Globalands

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Global Sustainable Land Use:

Concept and Examples for Systemic Indicators

Input Paper for the 3rd GLOBALANDS International Expert Meeting,
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prepared by

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All errors and omissions remain the sole responsibility of the authors.

Acronyms

AF	Agroforestry
CA	Conservation Agriculture
CBD	United Nations Convention on Biological Diversity
CCD	United Nations Convention to Combat Desertification
CDM	Clean Development Mechanism
CFS	UN Commission on Food Security
CSA	Climate smart agriculture
EEA	European Environmental Agency
EC	European Commission
EPA	Environmental Protection Agency (USA)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCCC	United Nations Framework Convention on Climate Change
GHG	greenhouse gas(es)
GEF	Global Environment Facility
GPFLR	Global Partnership on Forest Landscape Restoration
HCVF	High Conservation Value Forest
HLPE	UN CFS High Level Panel of Experts on Food Security and Nutrition
IAASTD	International Assessment on Agricultural Science and Technology for Development

IFAD	International Fund for Agricultural Development
IINAS	International Institute for Sustainability Analysis and Strategy
IPCC	Intergovernmental Panel on Climate Change
ITTO	International Tropical Timber Organization
IUCN	International Union for Conservation of Nature
JRC	Joint Research Centre
LUC	land use change(s)
NLBI	Non-Legally Binding Instrument on All Types of Forests
NTFP	Non-timber forest products
OA	Organic Agriculture
REDD	Reducing Emissions from Deforestation and Forest Degradation
SDG	Sustainable Development Goals
SFM	Sustainable Forest Management
SLM	Sustainable Land Management
UBA	German Federal Environment Agency
UN	United Nations
UN GA	United Nations General Assembly
UNEP	United Nations Environment Programme
UN FF	United Nations Forum on Forests
VGGT	Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security
WOCAT	World Overview of Conservation Approaches and Technologies
WP	Working Paper

1 Introduction

This is an **input paper** for the 3rd International Expert Workshop of GLOBALANDS to be held in at UNEP Paris from April 7-8, 2014. It is meant to stimulate the discussion on indicators for global sustainable land use with regard to future Sustainable Development Goals (SDG). The paper is based on previous work, discussions in the project team, and own considerations of the authors.

It should be noted that a "Global Sustainable Land Use Standard", based on the discussions within the project team, is defined as a **bundle of three approaches** which apply at different levels of governance instead of a single "standard". The approaches need further substantiation and implementation within the project:

- **Approach 1:** Support the definition of **targets** for sustainable land use in relevant UN processes (SDG, UNCCD…)
- **Approach 2:** Develop **systemic Indicators** (socially & regionally differentiated sustainable practices for land uses) to support Approaches 1 and 3
- **Approach 3: Safeguarding** sustainable land use in existing international governance systems (UN conventions and their mechanisms, World Bank Project Guidelines etc.)

This paper is an excerpt of an upcoming full GLOBALANDS working paper and presents current thoughts on Approach 2. The authors look forward to reactions and inputs from participants of the 3rd Expert Workshop. Based on this, the full Working Paper will be developed.

1.1 Global Sustainable Land Use: Defining the Concept

Sustainable land use at global scale is subject to agreement on adequate definitions (Kaphengst 2014). Beyond the generic discussion, managing land sustainably needs "*a knowledge-based combination of technologies, policies and practices that integrate land, water, biodiversity, and environmental concerns (including input and output externalities) to meet rising food and fibre demands while sustaining ecosystem services and livelihoods*" (Lal, Safriel, Boer 2012).

This sustainable land management (SLM) also considers traditional knowledge as practices and innovations of indigenous and local communities[1].

Experiences of SLM can be found all around the world, and it can be applied by public and private actors (FAO 2013a).

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[1] See e.g. http://www.cbd.int/tk/material.shtml

1.2 The Role of Indicators

SLM requires indicators to express and "measure" sustainable land use with regard to specific activities, i.e. a *metrics* for qualifying SLM as well as for monitoring and compliance.

GLOBALANDS carried out a survey and compilation of land-related sustainability indicators in various schemes which concluded that currently *no existing* set of indicators consistently describes sustainable land use in *both* the environmental and social domain (Eppler, Iriarte 2013).

Furthermore, most of current indicators concern *environmental* characteristics of land, including ecosystem services, and then address the "impact" of land use through defining acceptable *levels* of interference**,** or respective *targets* to be achieved over time. With regard to the current global discussion on SDGs this does not only create the problem of measuring e.g. soil qualities at appropriate scales (and with respective costs) but also a *proliferation* of indicators which seems unsuitable for (political) agreement at UN level.

Last but not least, *social* aspects of land use are fundamental for any sustainable land use target, and their adequate inclusion appears crucial for any progress towards negotiating SDGs.

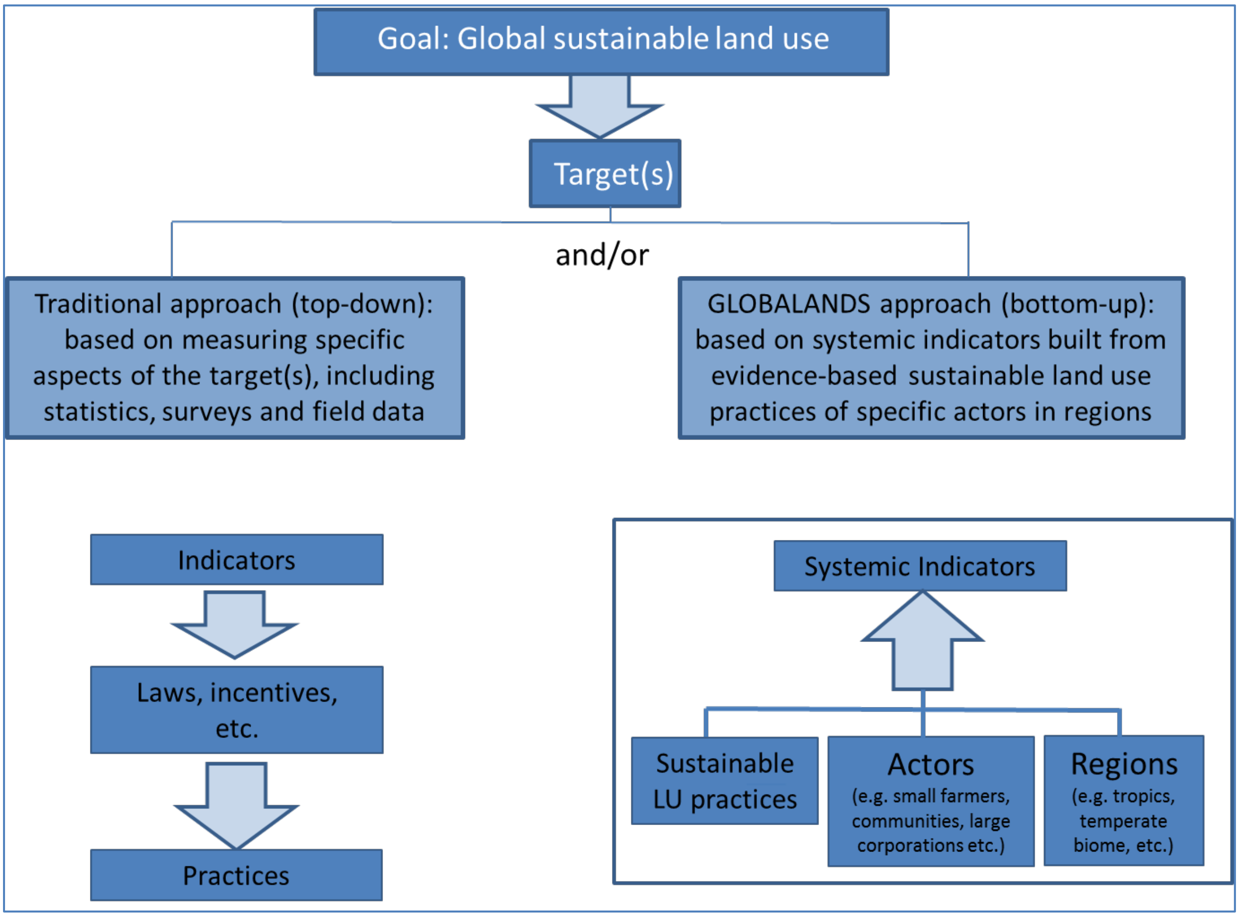
1.3 The Systemic Indicator Approach

GLOBALANDS suggests a different concept of land-related sustainability metrics for which the leading thought is to focus on land *use*:

Instead of characterizing environmental aspects, the concept of systemic indicators focuses on *specific uses* of land which are sustainable not only in the environmental, but also the social domain (*sustainable practices)* which are *combined* with specific actors on a certain (regional) scale.

The essence of the systemic indicator approach is shown in Figure 1.

Figure 1 Overview of the Systemic Indicator Approach



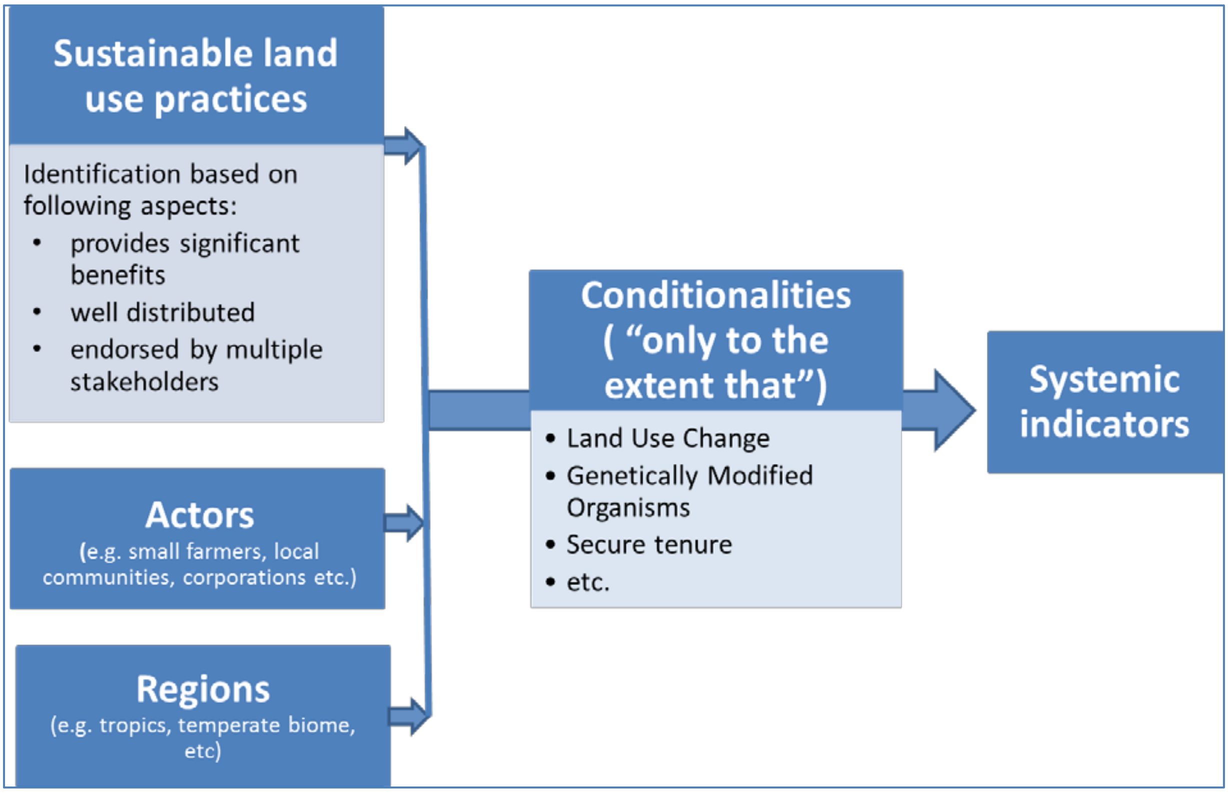
Source: IINAS with input from GLOBALANDS team

A bottom-up approach is used to identify evidence-based sustainable land use *practices* carried out by specific actors (socio-economic context) in a given region (geographical context).

The *combination* of these elements leads to an *aggregated* expression of sustainability. The qualification of land use practices applied by actors in specific regions allows for social and geographical differentiation.

The concept does not deliver sustainable land use indicators on its own - it requires *normative* decisions by stakeholders on which practices are deemed sustainable if carried out by whom, and where. Furthermore, some restrictions (conditionalities) may apply to narrow the range of combinations, as depicted in Figure 2.

Figure 2 Detail of the Systemic Indicator Approach



Source: IINAS with input from GLOBALANDS team

In the following, the Systemic Indicator concept is illustrated more specifically through examples for agricultural and forest land use.

For each land use practice, the respective actors and regions are given as well as potential restrictions, and references to real-world cases.

2 Systemic Indicators for Agricultural Land (Example 1)

Agriculture is *multifunctional* - it provides food, feed, fiber, fuel and other goods. It also has a major influence on other essential ecosystem services such as water supply and carbon sequestration or release. Agriculture plays an important social role, providing employment and a way of life. Both agriculture and its products are a medium of cultural transmission and cultural practices worldwide.

Agriculture accounts for a major part of the livelihood of 40% of the world's population and occupies 40% of total land area; 90% of farms worldwide have a size of less than 2 hectares. Agriculture includes crop-, animal and fishery-based systems or mixed farming (IAASTD 2008).

Land degradation, resulting from *unsustainable* land management practices[2], is a threat to the environment, as well as to livelihoods where the majority of people directly depend on agricultural production - it jeopardizes food security and increases poverty (Liniger 2011).

As research and policy links between climate change and agriculture have advanced, *"climate-smart agriculture" (CSA)* emerged as a framework to capture the concept that agricultural systems can be developed and implemented to simultaneously improve food security and rural livelihoods, facilitate climate change adaptation and provide mitigation benefits (FAO 2010a; WB 2011).

CSA - defined by its intended outcomes rather than specific farming practices - is composed of three main pillars: sustainably increasing agricultural productivity and incomes; adapting and building resilience to climate change and reducing and/or removing greenhouse gases emissions relative to conventional practices (FAO 2013b). The agricultural technologies and practices that constitute CSA are, in most cases, not new, and largely coincide with those of sustainable agriculture and sustainable intensification[3] - the latter a term to describe a form of production wherein "*yields are increased without adverse environmental impact and without the cultivation of more land*" (RS 2009). In this sense the term denotes an aspiration of what needs to be achieved, rather than a description of existing production systems (MP 2013).

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[2] For example: intensive tillage (which promotes erosion of some 25,000 million t of topsoil per year), nutrient mining, poor soil cover, and pollution from conventional intensive farming, deforestation and poor grazing management (FAO 2011).

[3] Sustainable agricultural intensification is defined as producing more output from the same area of land while reducing the negative environmental impacts and at the same time increasing contributions to natural capital and the flow of environmental services (Pretty 2011; RS 2009).

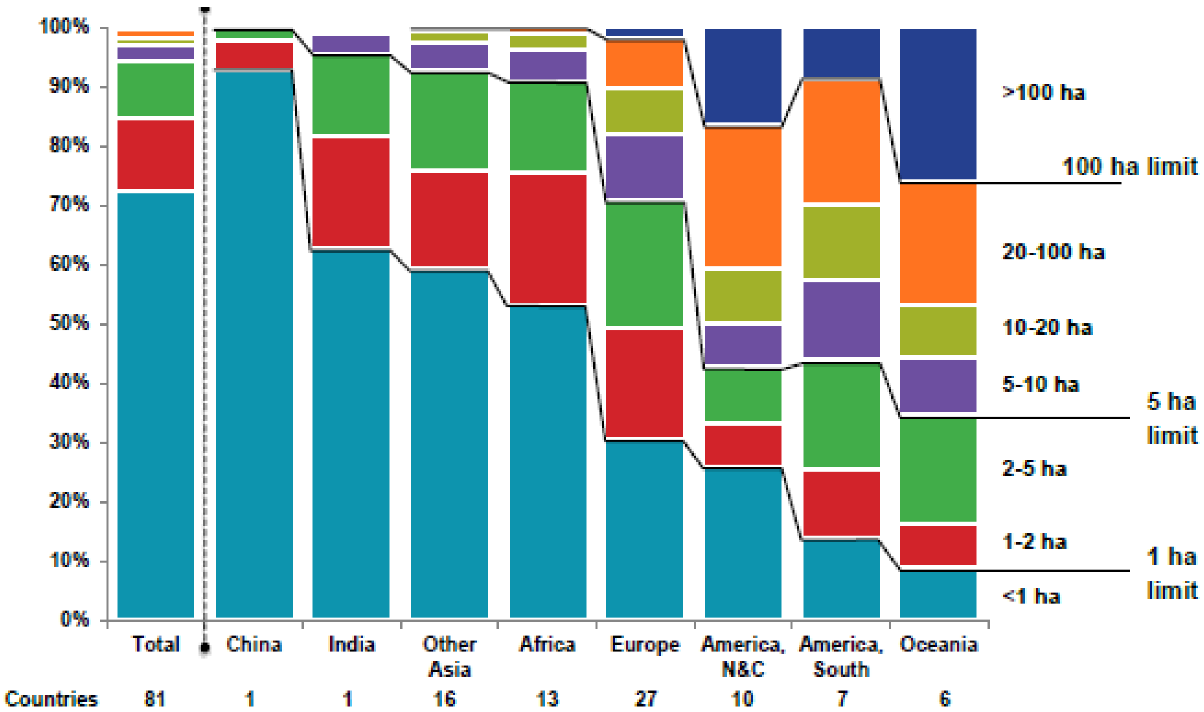
2.1 Socioeconomic Context of Sustainable Agricultural Land Use

There is a multitude of agricultural systems worldwide. They range from small scale farms (1-2 ha or less) to large scale operations with up to several thousand hectares across a variety of ecosystems and encompassing very diverse production patterns (WB 2011). On the one hand there are small scale farms ranging from (I) small subsistence farms, with non or only little access to markets, and smallholder farms (only partly subsistence) with access to markets, mostly in developing countries, to (II) extensive small-scale farms and (III) intensive (in form of input use) in all agro-ecological zones.

On the other hand, large-scale farming operations can be divided in (I) extensive commercial large scale farms (e.g. large scale organic agriculture in the US, large scale extensive grazing systems in the EU or Australia), (II) intensive large-scale farms (Western Europe) together with (III) high industrialized operations (e.g. Ukraine, Brazil).

Worldwide, the vast majority of farmers are smallholders or family farmers. Most of them live in developing countries, with a high degree of dependence on subsistence systems, i.e., production by households for their own consumption, and a high degree of dependence on both the biophysical and socioeconomic systems (IAASTD 2008).

Figure 3 Regional Diversity of Farm Holding Size Patterns



Source: HLPE (2013)

There are many different ways to define smallholder agriculture. This diversity reflects different historical trajectories, highly diverse ecosystems and the different roles smallholders have played – and continue to play – in societies at the local, national and international levels.

FAO (2012) proposes: "*Smallholders are small-scale farmers, pastoralists, forest keepers, fishers who manage areas varying from less than one hectare to 10 hectares. Smallholders are characterized by family-focused motives such as favoring the stability of the farm household system, using mainly family labor for production and using part of the produce for family consumption.*"

The significance of smallholder agriculture is not limited to a subgroup of low-income countries, contrary to widespread perception. Smallholder play a role in the EU, OECD countries, and in developing countries, including Brazil, India, China that have reached "middle income" status in the past 15–20 years.

This does not imply that problems faced by smallholders are identical in all countries. However, smallholder agriculture intersects with issues of (relative) poverty, contributions to food security and food sovereignty, economic growth and broader rural development issues in almost all countries (HLPE 2013).

Industrialized large-scale farms are common in developing or transition countries. They have operational units that often exceed 10,000 ha and are hence bigger than the largest farms in comparable land abundant regions in developed countries.

Such large operational units are often horizontally integrated into corporations controlling hundreds of thousands of hectares with the largest now approaching a million ha of good crop land (WB 2011).

Table 1 Common Characteristics of Small vs. Large Scale Farming Systems

Small-Scale Farming Systems	Large-Scale Farming Systems
Small land area (0.5-5 ha)[4]	Large scale land area (50-100 – 50.000ha and more)
Often poor, marginalized land, less land area without sufficient tenure rights, no ownership for instance on trees	Deep and fertile soils required for cropping, large scale extensive grazing systems are as well on marginalized, poor land
Diversity of crops and mixed farming systems	Monocultures
Low input farming	High input farming (pesticides, fertilizers, ..)
Diverse production goals (e.g., feeding the family, meeting social obligations, achieving a target income); Household's livelihood is primarily but not exclusively derived from farming	Only commercial
Communal responsibilities, labor intensive	Reduction in rural labor due to large scale production - High reliance on technologies [5] resulting large scale migration from rural communities to urban centers
Limited market access (poor roads and insufficient transport)	Very good market access
Poor infrastructure (most roads, schools, etc., provided by farmers themselves)	Modern infrastructure, highly efficient machinery
No subsidies, only aid or on project level	Many government grants and subsidies

Source: own compilation by IINAS

2.2 Regional Aspects of Sustainable Agricultural Land Use

The agro-ecological zoning can be defined as a spatial classification of the landscape into area units with similar agricultural and ecological characteristics, e.g.:

- comparable agro-climatic conditions for annual cropping, perennial cropping, or agroforestry;
- similar conditions for livestock husbandry;
- comparable land resource conditions such as soil, water or vegetation parameters;
- similar land management conditions such as ruggedness of agricultural land, slope steepness, or general topographic variations.

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4 Since the appropriate size threshold must be adapted to regional and national situations “small scale” farm size differs between countries e.g. in Brazil small scale farms are defined ranging from 5-110 ha (HLPE 2013, page 25.)

5 In Brazil, 1 job is created per 8 hectares cultivated by small farmers using mixed cropping, while large-scale mechanized monocultures generate 1 job per 67 hectares. With improved working standards and rights (e.g. occupational safety and health), sustainable smallholder agriculture can represent a key driver for decent rural jobs (FAO 2012).

Table 2 Agro-Ecological Zones for Cropland

Land use	Man-agement	Altitude	Climate	Aridity	Agricultural systems characteristics and selected examples
Cropland	Rainfed	Highlands			Low productivity, small-scale subsistence (low-input) agriculture; a variety of crops on small plots plus few animals
Cropland	Rainfed	Intermediate to Lowlands	Tropics	Dry	Drought-resistant cereals such as maize, sorghum and millet. Livestock consists often of goats and sheep, especially in the Sudanosahelian zone of Africa, and in India. Cattle is more widespread in southern Africa and in Latin America
Cropland	Rainfed	Intermediate to Lowlands	Tropics	Humid	Mainly root crops, bananas, sugar cane and notably soybean in Latin America and Asia. Maize is the most important cereal. Sheep and goats are often raised by poor-er farmers while cattle are held by wealthier ones.
Cropland	Rainfed	Intermediate to Lowlands	Sub-Tropics		Wheat (is the most important cereal), fruits (e.g. grapes and citrus), and oil crops (e.g. olives). Cattle are the most dominant livestock. Goats are also important in the southern Mediterranean, while pigs are dominant in China and sheep in Australia
Cropland	Rainfed	Intermediate to Lowlands	Temperate		Main crops include wheat, maize, barley, rapeseed, sugarbeet and potatoes. In the industrialized countries of Western Europe and North America, this agricultural system is highly productive and often combined with intensive, penned livestock (mainly pigs, chickens and cattle)
Cropland	Irrigated	Paddy rice			Mainly found in South and Southeast Asia, often combined with livestock. In China pigs are the dominant livestock, while in Muslim and Hindu countries such as Indo-nesia, Bangladesh and India, sheep and goats are much more common
Cropland	Irrigated	Other crops			Other irrigated crops; medium to high inputs. The most important crops are cereals (mainly wheat and maize), vegetables, cotton and, fodder crops (especially in North Africa and the Near East). Livestock consists of all types of animals. Both crop and livestock productivities are relatively high

Source: IINAS

Table 3 Agro-Ecological Zones for Rangeland

Land use	Climate	Agricultural systems characteristics and selected examples
Rangeland	(Sub) Tropics	Mainly goats and sheep for meat production. Cattle also raised in Eastern and Southern Africa, and in North and South America
Rangeland	Temperate	Mainly found in the Northern hemisphere and includes mainly cattle for meat as well as for diary production; high inputs and high productivity
Rangeland	Boreal	Found in the northern part of Canada, the Scandinavian countries, Russia and Alaska; extensive system of very low productivity
Forest		Includes extensive forest based subsistence agriculture and commercial tree crops
Desert		Very scattered extensive and low productive livestock grazing

Source: IINAS

2.3 Sustainable Practices in Agricultural Land Use

The concept of sustainability is a challenging one in agriculture. There are many definitions, none universally accepted. Appropriately, most are concerned with the need for agricultural practices to be economically viable, environmentally considerate and able to meet human food, feed and fiber needs in the long run.

In fact, a wide range of land and water management practices have evolved over the past several decades to address the negative impacts of land degradation and to increase long-term agricultural productivity[6].

Several reports such as IAASTD (2008), Liniger et al. (2011), Schwilch et al. (2012), FAO (2013) and WRI (2013) etc. highlight these practices and include case studies where they are already being adopted across the globe.

The World Overview of Conservation Approaches and Technologies (WOCAT)[7] offers a unique standardized methodology and tools for documenting and evaluating SLM approaches and technologies and innovative templates for dissemination of key information of best practices to field practitioners, decision-makers and policy-makers, including the UNCCD[8] and GEF focal points.

The WOCAT methods and tools have been used in more than 50 countries to document more than 300 SLM technologies and 200 SLM approaches and more than 500 practitioners have been trained in the application of the tools.

This has resulted in high quality publications developed together with key UNCCD partners on SLM best practices in different regions of the world, including Sub-Saharan Africa and the Himalayan Region, as well as in countries such as Bangladesh, China, Ethiopia, Mongolia, Nepal, Senegal, South Africa, Tajikistan and Tunisia.

From these sources, the following preliminary list of promising sustainable agricultural practices was derived (see Table 4).

6 See www.wocat.net

7 WOCAT offers a unique standardized methodology and tools for documenting and evaluating SLM approaches and technologies and innovative templates for dissemination of key information of best practices to field practitioners, decision-makers and policy-makers, including the UNCCD and GEF focal points.

8 Over 250 SLM techniques that combat land degradation and build its resilience to drought and climate change are available through the Convention to Combat Desertification (CCD 2014).

Table 4 Key Sustainable Agricultural Practices

Practice group	Practices (Technologies)
Agroforestry Describes land use systems where trees are grown in association with agricultural crops, pastures or livestock.	Alley cropping, Forest farming, Silvopastoralism (trees and livestock), Riparian forest buffers, Windbreaks (Shelter-belts), Leguminous trees, Sequential cropping systems (short-term crops planted with and eventually replaced by long-term timber trees), Wide row intercropping (Wide spacing between rows of timber trees, with crops cultivated between the rows), Dispersed trees (timber trees with shade-tolerant crops in a permanent arrangement)
Conservation Agriculture Characterized by three basic principles: minimum soil disturbance, a degree of permanent soil cover, and crop rotation.	No-tillage, Minimum tillage or reduced tillage, Permanent soil cover and Crop rotation
Organic agriculture Is a holistic production management system that avoids the use of synthetic fertilizer, pesticides and genetically modified organisms.	Crop rotations and enhanced crop diversity; Different combinations of livestock and plants; Symbiotic nitrogen fixation with legumes; Application of organic manure; Biological pest control ('push-pull')
Integrated Crop - Livestock Management (ICLM) Supports synergies within the agricultural system.	Animals stall-fed (zero-grazing); Harvesting and relocating nutrients (enclosure animals on cropland or otherwise collect - sometimes store and process - and spread manure on cropland to improve fertility and hence production); Haymaking, production of forages, grasses and leguminous trees (combination with agroforestry); enclosures (controlled grazing (e.g. rotational grazing)

Source: own compilation by IINAS

2.4 Systemic Indicators for Agricultural Land Use

Resulting from the previous chapters, the following table combines sustainable practices with specific actors within different (specific) regions.

However, the list does not claim to be comprehensive.

Table 5 Overview of Systemic Indicators for Agricultural Land Use

Land Use Practice	Actor / Farming system	Region
Agroforestry	All small-scale land users	Dry and semi-arid regions, sub-humid mountains + temperate zones Suitable for all types of cropping systems where woody and non-woody species can be mixed
	Large-scale land user – extensive and intensive (e.g. tea / coffee plantations)	Temperate and tropical zones
Conservation Agriculture	Particularly on large scale commercial farms (extensive and intensive), on industrialized large scale only with restrictions	Humid tropics, Sub-tropics and temperate zone
	Suitable on small scale farms	All regions
Organic Agriculture	All small-scale land users (smallholders and family farmers sometimes organized in groups or companies)	All agro-ecological zones
	Large scale extensive	All agro-ecological zones
Integrated Crop - Livestock Management	Subsistence small-scale to intensive small scale farms;	Common in semi-arid zones (with rainfall mainly between 750-1,500 mm) and Sub-humid and humid areas Tropical / temperate highlands
	Extensive/Intensive large scale farming	

Source: own compilation by IINAS

3 Systemic Indicators for Forest Land (Example 2)

Forests and forestry became a global concern some decades ago due to high deforestation rates in the tropics. In response, international and regional initiatives - both mandatory and voluntary - developed criteria and indicators for SFM, and aim to provide safeguards for e.g. REDD+ projects. The UN Forum on Forests (UNFF) 9 and particularly the Non-Legally Binding Instrument on All Types of Forests (NLBI) were instrumental in fostering SFM. Assuring forest multi-functionality is a key goal of SFM. As a consequence, it is expected that both protected areas and sustainably managed plantations increase in the future.

3.1 Socioeconomic Context of Sustainable Forestry Land Use

The relevance of *secure tenure* is extensively agreed among stakeholders. As recognized by FAO (2010b), it enables or provides incentives for people to invest time and resources in forest management. The Voluntary Guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security (CFS 2012) are key to improve governance of tenure of forests and consider general provisions to meet this goal.

In contrast to ownership, the *manager* is responsible for the actual practice of forest management so that “private entities“ vs. “community management“ is considered here, disregarding whether the community is indigenous or not.

3.2 Regional Aspects of Sustainable Forestry Land Use: Biomes

Intrinsic natural features and dynamics of different biomes and therefore, various “natural behaviors” make that from the management point of view, a “best practice” in a given ecosystem might result in detrimental effects in other ecosystem. In other words, sustainable silviculture should be tailored to each specific ecosystem, e.g., selective logging in forest harvesting is the most applied technique in tropical ecosystems while clear-cuttings (assuring given safeguards in terms of extension, age of the stand, techniques applied, etc.) could be the most appropriate system in the boreal biome.

To take these specificities into account, this report has distinguished into tropical and temperate/boreal.

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[9] http://www.un.org/esa/forests/

3.3 Sustainable Practices in Forestry Land Use

The compilation of practices has taken into account the country reports to the UNFF as input to identify systemic indicators for most relevant situations.

Voluntary forest certification schemes have been key instruments promoting SFM worldwide. Third-party certification is intended to provide credible evidence of SFM (Gustafsson et al 2012). There exist different voluntary forest certification types covering an ample range of actors and including provisions targeted for smallholders. Major standards such as FSC and PEFC have been developed at international level but are subjected to a more regional adaptation (country level or regional level). Moreover, the schemes have adapted the general schemes for smallholders.

Forest certification has been implemented in all types of ecosystem including from natural forests to plantations all around the world and by various actors.

Retention forestry is focused on enhancing the environmental features at the stand level. Retention forestry leaves a portion of the original stand unharvested in order to maintain the continuity of structural and compositional diversity and it is inspired on mimicking natural disturbance patterns and processes. Moreover, retention forestry is "*an approach to forest management based on the long-term retention of structures and organisms, such as live and dead trees and small areas of intact forests, at the time of harvest*" (Gustafsson et al. 2012). Retention forestry reflect similarities with agroforestry, being the most prominent that *both result in a tree cover which is intermediate between treeless vegetation and continuous forest* (Roberge et al. 2013).

As stated by Lindenmayer et al. (2012), the retention approach supports the integration of environmental, economic, and cultural values and is broadly applicable to tropical, temperate and boreal forests, adaptable to different management objectives, and appropriate in different societal settings. Therefore, since retention forestry is based on ecological processes, the practical application of this concept to various ecosystems is different (i.e. retention forestry should be targeted in different ways to e.g. selective logging in the tropics vs. clear cuttings in boreal ecosystems).

Afforestation is, according to FCCC (2001), the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.

Reforestation refers to the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land.

For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest on 31 December 1989 (FCCC 2001).

- These projects also contribute to strengthen the social and financial capital of communities and to climate change adaptation by increasing the resilience of communities and the local environment through enhancing the natural capital of rural communities, recovering severely degraded lands, protecting water resources, and conserving biodiversity.
- There are barriers both in the supply and demand side for scaling-up of Afforestation/Reforestation activities.
- Among the recommendations it is highlighted the need for simplifying the land eligibility requirements by using more flexible criteria to eliminate incentives for deforesting and subsequently reforesting lands.

Forest and landscape restoration turns barren or degraded areas of land into healthy, fertile, working landscapes that local communities and ecosystems can sustainably cohabit. Many organizations published guidelines, e.g. for dryland forests (FAO 2013c; IUCN 2011), and for degraded and secondary tropical forests ITTO (2002).

3.4 Systemic Indicators for Forestry Land Use

From the previous considerations, the following list of systemic indicators for the forest land use was derived.

Table 6 Overview of Systemic Indicators for Forestry Land Use

Land Use Practice	Actor	Region
Voluntary certification	All	mainly applied in temperate/boreal
Retention Forestry	corporation, public forests	temperate and boreal
Reduced/low impact logging	corporations	All
Afforestation/Reforestation	All	All
Forest restoration	All	All

Source: own elaboration by IINAS

4 Discussion of the Approach

The concept of defining "sustainable land use practices" of key actors in specific socio-economic and regional settings seems possible, although it still lacks detailing and "proof" of overall implementability. Given the preliminary state of work, the following issues need further reflection:

- The various land use practices need to reflect not only the socio-economic setting, but also have to address the fundamental issue of *land tenure*. As the VGGT (see CFS 2012) are not (yet) operational in the real world, this promising concept cannot provide evidence of being applicable to the examples discussed here[10]. Thus, it is still a *working hypothesis* that implementing the VGGT would be an appropriate element of the sustainable land use practices.
- The suggested systemic indicators are "aggregated" with regard to environmental aspects, i.e. the practices selected here are *assumed* to be environmentally sustainable. There are surely limits to this assumption which need identification in the further work.
- The examples for agriculture and forestry are still rudimentary, as data collection and screening is ongoing.
- It needs to be discussed what effect an implementation of systemic land use indicators in international governance systems have and how implementation could be feasible.

5 Further Work on the Approach

The work on the examples was meant to substantiate that the overall approach is feasible. Still, there is much more evidence to be collected through further examples in specific socio-economic and regional settings to broaden the knowledge base. This would require more resources, though, and should be performed in collaboration with partners in the respective regions to allow for an inclusive discussion of the approach, and findings.

Furthermore, the examples for agriculture and forestry represent more than 90% of global land use, but as *future* pressures from e.g. urbanization and infrastructure development will significantly impact on agricultural and forest land uses (Fritsche, Eppler 2013), it would be worthwhile to extend the examples to the area of "sustainable cities".

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[10] For the ongoing "field testing" of VGGT implementation through donor activities see http://landgov.donorplatform.org/

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