The GEF-funded KM:Land project aims to lay the foundations for a comprehensive system to track progress across the GEF Land Degradation Focal Area. The KM:Land project was designed to address the knowledge management gaps in the GEF Land Degradation Focal Area by providing the scientific-technical basis for selecting indicators to demonstrate the benefits, impacts and good practices of SLM projects in the GEF portfolio.


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# Measuring Impacts of Sustainable Land Managment

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## Measuring impacts of Sustainable Land Management

Improved land management plays an important role in helping to secure food and other provisioning services such as water supplies. Surprisingly little attention has been given to how to monitor and evaluate sustainable land management (SLM) practices for its global benefits and long-tem impacts. The GEF-funded project 'Ensuring Impacts from SLM - Development of a Global Indicator System' or KM:Land for short, was designed to address this shortcoming by developing a suite of global and project-level indicators to measure global environmental benefits and local livelihood benefits. The indicators and accompanying conceptual framework are now being adopted and adapted by both the GEF and UNCCD in their efforts to measure impacts of their respective strategies to combat land degradation.

## Simplifying the complexity of land degradation and SLM

Land degradation entails a range of interactions of biophysical processes, climatic variations and human activities that are dependent on each other. Separation of biophysical and socio-economic factors is always arbitrary, and indicators of complex phenomena need to ensure that they cover all aspects of the problem. The KM:Land project therefore designed a conceptual framework to help show the logic behind the selection of the indicators and to distinguish between indirect driving forces and pressures and the impacts of changes in environmental state on human well-being. Combining aspects of the well-known Driver-Pressure-State-Impact-Response (DPSIR) model with the framework used in the Millennium Ecosystem Assessment resulted in the SLM framework shown below.

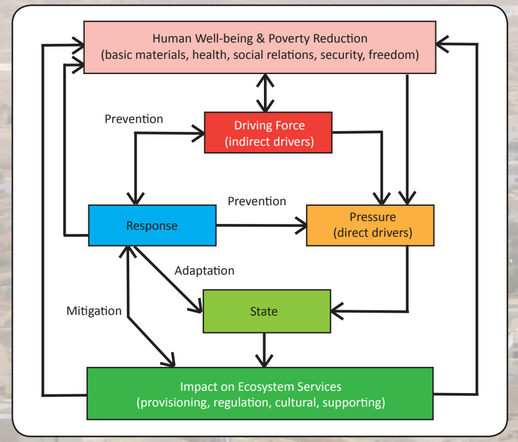


*Figure 1. Conceptual framework for SLM.*

After an iterative process involving UN agencies and other collaborating institutions and experts, the KM:Land project identified a set of four global-level indicators (Table 1). Efforts were taken to ensure that this indicator set conforms to the internationally recognised SMART criteria (Specific, Measurable, Achievable, Relevant and Time-bound).

## Land cover/land use

This indicator measures current land cover and assesses the change in land cover and land use types following the FAO classification and methodology system, reporting in units of ha or % of area under each class. These are state indicators that provide contextual information for the evaluation of the other indicators, and that allow the assessment of change in land cover/land use within a project area over time. These are usually based on remote sensing with adequate groundtruthing. Participatory workshops can help to identify specific land use systems, as exemplified by the WOCAT programme.

## Land productivity

This indicator measures changes in land productivity that reflect land improvement or degradation and is usually measured in units of production/unit of input or area (e.g., tons of crops, meat or milk/ha, biomass/ha for forestry). These indicators also considers diversity of crop species such as number of varieties and % of total production. The influence of pest and diseases and other factors such as rainfall that can bias estimates need to be considered. Remote sensing, national statistics, local market and household surveys, and land user information provide the sources for measurement.

## Water availability

Two sub-indicators measure water availability. The first is total water off-take divided by available water in quantitative terms. The second is % of the rural population with access to safe drinking water as a qualitative indicator. Estimates are usually based on national statistics and project-level assessments in volumetric units. If generic values are needed they can be obtained through FAO's AQUASTAT. Often, water extraction is estimated by water use by crop or animal head.

## Human Well-being

Well-being has many different dimensions including health, security, cultural, educational and spiritual, values in addition to the usual economic measures. Several indicators were selected that reflect the attempt to capture the multi-dimensional facets of human well-being. The first is % of the rural population below the national poverty line. This can be based on income generated through each land use system or % of household needs generated on the average land holding of the population. The second and third indicators relate to human health using the maternal mortality ratio and/or proportion of chronically undernourished children 5 years and younger in rural areas. These indicators mainly draw on national statistics or project-level assessments.

Table 1 presents the indicators and their relationship to the conceptual framework.

## Pilot testing findings

Between May - September 2010, the KM:Land project undertook a pilot testing of the indicators in four countries operating a GEF/UNDP-funded land degradation project (Dominican Republic, Namibia, Senegal and Tajikistan). Most of the indicators were considered directly relevant to the projects and could be measured. The human well-being indicators were considered by the project teams to be of less direct relevance and therefore less likely to show beneficial results of SLM. The indicators relating to productivity and water availability were found to be conceptually demanding and potentially costly in terms of time and resources. All indicator exercises would require a baseline assessment, which are often under-resourced, thereby limiting the scope of SLM monitoring and assessment.

## Outcomes

The indicators now form part of the GEF Land Degradation Focal Area Portfolio Monitoring and Assessment Tool (PMAT) that will help the GEF to monitor results of their operations. Similarly, the UNCCD is proposing to adopt a modified version of the KM:Land conceptual framework along with KM:Land indicators in its Impact Indicator Reporting Templates. These will be presented to the UNCCD COP10 in October, 2011.

*Table 1. Global-level indicators and their placement in the SLM framework.*

| Global Indicator | Measurable Indicator at project level | SLM Framework |
|---|---|---|
| Land cover / Land Use | Land cover | State |
| | Land use systems | State, Response |
| Land productivity | Net Primary Productivity (NDVI corrected) | Impacts on ecosystem services |
| | Annual agricultural production data including arable crop, livestock and forest production data | Impacts on ecosystem services |
| | Agro-diversity | Impacts on ecosystem services |
| Water availability | Off-take for agricultural use | Pressure, Impacts on ecosystem services |
| | % of population with access to safe drinking water | Impacts on ecosystem services |
| Human Wellbeing | Percentage of rural population below the poverty datum | Impacts on human well-being |
| | Maternal health in rural areas | Impacts on human well-being |
| | Proportion of chronically undernourished children under 5 in rural areas | Impacts on human well-being |

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