insurance policy (i.e. “…should most in situ varieties disappear”)
- Other ex situ conservation methods of CGR: DNA storage, botanical gardens, cryopreservation, …

Sources: The international dimensions of genepools

Ecosystem approach to preserving in situ diversity
- November 1995: CBD adopted ecosystem approach as the primary framework for action under the Convention
- The Ecosystem Approach “requires the taking into consideration of the effects of actions on every element of an ecosystem, based on the recognition that all elements of an ecosystem are linked.” This acknowledges the importance of in situ diversity to support the ecosystem processes which maintain ecosystems services.
### Biodiversity internationally recognized for food security in legal framework

- Commitment No.3 of the Rome Declaration on Food Security made at the World Food Summit held in Rome in 1996.
- Convention on Biological Diversity (CBD) 1992
- International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGR)
- Trade Related Intellectual Property Rights (TRIPs)
- MDG 7, Target 2: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss.

### Innovation for Linking Food Security and Biodiversity

A policy agenda with accelerated technical and institutional innovations

### Technical Innovations

- New seed bank in Svalbard
- New techniques for ex situ conservation
- Development of new crop varieties improve productivity under new/changing climate conditions, relying heavily on biodiversity preserved ex and in situ
- New research on the micro-biodiversity (diversity of micro organisms, e.g. in soils) and its role in ecosystem processes

### Institutional Innovations

- Link food security approach to ecosystem approach
- Rewards for public ecosystem service management of the poor (innovative financing for biodiversity (PES, Offsets, Certification, REDD,...))
- Tenure security to allow long-term sustainable land management
- Right mix of regulation, community management and market based mechanisms for addressing private, common pool and public good nature of biodiversity

### The unfair burden-and benefit sharing of biodiversity conservation and utilization must be overcome
Simone Schiller, Nadja Kasperczyk, IfLS: Results presentation

Environmentally-sound food security
*Naturverträgliche Ernährungssicherung*

Results of interviews

Dipl. Ing. Agr.
Simone R. Schiller

Dipl. Biol.
Nadja Kasperczyk

Institute for Rural Development Research (IfLS) at the Johann Wolfgang Goethe University Frankfurt

Food Security and biodiversity in the context of this project

Definition of Food Security
World Food Summit, 1996

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Dimensions of Food Security

Access
Utilisation
Availability
Stability

Food Security

Agriculture and Biodiversity

Two main challenges for agriculture:

1) To mitigate negative impacts of agricultural practices on biodiversity (not directly used)
2) To sustain agricultural biodiversity and ecosystem services necessary for agriculture

Agricultural Biodiversity
(CBD Definition)

"All components of biological diversity relevant to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems"
Expert Interviews

- guiding questionnaire (mainly by phone, some personal)
- Interviewees:
  - FAO: Linda Collette
  - IUCN: Jeff McNeely
  - CBD: David Coates
  - WHH: Heinz Peters
  - GTZ China: Luis Waldmüller
  - CEDAC Cambodia: Yang Saing Koma
  - EU COM DG Environment: Szilvia Bosze, Krystof Sulima, Jörg Roos
  - ZEF: Manfred Denich, Franz Gatzweiler
  - CDE/ Uni Bern: Markus Giger (CH)

Results of the expert interviews

Structure

- Challenges for food security and conservation of biological diversity
- Synergies between food security and conservation of (agricultural) biodiversity
- Strategic orientation
- Actions needed at local, national and international level
- Research needs
- Conclusion – Some success factors

Challenges for food security and conservation of biological diversity

- Water scarcity & quality
  - Due to climate change
- Land
  - Competition with biofuel production
  - Urbanisation
  - Degradation

Challenges for biodiversity conservation in the light of food security

- Extensive environmental foot print of food security
- Inefficient agricultural systems (wrong inputs and outputs causing pollution)
- Loss of genetic diversity
- Overlooked local agro-biodiversity in rural development and agricultural programmes
- Farmers’ self-image as food producer, not as manager of natural resources
- Short-term policy decisions (neglecting long-term sustainability criteria)
- To commercialise family farming systems without causing loss of biodiversity

Food security challenges 1

- Consumer behaviour
- Climate Change
- Demographic change
- Oil prices rise
- Biodiversity loss/ loss of genetic resources
- GMO crops
- externalised environmental costs of agriculture

Food security challenges 2
Synergies between food security and conservation of (agricultural) biodiversity

Synergies: biodiversity and food security
- Agricultural biodiversity sustains agriculture
  - Genetic resources,
  - Pollination
  - Soil biodiversity,
  - Providing a nutritious and beneficial diet
- Synergies especially between multifunctional smallholder farming, low-input farming, organic farming
- Agricultural biodiversity supports diverse agriculture:
  - More resilient agricultural systems (to changes and shocks)
  - More people to benefit from
- Positive impacts on climate change:
  - Biodiversity (genetic resources) as insurance for adaptation to changing environment; climate, water supply etc.
  - Soil biodiversity contributes to soil carbon sequestration

Actions needed at local, national and international level

Strategic orientation
- Use a diversity of strategies to fit to local conditions
- Integrated and harmonized approaches of nature conservation and food production
- Maintain a diverse system of agriculture, with low and high intensities, multifunctional agriculture
- Long-term orientation of agricultural land use, ensuring adaptability of systems
- National actions are the most needed

Actions at local level
- Promoting smallholder farming, organic agriculture, adapted shifting cultivation practices, other low input system, having high potentials to sustainably increase yields
- Building up local institutions or cooperatives to promote sustainable land use systems
- Stimulating farmers self image as “biodiversity managers”
- Improving access to markets for products based on agricultural diversity
- Providing benefits from conservation areas and ecotourism to local people

Actions at national level
- Integration of biodiversity conservation and natural resources management into rural development policies (and others)
- Strengthen the capacities of environment ministries and establish a culture of coordination and interaction with agriculture, finance, and other ministries
- More investment into agriculture (research, training, infrastructure, extension, innovation systems) putting priorities on near-natural production
- Incentives for farmers
  - To compensate the maintenance of diversity of domesticated plants and animals
  - Agricultural subsidies for biodiversity instead of pesticides, for sustainable production systems
National policy instruments

- Payments for environmental services
  - Feasibility depends heavily on circumstances
  - Financing difficult in poor countries
  - Requires secure land tenure
  - Has potential to honour services that the poor produce for society
- Land use planning
- Land registration/land titles
- Biosphere reserves, linking nature conservation and human development in the Man and Biosphere approach (UNESCO)

National and international needs for action

- Remove trade distortions through modifying perverse incentives
- Sectoral organisation of institutions is a weakness, because it hampers an ecosystem approach (ministries, international institutions, etc.)
- Awareness raising at all levels to understand the importance of biodiversity conservation and ecosystem services

International conventions and treaties

- Increase the pace of CBD implementation
- More attention on the ecological footprint of agriculture, so far focus is the value of biodiversity to agriculture
- Need to strengthen international and national actions plan
- Use CBD for a healthy debate on trade, incentives, biodiversity and poverty reduction
- Integrating biodiversity and food security into CDM and REDD is necessary

Practice examples

- FAO-East Africa: integration of few (1-2) commercial crops into traditional farming systems
- Amazonas (Brazil): Shifting cultivation (without burning), agroforestry, methods to improve soil fertility etc.
- Vittel (France): Payment to farmers for water protection
- EU: Agri-environmental Schemes (including programmes for hedgerows, buffer zones etc.)
- Satoyama Initiative (Japan): Incentives for diverse and traditional forms of farming
- Cambodia: Farmer Innovation Support Fund (to invest in economic and ecologic farm innovations)
- Biosphere Reserves: more intensive production in buffer zones and additional income through e.g. eco-tourism for local people (wild coffee Ethiopia, regional brand Rhön, argan oil /Maroc)

Research themes

- Soil biodiversity, soil organisms are under-researched
- No research on GMO due to risks in climates without winter
- Mitigation and adaptation strategies for agriculture to climate change
- Measures to reduce greenhouse gas emission through agriculture
- Sustainable agriculture
- More research into adapting successful system to other circumstances
- Cultural identity and biodiversity
- Understanding reciprocity between development cooperation, food security, poverty reduction and biodiversity
Research approaches

- More research not only IN but WITH developing countries
- More on-farm research
- Knowledge exchange with farmers
- More quantified information on good practices to inform policy makers
- Communication of research findings and best practice examples
- Capacity building for better policy making

Conclusion – Some success factors

- Success factors are site-specific
- Policy makers that put forward the right policies
- Empowerment of farmers
- Multi-level stakeholder dialogues
- Local institutions to develop sustainable agricultural systems
- Access to land
- Provide benefits for local people
- Regional land use planning
- Awareness raising for biodiversity (farmers and consumers)
- Training of farmers
- Considering agriculture in a holistic way (ecosystem-approach)

Thank you for your attention!

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## Workshop Agenda

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<tr>
<td>9:30 – 10:30</td>
<td><strong>Welcome and introduction</strong>&lt;br&gt;Prof. Dr. Beate Jessel, President of BfN</td>
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<td><strong>Keynote: Sustainable Land Management - a Key to Conservation and Food Security</strong>&lt;br&gt;Luc Gnacadja, Executive Secretary United Nations Convention to Combat Desertification (UNCCD)</td>
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<td><strong>Keynote: New Approaches for Linking Food Security and Biodiversity Conservation</strong>&lt;br&gt;Prof. Dr. Joachim von Braun, Centre for Development Research, University of Bonn (ZEF)</td>
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<td>10:30 – 11:15</td>
<td><strong>Presentation of results of expert interviews</strong>&lt;br&gt;Simone Schiller and Nadja Kasperczyk (IfLS)</td>
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<td>11:15 – 12:00</td>
<td><strong>Interactive discussion session</strong></td>
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<td>12:00 – 13:00</td>
<td><strong>Lunch</strong></td>
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<td>13:00 – 15:00</td>
<td><strong>Developing recommendations for actions</strong>&lt;br&gt;Short Inputs&lt;br&gt;from Dr. Heinz Peters (Welthungerhilfe), Dr. Michael Brüntrup (DIE), Frank Begemann (BLE/IBV) &lt;br&gt;<strong>Working groups</strong>&lt;br&gt;1) Local Actions – potentials for farmers and businesses&lt;br&gt;2) National Policies – what governments can/should do&lt;br&gt;3) International Treaties/conventions – towards a global strategy</td>
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<tr>
<td>15:00 – 15:15</td>
<td><strong>Coffee break</strong></td>
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<tr>
<td>15:15 – 16:45</td>
<td><strong>Presentation of group work results and discussion</strong></td>
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<tr>
<td>16:45 – 17:00</td>
<td><strong>Conclusion and Perspectives</strong></td>
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</tbody>
</table>
Key Experts’ Questionnaire

Introduction: Food security perspective

- Global food security is an objective needing actions in different places, at different levels and in different fields. What do you think is the largest challenge to produce sufficient and stable food in a sustainable and an environmentally friendly way?
- Biodiversity loss and climate change are factors affecting global food security. If you ranked by importance all obvious factors like land degradation, peak oil and prices, bio-energy needs, food prices, conflicts and catastrophes, growing population, change in consumer behaviour, etc., where would you place biodiversity and climate change (ranking: very important, less important, not important)?

Challenges for nature / biodiversity conservation in relation to food security

- What do you think are the largest challenges for the conservation of biodiversity in relation to achieving food security?

Synergies between nature conservation and food security

There are synergies between increased food production, nature / biodiversity conservation and climate protection. (In our understanding, an environmentally-sound food security is based on land use which conserve, safeguards and rebuilds ecosystem services.)

- Where do you see the synergies between biodiversity conservation and food security?
- How do these synergies contribute to climate change mitigation/adaptation?
- Do you know any success models, examples (agricultural systems, advanced technologies, projects, policy frameworks ...), that help strengthen and/or build on these synergies? Please consider success models in the following areas:
  o Land use systems / approaches
  o Policy environment
  o Institutional mechanisms
  o Financing mechanisms
- What ‘factors for success’ make them positive models?
- What are the impacts of the success models? (positive and negative, all aspects of sustainability)
- Are these models region specific or could you imagine that they can be transferred to other regions?

Chances for improving synergies and benefits

- Which of the existing or new strategies, approaches, instruments and measures are particularly suitable to support an environmentally sound food security, strengthen the above-mentioned synergies and help address the challenges? Please consider strategies, approaches, tools and measures in the following areas:
Land use systems / approaches
Policy environment / mainstreaming
Institutional mechanisms
Financing mechanisms

What actions are needed at the following levels?
- international (CBD, post-Kyoto process etc.)
- national
- EU

• Which roles could / should different stakeholder groups (such as civil society, government etc.) play?

End

• Do you have any further suggestions or comments on this topic?
• Where do you think is further research needed?
• Could you conclude with a final statement on how to foster synergies between nature conservation and food security?