9/Sep/2017
Ordos International Conference and Exhibition Center
UNCCD/COP13

Sustainable Land Management: its Technologies and Approaches

1. SLM: Sustainable Land Management
2. Our study on the effects of SLM
3. Innovating SLM framework

Prof. Atsushi Tsunekawa
Arid Land Research Center
Tottori University
tsunekawa@alrc.tottori-u.ac.jp

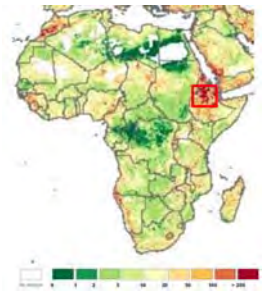
1. Sustainable Land Management (SLM)

- In document ICCD/CRIC(11)/INF.3, SLM was defined as "the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions''.
- This definition, originating from the United Nations Earth Summit in 1992, presents SLM as a holistic approach to achieving long-term productive ecosystems by integrating biophysical, sociocultural and economic needs and values.
- The conceptual framework for land degradation neutrality (LDN), as developed by the SPI (ICCD/COP(13)/CST/2), considers SLM one of the main mechanisms to achieve LDN.

SLM Technologies and Approaches

- SLM technology is defined as an agronomic, vegetative, structural, or management measure applied in the field.
- SLM approach is defined as the ways and means used to promote and implement a given SLM technology, whether through a project, an indigenous system, or a local initiative. (WOCAT)

2. Our study on the effects of SLM Upper Blue Nile Basin, Ethiopia



Severe water erosion

Soil erosion problems

Onsite

Land destruction by gully
Decrease in soil fertility by sheet erosion

Offsite

Sediment discharge to rivers, water pollution
Declined dam function by sedimentation

Soil and water conservation measures

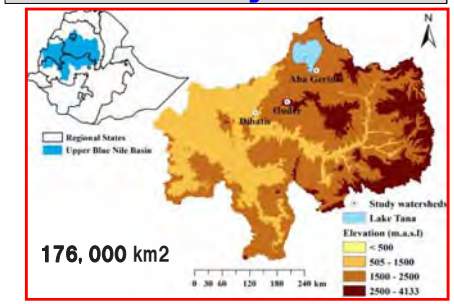
Stone bund and trench

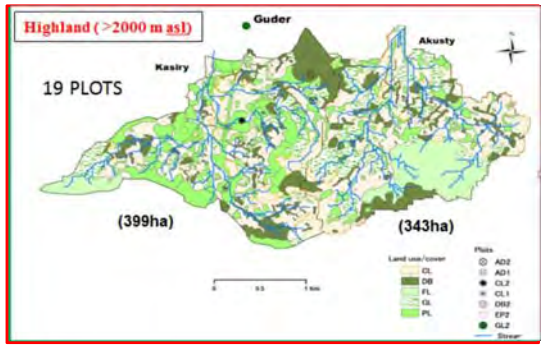
Gabion for gully

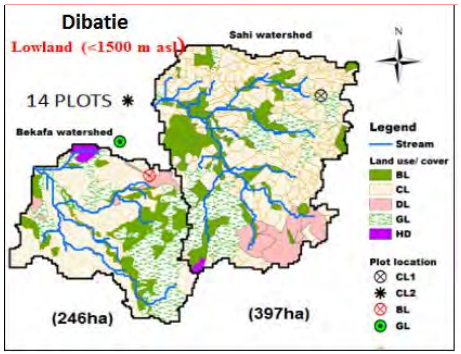
Project summary

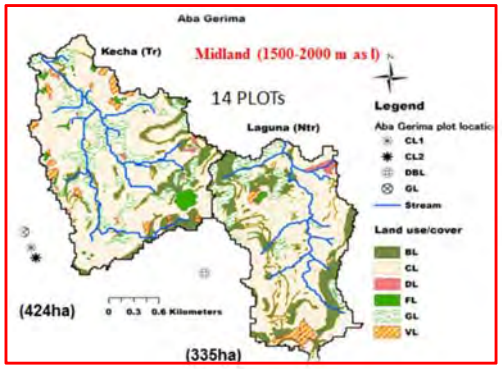
Project title	Land management to mitigate soil erosion in the Blue Nile Basin
Principal institute	Arid Land Research Center (ALRC), Tottori University, Japan
Collaborating institute	Bahir Dar University (BDU), Bahir Dar, Ethiopia
Principal investigator	Professor Atsushi Tsunekawa, ALRC, Tottori University, Japan
Project period	October 2013 to March 2018
Source of funding	Grants-in-Aid for Scientific Research (KAKENHI) from Japan Society for the Promotion of Science (JSPS), Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan

Three study sites

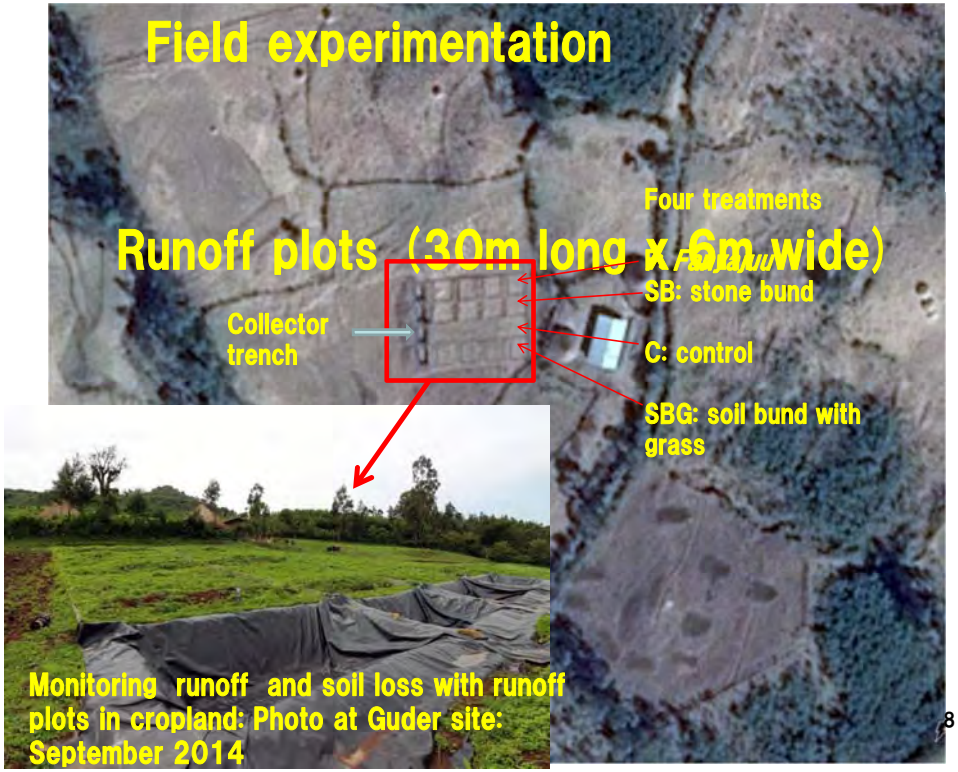






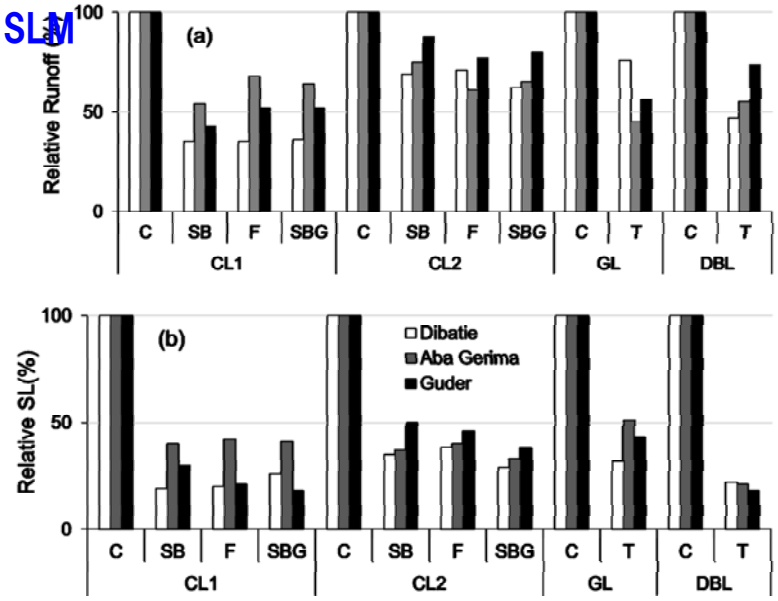


CL: cultivated land: AD: *Acacia decurrens*: DB: Degraded bushland: EU: Eucalyptus plantation: GL: Grazing land



Effects of SLM

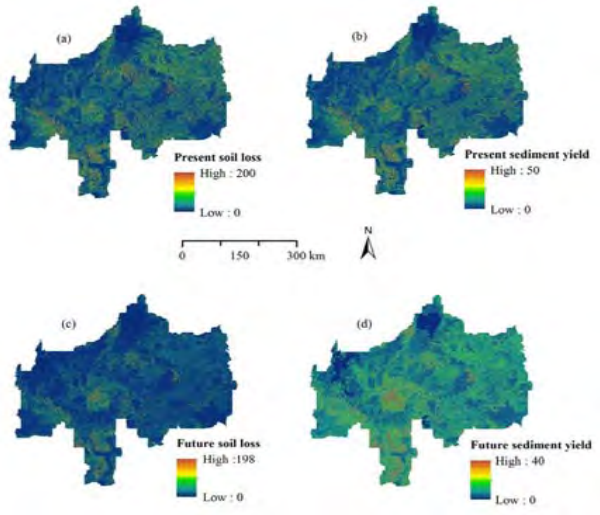
C: control
CL: cultivated land
SB: stone bund
F: *Fanyajuu*
SBG: soil bund with grass
T: trench



Assuming relative values for control plots as 100%, SLM measures (SB, F, SBG, and T) reduced runoff by 12% to 65%, and soil loss by 49% to 82%.
Generally the SLM measures perform relatively better at Dibatie compared to the other two sites.

Targeted SLM interventions in UBNB could reduce SY by 61.4% (Haregeweyn et al., 2017)

If appropriate soil and water conservation practices targeted ca. 79% of the area with moderate to severe erosion (>15 t ha-1 yr-1), the total sediment yield from the basin could be reduced by ca. 61.4%.



Soil loss and sediment yield (t ha-1 yr-1) maps of the Upper Blue Nile River basin: a, present (2016) soil loss; b, present sediment yield; c, future (2025) soil loss and d, future sediment yield

Farmers in Guder are benefit conscious for decision SLM (Zerihun et al. 2016)

Motivation type	Proportion of farmers that mentioned as primary (%)	Mean score	Std. Dev.	Score rank
To generate cash income from charcoal production	84.6	6.82	0.48	1
To improve soil fertility of cultivated lands	75.3	6.01	0.59	2
As soil and water conservation mechanism	52.5	4.16	1.36	3
To serve as source of firewood	38.3	3.56	1.37	4
As source of construction material	23.5	3.36	1.02	5
As source of animal feed (small ruminant and cattle)	16.7	2.41	1.12	6
To serve as farm boundary	9.3	1.80	1.22	7

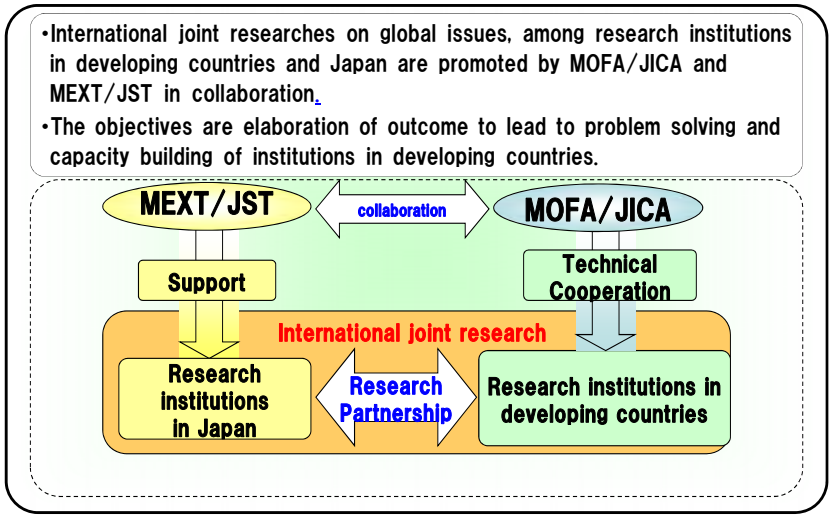
Gender unnutrality in access to agricultural extension services from survey in 923 farmers East Gojjam (Elias et al., 2015)

Participation level	Village 1(Enerata)		Village 2 (Wonka)		Village 3(Kebi)	
	MHHs	FHHs	MHHs	FHHs	MHHs	FHHs
Model farmers (A)	146	1	75	1	42	0
Copy (follower) farmers (B)	548	27	169	8	279	10
Traditional farmers (C)	229	64	252	157	39	30
Total	923	92	496	166	360	40

SATREPS-Ethiopia project summary

(a) Title of project	Development of next-generation Sustainable Land Management (SLM) framework to combat desertification
(b) Research period	5 years (April 2017-March 2022)
(c) Funding	Jointly by Japan Science and Technology Agency (JST) and JICA
(d) Principal investigator	Professor Atsushi Tsunekawa, Tottori University
(e) Local oordinator	Dr. Enyew Adgo, Bahir Dar University, Ethiopia
(f) Collaborating institutes in Japan	Tottori University Shimane University The University of Tokyo
(g) Counterpart country	Federal Democratic Republic of Ethiopia
(h) Counterpart institutes in Ethiopia	Bahir Dar University Amhara Agricultural Research Institute Water and Land Resource Center Ministry of Agriculture

Science and Technology Research Partnership for Sustainable Development (SATREPS)



MEXT: Ministry of Education, Culture, Sports, Science and Technology

MOFA: Ministry of Foreign Affairs JST: Japan Science and Technology Agency

JICA: Japan International Cooperation Agency

3. Innovating SLM framework: Features of the next generation SLM

	Current SLM	Next generation SLM
Main purpose	Reduction of soil erosion	In addition to reduction of soil erosion, improving land productivity, improving livelihood, economic and social empowerment
Form of farmers' participation	In most of the cases, legally forced participation and unpaid work	Voluntary participation of farmers through economic incentives
Problems and issues	Lack of sustainability and autonomy	Developing elemental technology (SLM technology) and methods for upscaling it (SLM approach)

Conclusions

1. SLM is a tool to restore degraded land, and to achieve Land Degradation Neutrality.
2. Innovating SLM technologies/approaches is required to improve the sustainability in SLM.
3. Next-generation SLM
   - farmers-first: farmers' benefit
   - comprehensive: link restoration of land and improvement of livelihood