

Landscape Approaches

Addressing food security, climate change and biodiversity conservation in an integrated way

Landscapes – result of intimate interaction between people and nature

For generations, people have managed natural resources in such a way that their multiple needs for food, fiber, fodder, fuel, building materials, medicinal products and drinking water were fulfilled. Farming, livestock, forestry and fisheries systems have evolved, and been adapted to variable and changing environmental and socio-economic conditions. Not only natural factors, but also population growth or loss, tenure arrangements, labor availability, access to markets and economic growth, as well as cultural traditions and political strategies have shaped landscapes over time. These complex interactions have generated today's rich diversity of semi-natural and cultural landscapes¹. Development activities can be implemented in different territorial units. The landscape approach takes ecological or natural resource-based limits to delineate a territorial unit (e.g. watersheds, transfrontier conservation areas). Furthermore it deals with multiple stakeholders in a cross-sectoral perspective on a regional or local level.

There are many ways of defining landscapes. Common to most definitions is that they imply the interaction between human societies and the natural environment, resulting in a unique set of characteristics that distinguish one landscape from other surrounding areas. Landscapes tend to cross administrative units or national borders, thus posing challenges to governance. It is a specific set of ecological, cultural and socioeconomic characteristics distinct from its neighbors. Human actions and work plays the key role and its influences on its surroundings that are shaping the landscape. A clear delineation of landscape boundaries often depends on the stakeholders involved, and the activities envisioned. As a general rule for implementing Landscape Approaches, the area should be large enough to allow for management of complementary and interdependent elements and resources, and small enough to enable all relevant stakeholders to cooperate and participate in planning and decision-making. (FAO 2012)

Unsustainable development and management of landscapes

Human population growth resulting in increased demand for goods and services has often been made responsible for unsustainable development of landscapes leading to the degradation of land and water resources and biodiversity loss.

¹ FAO (2012): Mainstreaming climate-smart agriculture into a broader landscape approach. Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change, Hanoi, Vietnam, 3-7 September 2012. FAO, Rome.
<http://www.fao.org/docrep/016/ap402e/ap402e.pdf>, accessed January 14, 2014.



However, the problem of unsustainable management has been further intensified by certain market-driven approaches that aim at 'optimizing' the production derived from forestry, animal husbandry or farming enterprises by focusing on relatively few marketable products. As a result, less specialized farming systems, such as mixed crop-livestock systems, are on the decline in many parts of the world - one of the main reasons for agrobiodiversity loss. Non-marketable benefits of diversified farming systems, including for example ecosystem services, tend to be neglected², and similarly the deterioration of natural resources, such as water and soil, or increased climate variability, are treated as 'external cost'. Thus, strategies that focus on immediately realizable economic benefits tend to neglect other benefits and costs that may affect society as a whole, or become relevant for future generations' livelihoods.

Furthermore, some landscapes are managed unsustainably because traditional knowledge or social structures have eroded, e.g. as a result of population displacement, or because capacities, resources, technologies and investments are lacking³. Also human interests most of the time are not matching sustainability; many short term undertakings are seeking for the most benefit in shortest time without thinking about future implications. War and devastation do reduce sustainable and long term interactions of people within their countries.

Landscape Approaches – integrating and balancing multiple goals

Landscape Approaches combine natural resources management with environmental and livelihood considerations. Optimization of production and resource use is treated at a larger scale – the landscape. People's activities and needs are regarded as an integral part of the system rather than external factors⁴. By moving the scale, it becomes clearer that management decisions made at farm level, concerning such issues as water use, soil management and the maintenance of diversity-rich landscape features, have an impact on the surrounding landscape and the ecosystem services they provide. Important for the land user, they also profoundly influence the productive capacity of the land. Landscape Approaches thus help to identify and develop positive externalities and reduce negative impacts resulting from individual management decisions⁵.

² *ibid.*

³ FAO (2012): Mainstreaming climate-smart agriculture into a broader landscape approach. Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change, Hanoi, Vietnam, 3-7 September 2012. FAO, Rome. <http://www.fao.org/docrep/016/ap402e/ap402e.pdf>, accessed January 14, 2014.

⁴ *ibid.*

⁵ *ibid.*

Placing human well-being and needs at the center of the decision-making process, the rights and cultural values of involved communities are to be respected alongside their land use objectives. This involvement helps ensure local commitment to solutions and the long-term success of sustainable development initiatives. The various aspects of sustainability are given more weight compared to an optimization strategy based on economic considerations only.

The Economics of Land Degradation (ELD-) Initiative highlights the interlinkages and synergies between sustainable land use management and increased economic benefits from the conserved and restored ecosystem services. The provided data in the ELD report⁶ shows that within a landscape, a vast range of stakeholders can align their focus on economic returns from land and its preservation. Further on, an economic valuation of management strategies provides the foundation for stakeholders with different objectives to balance and reflect their activities with others and weight the ecologic and economic impacts. Thus, the benefits can serve as a mechanism to resolve competing land use claims as well.

Landscape Approaches require a multidisciplinary perspective and multi-stakeholder activities to negotiate goals and priorities and implement actions. Stakeholders must clearly define and agree on the goals and desired objectives and outcomes and then assess the current and future factors that will influence the process. Trade-offs and synergies need to be carefully assessed and appropriate landscape-scale management interventions identified. Planning approaches, such as participatory Integrated Land Use Planning (ILUP), can support these multi-dimensional and multi-jurisdictional processes.⁷ The main substantive innovations have been the recognition of the need to address the complex interactions between different spatial scales, and the need to embrace the full complexity of human institutions and behaviors.⁸ As rural areas do not only have one function (like agricultural production) it is of great importance to moderate the coexistence of those different functions, so that long-term survival of people is to be assured.

⁶ ELD Initiative (2013). The rewards of investing in sustainable land management. Interim Report for the Economics of Land Degradation Initiative: A global strategy for sustainable land management. http://www.eld-initiative.org/index.php?eID=tx_nawsecured1&u=0&file=fileadmin/Dateien/ELD-Umbruch_131016_web.pdf&t=1395312285&hash=9c42e5d1a726a6517388eb7afc0b12dd97a8e0ab

⁷ FAO (2012): Mainstreaming climate-smart agriculture into a broader landscape approach. Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change, Hanoi, Vietnam, 3-7 September 2012. FAO, Rome. <http://www.fao.org/docrep/016/ap402e/ap402e.pdf>, accessed January 14, 2014.

⁸ Sayer, J. et.al. (2012): Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. In: PNAS, May 21, 2013, vol. 110, no. 21, p.8349–8356

Ecosystem services are resources and processes that are supplied by ecosystems to the benefit of humans and all forms of life. They include, for example, effective nutrient, water and carbon cycling, resulting in fertile soils, clean air and drinking water. Furthermore, ecosystem services include microbial decomposition of wastes or pollutants, pollination of crops, as well as natural pest and disease control and resilience to shocks and climate variability. In a broader sense, cultural, recreational and spiritual aspects are also included, e.g. places for recreation and a sense of place, or the 'beauty' of landscapes. They can be subdivided into four different areas: supporting services, providing services, regulative services and cultural services. (Millennium Ecosystem Assessment, 2005)

Food security and biodiversity conservation as key elements of sustainable landscapes

It is estimated that at least 870 million people worldwide suffer from hunger and malnutrition (FAO, 2013). The vast majority lives in developing countries in rural areas. Stable agricultural productivity growth for food security depends critically on the quality of landscapes and their ecosystems. Sustainable agriculture, watershed protection as well as biodiversity conservation will have positive impacts on soil fertility, resistance to pests and diseases and overall capacity of adaptation and resilience of the production system for improved food security.

The preservation of biodiversity is crucial in view of ensuring diversity of landscapes and quality of foods produced by an agricultural system that focuses on homogenization of agricultural systems and landscapes, with a narrowing set of globalized foods and nutrition base. Biodiversity-based ecological agriculture conserves biodiversity and reinforces ecological principles that are suitable for local ecosystems and food culture. Biodiversity is therefore crucial for adaptation and resilience of landscapes to changing (climate-) conditions. Loss of biodiversity can have significant negative impacts on food security, livelihoods, income and local migration.

Especially agricultural biodiversity entails crops and their varieties, the wide range of used wild and semi-wild plants and animals, as well as associated organisms, such as for example pollinating insects and soil microorganisms.

It is a result of interaction between people and their natural environment, and depends on human management - just as the landscape it is associated with. Agricultural biodiversity could thus play a key role in landscape approaches, as it links human nutrition and resource needs with the requirements to maintain and increase productivity and ecosystem services in the wider landscape.

Dietary diversity, founded on diverse farming systems, can improve nutrition and health, resulting in benefits for human productivity and livelihoods. Moreover, diversity of species and varieties in farming systems can increase resilience of farming systems⁹. Active management and use of agricultural biodiversity could thus become an important corner stone in landscape approaches.

Many of the benefits of biodiversity are manifested at different spatial and temporal scales, and cut across political divisions and administrative entities. Though obviously highly related to agriculture, nutrition and environmental sustainability, the topic is not among the top priorities for policies relating to any of these fields. Landscape approaches offer the opportunity to make the multiple relations between (agro)biodiversity and the development goals treated in such projects more tangible and visible to all stakeholders.

Landscape Approaches and climate change

The effects of climate change are already having an increasing impact on people's livelihoods. This requires cooperation of stakeholders across various scales and sectors. Landscape approaches can help reduce negative impacts for individuals and distribute risks, costs, benefits and opportunities more equally, while increasing resilience and adaptive capacities of humans and ecosystems.

By taking a landscape approach and applying climate-smart agriculture, there are many options for mitigating negative effects and increasing productivity of farming systems. For example, by conserving valuable wetlands, managing flooding areas and increasing water infiltration and retention in soils, impacts from excessive rainfall events can be reduced, while also increasing agricultural productivity and the level of agrobiodiversity in the entire landscape. Moreover, cooperation of stakeholders can help reduce greenhouse gas emissions from farming, for example by improving the management of organic manures and energy use as well as introducing agro-forestry systems.

⁹ Frison, E.A., Cherfas, J., Hodgkin, T. (2011): Agricultural biodiversity is essential for a sustainable improvement in food and nutrition security. *Sustainability* 2011 (3): 238–253.

Uniting benefits from forestry and agriculture

Forests and trees on farm and rangeland contribute to food and nutrition security in multiple ways. Besides providing direct benefits to farmers, forest dwellers and herders, they are of particular importance for clean water supply, watershed protection, the regulation of the local climate (reducing extreme heat and coldness) as well as flood and erosion control.

The restoration of forest ecosystems has gained international consideration in the context of the Aichi Targets agreed under the Convention of Biodiversity, where at least 15% of the globally degraded ecosystems (including forests) should be restored by the year 2020. Also in the context of Reducing Emissions from Deforestation and Degradation (REDD+) the restoration of forests and enhancement of tree cover (and thus carbon stocks) in landscapes has been identified as an important approach to combat climate change while providing multiple social, ecological and economic benefits.

Unlike reforestation and afforestation initiatives, which focus on planting trees for timber production and sequestration of carbon, the concept of Forest Landscape Restoration can be seen as a tree based landscape approach with a focus on restoring ecosystem services provided by forests and trees. This implies forests but also tree formations in landscapes (e.g. along rivers, roads and islets of forests in agricultural lands) as well as agroforestry systems.

What makes Landscape Approaches successful?

The main problem to be solved in landscape approaches is that trade-offs exist between long-term and short term benefits and costs, and economic and other (social, ecological, cultural) benefits and costs. Furthermore, even if a change in management measures can increase benefits on the landscape level, individuals can have fewer benefits and others more. Finding solutions for such problems seems to be a main challenge of landscape approaches.

Local benefit-sharing mechanisms can be one part of the solution. For example, ecotourism enterprises that rely on the landscape 'beauty' can support farmers maintaining it by offering local food products to visitors, or by making (paid) visits to farms a part of their marketing strategy. Even more applicable would be protection measurements for erosion on slopes, so that downhill fields will not silt out. Here the farmers downhill should recompense people living uphill for their conservation work on the hills. However, targeted policies and direct payments may also be needed to actively support long-term benefits for society as a whole, and to achieve positive effects on a larger scale.

Landscape approaches pose challenges to governance, particularly if implemented on larger scale. Even though it is urgently necessary that government institutions from all relevant levels are involved, implementing and governing a landscape approach may exceed the existing capacities and requires more specialization and adaptive management¹⁰. In such cases, supporting specialized institutions or coordinating bodies¹¹ that are given a clearly defined mandate and focus on managing specific projects related to the moderation of different demands could be an option to consider. Capacity building at all levels is required to develop a shared vision and appropriate governance procedures for implementation and management.

Furthermore, suitable tools and indicators to measure ecological, social and economic processes in landscapes are required to allow for more accurate management decisions and policy interventions, and to evaluate and manage trade-offs between benefits and costs occurring at different temporal and spatial scales.

Funding instruments with relevance to Landscape Approaches

Innovative instruments are currently being developed, that allow for direct payments to developing countries for reducing forest degradation and deforestation. One such instrument is REDD+, agreed upon by the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) in December 2010 in Cancún, Mexico. Under REDD+, countries can receive direct payments for proven reduction of carbon emissions via forest protection. The success of REDD+ depends on how well the interface between agriculture and forest is managed, and how well stakeholder interests are being taken into account¹².

Another example is the setup of payments for ecosystem services (PES) who could play an important role in designing and implementing landscape approaches in the near future. They help harmonize the local people's need to achieve income in the short term, and the long-term goal to maintain ecosystem services, both locally and globally.

Furthermore, the World Bank's BioCarbon Fund could also become an instrument for providing direct income to

¹⁰ FAO (2012): Mainstreaming climate-smart agriculture into a broader landscape approach. Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change, Hanoi, Vietnam, 3-7 September 2012. FAO, Rome. <http://www.fao.org/docrep/016/ap402e/ap402e.pdf>, accessed January 14, 2014.

¹¹ siehe Bsp. Biosphärenreservat Rhön

¹² GTZ (2009): Making REDD work. A practitioners' guide for successful implementation of REDD (Reducing Emissions from Deforestation and Forest Degradation). GTZ, Eschborn. <http://www2.gtz.de/dokumente/bib-2009/gtz2009-0534en-redd.pdf>

communities owning the land where carbon sequestration measures are being taken¹³. However, these instruments will have to be embedded in coherent national policy strategies and evaluated continuously for their effectiveness to support the development goals of countries and communities¹⁴.

Also Access and Benefit Sharing Mechanisms that are implemented through the Nagoya Protocol of the Convention of Biodiversity (CBD) aim at sharing the benefits arising from the utilization of genetic resources in a fair and equitable way, thereby contributing to the conservation of biological diversity and the sustainable use of its components. This instrument is in an early stage of development and does not show feasible outcomes so far.

The Landscape Approach in relation to other spatial approaches

Various spatial approaches, such as integrated watershed management, territorial or ecosystem-based approaches, or community-driven development approaches, have been successfully implemented by GIZ programmes and projects in the past. They all imply a change from a sectoral towards cross-sectoral and multi-level views on development that involve various stakeholders and perspectives. These spatial approaches not only focus on the landscape, but also consider other territorial units, including administrative, economic or ethnic boundaries.

By applying a multi-level approach it is very important for the stakeholders operating at different levels to recognize their respective role and assume their responsibility. Important to consider are the political and legal setting, institutional structures, the rural economic system, the protection and sustainable use of natural resources, and preservation of biodiversity, with the participation of as many sections of a region's population as possible. Experience shows that, especially in poor livelihood conditions, sustainable management and use of landscapes and natural resources can only be brought forward when linked to clear advantages for the resident population (i.e. work towards win-win situations).

Landscape Approaches, where found appropriate, should build on existing experience and good practices developed, and strive to integrate them into a sound concept of spatial planning that unites benefits for people and nature.

¹³ World Bank (2010): Turning it around: Greening Ethiopia's Great Rift Valley. <http://www.worldbank.org/en/news/feature/2010/03/12/greening-ethiopia-rift-valley>, accessed January 15, 2014.

¹⁴ *ibid.*

Practical Examples

PROJECT EXAMPLE 1

UNESCO biosphere reserves – learning sites for sustainable development

Biosphere reserves are places that seek to reconcile conservation of biological and cultural diversity and economic and social development through partnerships between people and nature. They are established by countries and recognized under UNESCO's Man and the Biosphere (MAB) Program¹⁵. The GIZ supports those biosphere reserves in many countries and in many ways, e.g. in Cote D'Ivoire, in Nicaragua, Brazil, Vietnam or South Africa¹⁶.

There are currently 621 biosphere reserves in 117 countries, including 12 transboundary sites. They are typically designed around well-known or extraordinary landscape elements that depend on human management, such as mountains, lakes, islands or forest areas. Examples are the biosphere reserves of Mount Kenia or the delta of River Senegal. Biosphere reserves aim to achieve integrated management of land, water and living resources by putting in place bioregional planning schemes based on integrating conservation into development through appropriate zoning.

PROJECT EXAMPLE 2

EverGreen Project in African Countries

The project "Science and development cooperation for Scaling-up to an EverGreen Agriculture in African Countries" aims at incorporating trees into crop and grazing landscapes in Ethiopia, Kenya, Rwanda, Uganda, Tanzania and Malawi. It is jointly implemented by GIZ, ICRAF and World Vision. Besides a positive effect on agro-biodiversity, the approaches provide multiple benefits for families in rural areas, including increased crop yields, improved soil health, a source of wood fuel, fodder and tree products as well as alternative income sources by deploying the biological resources of the farm with a very modest cash investment. This con-

¹⁵ UNESCO (no year): Biosphere reserves – learning sites for sustainable development. <http://www.unesco.org/new/en/natural-sciences/environment/ecological-sciences/biosphere-reserves/>, accessed January 15, 2014

¹⁶ BMZ (2011): FAO (2012): Biosphere Reserves as Model Regions for a Green Economy.

tributes to create a more productive agricultural system and to provide greater resilience to pressures produced by climate change and the ongoing degradation of agricultural land.

PROJECT EXAMPLE 3

Communal land use planning Madagascar

In collaboration with the Malagasy Ministry for land use planning, GIZ has developed a participatory approach to spatial development planning and accompanies rural communes in the North-western Region of Boeny throughout the process. The land use plans allow for the different communal stakeholders to take stock of their natural resources and social and economic infrastructure and to determine the need and localisation of future zones, such as for agriculture and residential areas, for the next 15 years. The planning process takes place at the local landscape level and integrates the impacts of climate change on forests, water, agriculture and fishery. It brings together all sectors at the local and regional level and thus facilitates a sustainable natural resource management that takes into account the population's economic and social needs. So far, seven communes in Boeny have elaborated their land use plans that are now used as a reference to acquire private and public investments and to implement communal projects such as reforestation.

PROJECT EXAMPLE 4

Conventions locales Mauretania

Since 1994, GIZ supports the development of formally established arrangements between populations, which mainly live in customary land tenure systems, and local government representatives in eight West African countries (Benin, Burkina Faso, Cameroun, Mali, Mauritania, Niger, Senegal and Chad). Those so-called conventions define the rules, rights and duties of each party using and managing local landscapes and natural resources. In total, more than 150 local conventions were established. Local conventions can have various goals, ranging from the mere management of a specific resource (e.g. a shellfish species), through the management of a specific place (e.g. a pond), to an ecosystem (such as an inter-village forest). Local convention development processes comprise various phases including consultations, the identification of needs and the negotiations themselves.

The conventions in the regions Guidimaka and Hodh El Garbi in Mauritania are for example made for areas outside the individually used crop fields. They regulate the use of the pastures, the harvesting of grass, the gathering of dead wood, the cutting of tree branches for the construction of fences and the cutting of trees with the help of fees that are at the communities' disposal. In addition to those regulations, the user groups can, for example, take areas completely out of productive use or develop and apply special regulations for specific forms of use, for example regarding the harvest of Arabic gum. In order to make sure that the agreements are followed, the communities have employed supervisors, who are responsible to collect fees or penalties. Since local conventions are in place, the degradation of the vegetation has been verifiably reduced, with a positive effect on (agro) biodiversity.

References

- CoP (2010): CoP 10 Decision X/2 – Strategic Plan for Biodiversity 2011–20 (including the Aichi Targets). 10th meeting of the Conference of the Parties (CoP) to the Convention on Biological Diversity, 18–29 October 2010, Nagoya, Japan.
- FAO (2012): Mainstreaming climate-smart agriculture into a broader landscape approach. Background Paper for the Second Global Conference on Agriculture, Food Security and Climate Change, Hanoi, Vietnam, 3–7 September 2012. FAO, Rome, Italy.
- Frison, E.A., Cherfas, J. & Hodgkin, T. (2011): Agricultural biodiversity is essential for a sustainable improvement in food and nutrition security. *Sustainability* 3(1): 238–253.
- GIZ (2011): Biosphere Reserves as Model Regions for a Green Economy. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Eschborn/Bonn, Germany.
- GIZ (2012): Rural Territorial Development. An approach to rural development. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Eschborn/Bonn, Germany.

Dr. Klaus Ackermann:
klaus.ackermann@giz.de

Ragna John:
ragna.john@giz.de

Tanja Pickardt:
tanja.pickardt@giz.de

Caroline Schaefer:
caroline.schaefer@giz.de

- GTZ (2009): Making REDD work. A practitioners` guide for successful implementation of REDD (Reducing Emissions from Deforestation and Forest Degradation). GTZ, Eschborn, Germany.
- ITTO/IUCN (2005): Restoring Forest Landscapes. An introduction to the art and science of forest landscape restoration. ITTO Technical Series No. 23. International Tropical Timber Organization (ITTO), Yokohama, Japan & International Union for Conservation of Nature (IUCN), Gland, Switzerland.
- Millennium Ecosystem Assessment (2005): Ecosystems and Human Well-Being. A Framework for Assessment. Island Press, Washington D.C., USA.
- World Bank (2010): Turning it around: Greening Ethiopia's Great Rift Valley. Available at <http://www.worldbank.org/en/news/feature/2010/03/12/greening-ethiopia-rift-valley> Accessed

Published by	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	On behalf of	Federal Ministry for Economic Cooperation and Development (BMZ)		
	Registered offices Bonn and Eschborn, Germany	Division	Special Unit "One World, No Hunger"		
	Sector projects Rural Development; Sustainable Agriculture; Landmanagement; CCD; Forest Governance	Addresses of the BMZ offices	<table border="0"> <tr> <td>BMZ Bonn Dahlmannstraße 4 53113 Bonn, Germany T +49 (0)228 99 535-0 F +49 (0)228 99 535-3500</td> <td>BMZ Berlin Stresemannstraße 94 10963 Berlin, Germany T +49 (0)30 18 535-0 F +49 (0)30 18 535-2501</td> </tr> </table>	BMZ Bonn Dahlmannstraße 4 53113 Bonn, Germany T +49 (0)228 99 535-0 F +49 (0)228 99 535-3500	BMZ Berlin Stresemannstraße 94 10963 Berlin, Germany T +49 (0)30 18 535-0 F +49 (0)30 18 535-2501
BMZ Bonn Dahlmannstraße 4 53113 Bonn, Germany T +49 (0)228 99 535-0 F +49 (0)228 99 535-3500	BMZ Berlin Stresemannstraße 94 10963 Berlin, Germany T +49 (0)30 18 535-0 F +49 (0)30 18 535-2501				
	Dag-Hammarskjöld-Weg 1-5 65760 Eschborn, Germany T +49 61 96 79 - 6465 F +49 61 96 7980 - 6465 Rural.development@giz.de www.giz.de		poststelle@bmz.bund.de www.bmz.de		
Author(s)	Dr Anja Christinck				
Layout	GIZ				
As at	June 2014				