TerrAfrica Results Monitoring Matrix

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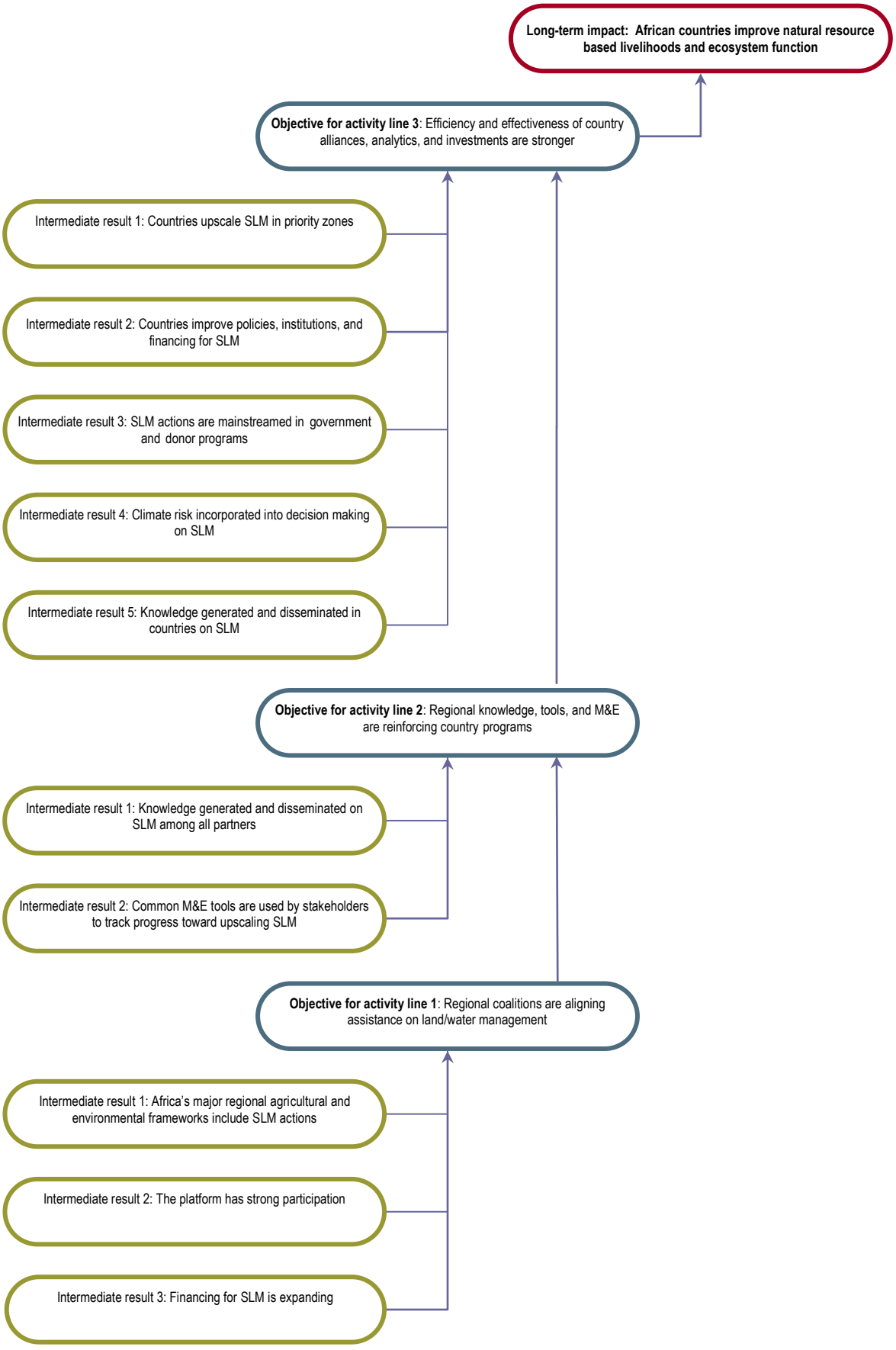
Summary

The TerrAfrica Results Monitoring Matrix, approved by the TerrAfrica Executive Committee in November 2008, allows the Secretariat and partners to monitor and evaluate the TerrAfrica partnership over the coming years. Expected key near- and long-term impacts are included, as well as the theory of change that partners have agreed upon that collectively contributes to these impacts. The document details the intermediate results and indicators to be used tracking the progress of TerrAfrica's annual work program to help deliver results. The indicators for the intermediate results are intended to be easily and cost-effectively tracked by partners and the Secretariat. Based on this framework, the M&E working group will operationalize the M&E system centered in NEPAD and produce M&E tools for use by individual project teams, country investment platforms, and international partners. The TerrAfrica framework is also meant to be used for CAADP Pillar 1 design and for updating the CAADP M&E system. The TerrAfrica Results Monitoring Matrix is built largely upon the SIP M&E framework (2007) and the TerrAfrica Business Planning Framework (2006).Vversion 1.0 of the TerrAfrica results monitoring matrix will be updated as the final M&E architecture is finalized and institutionalized.

Figure 1. Schematic of the TerrAfrica results framework



TerrAfrica targets a small set of specific impacts in participating countries. TerrAfrica partners are motivated by the desire to see improved sustainability and productivity of African land. Partners firmly believe that intertwined economic, social and environmental benefits accrue by preventing, stopping or reversing degradation of the land upon which a majority of African individuals and economies are dependent, and will be for the foreseeable future. Partners also believe that even in the absence of clear land degradation trends, sustainable land and water management (SLM) contributes to economic growth, environmental sustainability and reduced resource conflict, especially over the medium and longer-term.[1]

The key impact expected from investments financed in relation to the TerrAfrica work program is for African countries to improve natural resource based livelihoods and ecosystem function. The indicators used to track these impacts accommodate specific country settings and include:[2]

1. Maintenance of land quality (vegetation cover[3])
2. Increased land productivity (yields)
3. Increased household welfare (income, food, livelihoods)

At the regional program level, where and when possible, indicators will be aggregated to help cross fertilize knowledge, reflect progress made at sub-regional and regional levels, and contribute to enhance accountability and benchmarking.

The TerrAfrica workprogram contributes to these impacts by: (i) catalyzing alliances and synergies, (ii) generating and disseminating knowledge, and (iii) promoting and leveraging investment. Activities carried out focus on the country level and emphasize: (i) expanding the uptake of SLM technologies and approaches while considering landscape interactions (ie, soil erosion's downstream effects; forest conversion into farmland, groundwater recharge, etc.), (ii) improving enabling environments that allow better technologies and land-use planning to take root, (iii) managing climate risk to ensure that SLM gains are durable, and to harness synergies between adaptation and mitigation, and (iv) building long-term country programs needed to generate sustainable results at scale.

The results framework for the TerrAfrica partnership is presented below. It is built largely upon the SIP M&E framework (2007) and the TerrAfrica Business Planning Framework (2006). It is devised to be appropriate to the logic and rationale of TerrAfrica being recognized by partners and sub-Saharan countries as a regional platform for action to implement CAADP Pillar 1 on SLM, NEPAD's environment program areas 1 and 6, the REC action plans, the UNCCD regional and national action plans, and most critically, participating countries' sectoral programs and national strategies.

M&E at the program level can strengthen knowledge management, benchmarking, and design and implementation of discrete investments on the ground. This in turn helps builds transparent and participatory action coalitions in countries, enhances alignment around common goals, and reinforces trust. No program level M&E may capture the full picture of each individual country or operation; individual project performance is best captured within those discrete projects depending on country and local priorities. The program level should add value and allows for benchmarking, mutual learning, and portfolio level reporting.

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[1] See annex 1 for definitions of selected land related terms

[2] Some indicator tools are under development and/or application in field, along with approaches to aggregate, analyze, and present data. See the M&E framework for the Strategic Investment Program for SLM in SSA (SIP), a multi-partner investment umbrella led by the Bank.

[3] Considered a proxy for terrestrial ecosystem health including cropland, rangeland, and forest/woodlands.

The logic of the results framework

Achieving impacts from upscaling SLM requires a coherent theory of change on how that change will occur, in what sequence and with what effects. The logic of the results chain hierarchy below is based on TerrAfrica's "theory of change:"

- To more efficiently address land degradation and the African growth agenda, partners support African leadership and actions to improve alliances and enabling environments for SLM (governance, institutions, policy, etc), *which then*…
- contributes to improved incentives and therefore more knowledge and financing are unlocked, *which then*…
- contributes to greater technology uptake and better land use planning, *which then*…
- contributes to drive SLM up-scaling beyond current isolated experiences, *which then*…
- delivers impacts on sustainably securing ecosystem services (more food, fuel, and fiber, increased water availability, increased farm income and household income sources, greater carbon storage, arrested decline in biodiversity, less impact from climate risk/variability), while helping manage trade-offs between land uses, such as from controlling agricultural extensification into woodlands.

This change is being pursued by TerrAfrica partners working toward common results under each of the three activity lines. These results contribute to the partnership's vision of African countries improving their environmental, economic, and food security.

Activity lines 1 and 2 focus on activities at global and regional levels. These activities include the development of national frameworks that allow more cooperative cross-sectoral work, structure advocacy and strategic policy dialogue, advocate for increased investment in land quality in Africa, develop new knowledge and mechanisms to share it, and strengthen M&E tools and systems to help benchmark efforts, all under country leadership. Activity line 3 focuses on country level investment to scale up SLM. This is where the vast majority of resources are applied. Investments are supported by key analytics and advisory services where necessary to articulate countries' multisector investment programs.

Common principles

To achieve these results, a common set of principles is reflected throughout this results framework:

- Action based on partnership and comparative advantage
- African leadership on the land agenda and country ownership of the partnership
- Transparency and accountability
- Broad-based participation including civil society, community-based organizations and local farming communities
- Measurable, comparable, and sustainable performance and results that contribute to mutual learning and influence action

Challenges faced in finalizing the TerrAfrica M&E Architecture

There are several challenges to building an appropriate M&E architecture for TerrAfrica, although much work has already gone into it, most prominently through the preparation of the multi-agency GEF-SIP[4] umbrella.

The M&E system for TerrAfrica focuses on (i) a set of institutional and organizational processes and (ii) products, outputs, and impacts from projects or programs. The TerrAfrica approach is centered on contributing to alignment around a regional vision of SLM. This includes contributing to building and sustaining African-led partnerships, contributing to building and disseminating the right knowledge to the right actors at the right place and time, and contributing to harmonizing activities including investment. Capturing progress in these areas with indicators will require careful consideration of how to define and measure change, and what eventual success should entail. The validity and sensitivity of the indicators is crucial. The measurement of the success (or not) of the TerrAfrica platform represents conceptual challenges that need to be understood and addressed early on, particularly as baselines are to be developed and benchmarks are to be set. Unlike a discrete country level project, the program will be creating baseline as it goes along and adding progressively to accumulated results on key indicators.

Defining these indicators and then measuring and analyzing them correctly will be a challenge. The work has to begin early on in the finalisation of TerrAfrica indicators or else the processes that are set in place without baselines will start to become routine. The creation of the M&E system can help force clarity on the specific objectives and outcomes to be achieved from TerrAfrica. For it is only with specificity of outcomes that the indicators can be constructed to track the emergence of these same outcomes.

There are challenges of alignment on what to measure (outputs and outcomes), how to measure (selection of indicators), how to report what has been measured (aggregated or not aggregated), and how to approach the utilization within TerrAfrica of what is known from the M&E system (knowledge management). There are also significant challenges of piloting different tools and strategies for the collection, analysis, aggregation, and dissemination of relevant information—information that should feed into management decisions, peer review, and the knowledge base. Linkages among all the actors are critical and will affect the ability to report results.

Sorting out the piloting of indicators and tools, reporting on progress, and making sure they are appropriate to management needs at the national and regional levels is not to be taken lightly. The TerrAfrica Secretariat and all stakeholders will have a key function in gathering, analyzing, and sharing information relevant to the performance of the platform.

In the end, one of the key objectives of TerrAfrica is to contribute to effective and efficient investment in sustainable land management. Providing guidance to governments on how to do this, in what areas to do this, and with what policy tools to do so requires careful and verified information. TerrAfrica requires new knowledge to break out of the “business as usual” approach to rural development. It will require careful measurement of activities and program based approaches used within the region to learn what works, what does not work, and what can be made to work. Consequently, financial data, performance data, sustainability data, and good practice data will all have to be collected, analyzed, and disseminated.

[4] SIP: The Strategic Investment Program for SLM in Sub-Saharan Africa. This WB-led multi-partner investment umbrella was approved by GEF Council in June 2007 with $150m in grants plus significant co-financing and includes over 40 operations consistent with the TerrAfrica platform.

A note on convergence of TerrAfrica, SIP, and CAADP M&E

In building the TerrAfrica M&E system, the relationships between the SIP, TerrAfrica, and NEPAD's CAADP and Environment Action Program (EAP) should take advantage of synergies, avoid duplication, and ensure ease of monitoring and knowledge transfer, ideally by African institutions.

TerrAfrica's work program includes activities that clearly fall outside of the SIP umbrella (ie, regional knowledge products and tools, country operations not receiving GEF support, etc.). As such, it is necessary to methodically track these efforts because the SIP is not financing or following their progress.

The SIP, as a key investment program of TerrAfrica, maintains a portfolio of nearly 40 operations involving over 25 countries. Some investments under TerrAfrica fall outside the SIP umbrella. Each of these discrete operations generates data that is then aggregated to the extent possible at the regional level to report on portfolio progress to the GEF and its partner agencies. Because SIP is a subset of TerrAfrica, the SIP M&E system can be considered a subset of the TerrAfrica M&E system, but with some GEF-specific and agency-specific reporting requirements that TerrAfrica itself does not need to directly address.

Likewise, CAADP's work program includes activities that clearly fall outside of TerrAfrica (ie, large irrigation, agricultural research, etc.). CAADP is divided into four pillars, the first of which is land and water management. TerrAfrica is a vehicle to implement CAADP Pillar 1 and also key objectives of NEPAD's Environment Action Program. CAADP in particular is an enormous opportunity to mainstream land degradation and SLM into large-scale sector investment across the continent, and in the process strengthen external support and harmonization.

Results monitoring matrix for the TerrAfrica Platform

Results chain hierarchy	Indicators	Baselines & Targets (2006-2020)	Data sources	Reporting Responsibility	Assumptions	Use of results info
Long-term impact: **African countries improve natural resource based livelihoods and ecosystem function**	Change in the following indicators in investment areas, disaggregated by country, land-use type, and agro-ecological zone, against baseline data: (i) **Household welfare** measured by household surveys such as CWIQ (ii) **Productivity** measured by major crop yields (iii) **Vegetation cover and ecosystem function** measured by Net Primary Productivity/ rainfall (or NDVI/ rainfall)[5]	• Baselines: generated as investments implement • Targets from 2011 onwards: - Positive annual trends for 80% of discrete investments with relevant components[6] - Positive annual trends for the portfolio	• To be aggregated from discrete operations and country SLM investment frameworks. • Primary data for investment areas will be collected within the M&E systems of discrete operations via: sampled household and land-user surveys, existing satellite imagery and databases calibrated with groundtruthing. See SIP for details on each method.	• Regional M&E desk and technical specialists • M&E officers and technical specialists of discrete operations • National M&E officers and technical specialists	• Land degradation is prioritised in African policy-making and decision-making at local, national, and regional levels. • Climate risk management is recognized as key for land management • SLM interventions contribute to these impacts, which may not be attributed solely to SLM. • Net Primary Productivity tracks overall land quality. (note: NPP is a proxy indicator for overall terrestrial ecosystem function for rainfall dependent land. The indicator can be strengthened with rainfall and climate data coupled with good analysis. An alternate metric is NVDI combined with rainfall and climate data.)	• Informs PRSPs, sectoral strategies, assistance strategies. • Facilitates reporting on MDGs 1 and 7, CAADP pillars, and EAP. • Improves mutual learning, benchmarking, and investment quality.

[5] Data reliability for biophysical environmental impacts requires long term monitoring.

[6] Not every SLM investment will report on each indicator. For example, an operation targeting woodlands may not necessarily focus on crop yields but could instead focus instead on land-use planning, community woodlots, alternative stoves, and non-timber forest products to alleviate pressure on forest resources.

Results chain hierarchy	Indicators	Baselines & Targets (2006-2020)	Data sources	Reporting Responsibility	Assumptions	Use of results info
Activity Line 3 Objective (country level): Efficiency and effectiveness of country level alliances, analytics, and investments are stronger						
Intermediate result 1: **Countries upscale SLM in priority zones**	1.1 Hectares with SLM practices (reported by land use: crop, range, forest)[7] *Alternate:* *# land users adopting SLM practices (reported by land use: crop, range, forest)*	Baseline generates as operations implement	Project implementation reports from discrete operations, aggregated	Regional M&E desk aggregates from operations' M&E officers	SLM uptake is driven by strengthened policies, institutions, stakeholder involvement, knowledge sharing, financing availability, and alignment of efforts.	Provide feedback on adoption to improve countries' upscaling strategies and investment
Intermediate result 2: **Countries improve policies, institutions, and financing for SLM**	2.1 Total change in investment toward SLM, disaggregated by participating country, and domestic or external funding source.	2006: unknown Net increase per annum (in constant currency)	Public expenditure reviews (if available), budgetary data, SLM Investment Frameworks, and portfolio reviews	Partners, regional M&E desk, lead agencies, country SLM working groups	Domestic funding sources exist to be leveraged by well-organized country level stakeholders and can be tracked	Benchmarking and advocacy on barriers ion the enabling environment that hinder investment expansion in SLM
	2.2 # Country SLM Investment Frameworks (under preparation, under implementation)	0 in 2006 3, 4 by 2010 3, 7 add'l by 2015 3, 11 add'l by 2020	National SLM committee reports	Regional M&E desk, National SLM Committees, lead agencies	Investment frameworks strengthen cross-sector partnerships, and enable greater integration of SLM into PRSPs, sector programs, etc, which leads to upscaling	Enhance joint work programming to support expanded investment in countries
	2.3 # participating countries with improved scores on the *Composite Index for the SLM Enabling Environment*[8]	75% each year once baseline established (2006-08: tool under development)	Expert survey tool (under development)	Regional M&E desk	An index on this topic will be accepted as a credible tracking tool	Benchmarking
	2.4 # of operational SLM alliances established or strengthened at country and subregional levels,[9] (*Coalition Assessment survey tool*[10])	1 in 2006 10 by 2010 15 by 2015 20 by 2020	Expert survey tool (under development)	Regional M&E desk, lead agencies	Program based approaches reduce transaction cost over the medium to long term, allowing greater investment efficiency. Countries see benefits in coalitions.	Benchmarking

7 See annex 1
8 Please see SIP Program Brief for summary
9 Covering a transboundary landscape or multi-country political unit.
10 Indicator to be operationalized within the NEPAD/UNEP operation in the SIP. Survey tool includes basic effectiveness criteria for successful partnership building and management, including increased capacity for SLM advocacy, communications, knowledge sharing, and the political will to align activities. Please see SIP Program Brief for summary.

Results chain hierarchy	Indicators	Baselines & Targets (2006-2020)	Data sources	Reporting Responsibility	Assumptions	Use of results info
Intermediate result 3: **SLM actions are mainstreamed in government and donor programs**	3.1 % participating countries with SLM actions in PRSPs, CAADP compacts, or sector programs	2006: tbc 2010: 75% 2015: 90% 2020: 90%	Primary documents: PRSPs, CAADP roundtables, etc.	Regional M&E desk, NEPAD, RECs, National SLM committees	Mainstreaming will lead to greater investment on the ground	
	3.2 # international partners' country assistance strategies with SLM actions	Not tracked in 2006-08 7 by 2010 15 by 2015 20 by 2020	Primary documents: CASs etc.	Donors in country, Regional M&E desk, NEPAD, RECs, National SLM committees		Demonstrate tangible increase in international support to SLM
Intermediate result 4: **Climate risk incorporated into decision making on SLM**	4.1 # participating countries with plans and strategic interventions to manage climate risks to SLM	Not tracked in 2006-08 7 by 2010 15 by 2015 20 by 2020	Reports from national SLM committees and partners	Regional M&E desk, NEPAD, RECs, National SLM committees	Sufficient data available for statistical analysis, clear and comparable definitions of disasters and climate hazards	
	4.2 % of SLM operations that address specific climate vulnerabilities	Not tracked in 2006-08 50% by 2010 70% by 2015 90% by 2020	Project implementation reports from discrete operations, portfolio reviews	TerrAfrica partners and regional M&E desks, project portfolio reviews	Sufficient data available for statistical analysis, clear and comparable definitions of disasters and climate hazards	
Intermediate result 5: **Knowledge generated and disseminated in countries on SLM**	5.1 # country level knowledge products developed and disseminated (disaggregated by audience and activity[11])	Not tracked in 2006-08 10 by 2010 15 by 2015 20 by 2020	Reports from national SLM committees and partners	Regional M&E desk aggregates	Data and capacity exist to carry out and apply analytical work to inform development of program based approaches	Increase stakeholder capacities to share and apply knowledge to prioritise investment across sectors Supports advocacy and decision making
	5.2 # of country level comprehensive SLM information systems operational	0 in 2006 5 by 2010 10 by 2015 15 by 2020	Reports from national SLM committees and partners	TerrAfrica partners and regional M&E desks, project portfolio reviews	Existing or new systems can be well utilized to enhance knowledge access	Improves investment targeting, alignment, comparability and implementation

11 Audience: land users, policymakers, investors/planners

Results chain hierarchy	Indicators	Baselines & Targets (2006-2020)	Data sources	Reporting Responsibility	Assumptions	Use of results info
Activity Line 2 Objective (regional): Regional knowledge, tools, and M&E are reinforcing country programs.						
Intermediate result 1: **Knowledge generated and disseminated on SLM among all partners**	1.1 Regional SLM Knowledge Base operational	2006: none exist 2008: operational and maintained each year	Validated products on-line	TerrAfrica Secretariat	Improved access by country level stakeholders to knowledge will advance SLM upscaling.	Knowledge is pooled and more available to more users and is absorbed into country planning.
	1.2 # regional knowledge products and support tools developed and disseminated (disaggregated by audience and activity[12])	0 in 2006 10 by 2010 15 by 2015 20 by 2020	Validated products delivered, workshop proceedings available	Partners, lead agencies, TerrAfrica Secretariat	Better quantification and dissemination of land management experiences and options will advance SLM upscaling.	Country portfolios are strengthened by greater knowledge of best practices.
Intermediate result 2: **Common M&E tools are used by stakeholders to track progress toward upscaling SLM**	2.1 Cost effective M&E system operational at all levels	2009: Agreed regional M&E framework 2010: regional M&E operational; 2011 onward: 80% of new projects generate data for regional reporting by end of PY1	M&E Score Card[13], project implementation reports	Regional M&E desk, M&E systems of country programs and discrete investments	Capacity and political will exist at all levels to build operational M&E system. Data on biophysical impacts are available over longer term	Ensure generation of solid M&E data from countries. Improve M&E and learning.
	2.2 Existence of a set of piloted benchmarks	Selected benchmarks piloted and operational by 2010	Reports from M&E desk, all partners	Regional M&E desk	Benchmarking supports mutual learning	Compare efforts across national stakeholders and across countries and to attract additional financing.

12 Audience: land users, policymakers, investors/planners
13 M&E Score Card will be developed, tested, and operationalized to benchmark the quality of country and project M&E systems. The scorecard includes a number of variables for gauging M&E effectiveness. See the SIP Program Brief for details.

Results chain hierarchy	Indicators	Baselines & Targets (2006-2020)	Data sources	Reporting Responsibility	Assumptions	Use of results info
Activity Line 1 Objective (regional): Regional coalitions are aligning assistance for SLM						
Intermediate Result 1: **Africa's major regional agricultural and environmental frameworks include SLM actions**	1.1 NEPAD's CAADP and Environment Action Plan	Both by 2009	Regional monitoring reports	NEPAD, RECs	African-led program based approaches help drive further sector and donor alignment	Build greater political visibility for SLM and climate risk management, and act upon country level priorities
	1.2 REC action plans and regional CAADP compacts	4 by 2010	Sub-regional monitoring reports	NEPAD, RECs		
Intermediate Result 2: **The platform has strong participation**	2.1 # countries formally participating in TerrAfrica	4 in 2006; 10 by 2010; 15 by 2015; 20 by 2020	TerrAfrica work program, Country letters to Partners or Secretariat	TerrAfrica Secretariat, lead agencies	Program based approaches are needed to achieve national, regional and global targets (ie, CAADP 6% agricultural productivity, MDGs 1 and 7, etc.)	
	2.2 Increased year on year score on Coalition Assessment survey tool	Baseline generates when tool is first applied	Coalition Assessment survey tool[14]	Regional M&E desk	Partnerships are seen to be beneficial to participants, and strengthen African leadership on land	Strengthen and compare country level actions
	2.3 % timely delivery of annual work program activities (by partner)	80% each year	TerrAfrica work program; final deliverables available	Partners with TerrAfrica Secretariat		Improve communications and mutual learning
Intermediate Result 3: **Financing for SLM is expanding**	3.1 TLF[15] funded	0 donors in 2006; 3 donors from 2008 and each year thereafter	TLF reports	World Bank		Adapt TLF management, report to partners
	3.2 GEF-SIP[16] successfully disburses $150 million in GEF grants plus roughly $650 million in co-financing	2010: 80% of SIP operations disbursing; 2010 and annually thereafter: satisfactory ratings for 80% of completed SIP PIRs	Project Implementation Reports (PIR)	SIP Steering Committee	PIRs adequately capture SIP performance	Adapt SIP management
	3.3 Estimated total aid flows to SLM in the region, disaggregated by country and partner	Unknown in 2006; X in 2008 (*baseline to be determined on rolling basis*); Positive annual trend	Country SLM Investment Frameworks, TerrAfrica work program	Regional M&E desk, National SLM Committees, Lead agencies	Info can support SLM advocacy	Advocate for increased domestic and international investment in SLM

14 Indicator to be operationalized within the NEPAD/RECs institutional support operation in the SIP, led by UNEP. Survey tool includes basic effectiveness criteria for successful partnership building and management, including increased capacity for SLM advocacy, communications, knowledge sharing, and the political will to align activities. Please see SIP Program Brief for summary.
15 TerrAfrica Leveraging Fund, a multi-donor trust fund managed by the World Bank
16 GEF-SIP: Strategic Investment Program for SLM in Sub-Saharan Africa

Annex 1

Indicator: "Total investment area with SLM practices"

Justification of this indicator:

Since 2002, the objective of CAADP pillar 1 has been to expand the area under sustainable land and water management. TerrAfrica seeks the same goal, as do some national programs and numerous discrete operations.

During the same time, the DPSIR framework (Driver-Pressure-State-Impact-Response) has been used widely for categorizing numerous environment related indicators. The logical flow of the DPSIR can be illustrated in the following example: consumption or population size/growth (drivers) drive industrial emissions (pressures) which create polluted water or air (state) which impacts human or ecosystem health (impacts) which leads to policy/investment responses (responses). (European Commission 2002, EEA 2005).

The SLM indicator above is categorized as a response indicator. This category is suitable for current portfolio level reporting for the Bank (and partner operations under CAADP) due to its ability to be aggregated from existing, planned, and future operations. According to the current inventory of indicators in the ISRs of active projects in AFTAR, and the Bank led Strategic Investment Program for SLM in Sub-Saharan Africa, operations are already tracking hectares with improved land management practices across a variety of rural land uses (i.e., crop, forest, range).

This indicator is meant to be simple and cost effective to track but requires and accommodates clear locally appropriate definitions of what is meant by SLM practices. This issue is briefly elaborated below. An alternate wording for this indicator ("Land under sustainable management") is more difficult to operationalize because it seems to assume that current science can report on precisely what a sustainable state is, which is not the case, or at least not cost-effective. What is measurable and most cost-effective now is to apply an indicator that can track progress toward sustainability at farm scale and at landscape scales (such as agroecological zones, watersheds, or basins). Impact indicators are available but can be more costly to apply. Proxy indicators are the easiest, most operational option for reporting on SLM upscaling.

Definition of terms:

> ***Area:*** Hectares of land.
>
> ***Sustainable Land Management (SLM)*** is defined, according to the TerrAfrica partnership (2005), as the adoption of land use systems that, through appropriate management practices, enables land users to maximize the economic and social benefits from the land while maintaining or enhancing the ecological support functions of the land resources. This is also the definition used in a World Bank supported review of Uganda's public expenditure on SLM (2008). It may be necessary to further define what is meant by land and land degradation:
>
> > *Land* refers to cropland, range, pasture, forest and woodlands. Land is defined by the UN Convention to Combat Desertification as the terrestrial biologically productive system that comprises soil, vegetation, other biota, and the ecological and hydrological processes that operate within the system.
> >
> > *Land degradation* refers to the reduction or loss of the biological or economic productivity and complexity of land, resulting from land uses or from a process

or combination of processes, including processes arising from human activities and habitation pattern. These include long-term loss of natural vegetation; soil erosion caused by wind and/or water; deterioration of the physical, and chemical and biological or economic properties of soil (UN Convention to Combat Desertification).

Land quality refers to the degree of biological productivity and complexity of land.

SLM practices include both technologies and approaches applied to raise land quality. The precise practices are usually site specific, and this indicator allows project managers freedom in defining what is an SLM technology or practice. For example, tree planting may be an SLM practice in one area but not in another because the practice may negatively affect downstream water availability. *Technologies* refer to agronomic, vegetative, structural, and management measures that control land degradation in the field. Examples include terracing, forestation, reduced tillage, micro-irrigation, etc. *Approaches* include ways and means of support that help to introduce, implement, adapt, and apply technologies in the field. Examples include watershed management, climate risk management, community land use planning, etc.

Recognizing that there is no one 'miracle' solution to solve the problems of land degradation and low productivity, selection of the appropriate SLM technologies for a particular area will be determined by: (i) the qualities and characteristics of the local land resources; (ii) the SLM requirements of the land use to be pursued; and (iii) the socio-economic context and priorities of the land users. While SLM should target landscape level, it will be based on gaining incremental improvements within the land use production system through combining local practices that will result in:

- improved plant[17] management (e.g. higher yields, good vegetative cover, reduced raindrop impact),
- improved soil and nutrient management (e.g. higher organic matter levels, integrated plant nutrition, improved soil structure, good rooting conditions),
- improved rainwater management (e.g. reduced runoff, increased infiltration, improved soil moisture conditions), and
- reduced risk to production systems, people, and assets

There will be synergistic benefits from combining many of these, which can be expected to lead to greater productivity and environmental benefits than could be achieved with each one on a purely incremental basis.

There are a number of common technical elements that underpin win-win management options, notably: minimum soil disturbance; maintenance of good ground cover; restoration of soil organic matter and related biological activity; integrated plant nutrition management; better crop husbandry; development of integrated crop/livestock/agro-forestry systems; opportunistic flexible management of traditional pastoral systems; and delineation of temporary or permanent protected areas.

Specific practices that can be used in combination to advance toward SLM include (see table 1 below):

- **Crops**: conservation agriculture with crop rotation and intercropping, integrated pest management, inter-planting with trees and agroforestry, mulching and residue management, etc.

[17] Annual and perennial crops, grasses and other herbaceous pasture species, trees and shrubs.

- **Pasture and rangeland**: planned grazing processes, enclosures for recovery or enrichment planting, fire prevention, etc.
- **Forest and woodlands**: planting, natural regeneration, shelterbelt planting, fire protection, community woodlots, etc.
- **Soil management**: retention of crop residues and soil cover, additions of organic amendments including compost and manure and cover crops, integrated nutrient management, reduced tillage, etc.
- **Rainwater management**: contour ridges, natural vegetative strips, soil cover and residue management, reduced tillage, etc.
- **Rural land use planning**: participatory, community, local, provincial, national, plus natural asset mapping, conflict resolution mechanisms, etc.
- **Watershed management**: is a participatory approach to safeguard upstream/downstream benefits and interactions. Examples include upland conservation activities (forestation, tree felling or grazing restrictions, alternative livelihoods, etc) to secure environmental services for downstream farmers.
- **Climate due diligence**: sustainable land use systems require managing climate risk. This approach includes: profiling risks to natural resource assets, and integrating community perceptions of local climate change into SLM technology options (ie drought resistant seeds, water harvesting, flood control, etc.), and strengthening early warning systems.

Table 1. Typology of SLM practices

SLM practices		
Land/water mgt approaches	**Land/water mgt technologies**	
Land use regimes	**Agronomic and vegetative measures**	**Structural measures**
• Watershed plans • Community land use plans • Grazing agreements, closures, etc. • Other	• Intercropping • Agro-forestry in crop or grazing systems • Afforestation and reforestation • Mulching and crop residue • Crop rotation • Fallowing • Low till • Composting/green manure • Integrated pest mgt • Vegetative strip cover • Contour planting • Re-vegetation of rangelands • Integrated crop-livestock systems • Woodlots • Alternatives to woodfuel • Sand dune stabilization • Other	• Terraces and other physical measures (e.g., soil bunds, stone bunds, bench terraces, etc.) • Flood control and drainage measures (e.g., rock catchments' water harvesting, cutoff drains, vegetative waterways, stone-paved waterways, flood water diversion, etc.) • Water harvesting, runoff management, and small-scale irrigation (shallow wells/boreholes, micro ponds, underground cisterns, percolation pits, ponds, spring development, roof water harvesting, river bed dams, stream diversion weir, farm dam, tie ridges, inter-row water harvesting, half-moon structures, etc.) • Gully control measures (e.g., stone checkdams, brushwood checkdams, gully cut/reshaping and filling, gully revegetation, etc.) • Other