Building foundations for source-to-sea management: the case of sediment management in Lake Hawassa sub-basin of Ethiopian Rift Valley

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Why "source-to-sea approach" for natural resources management?

= The need for holistic approach to manage complex issues of natural resources management

= The current approaches have a common objective of 'integration' but most of them are critiqued for their limited emphasis on the social, economic and environmental linkages between land, freshwater coastal and marine systems

= This is a weakness the source-to-sea approach resolved.

- In this study, we re-contextualized the “source-to-sea” concept to an endorheic lake = “source-to- lake”

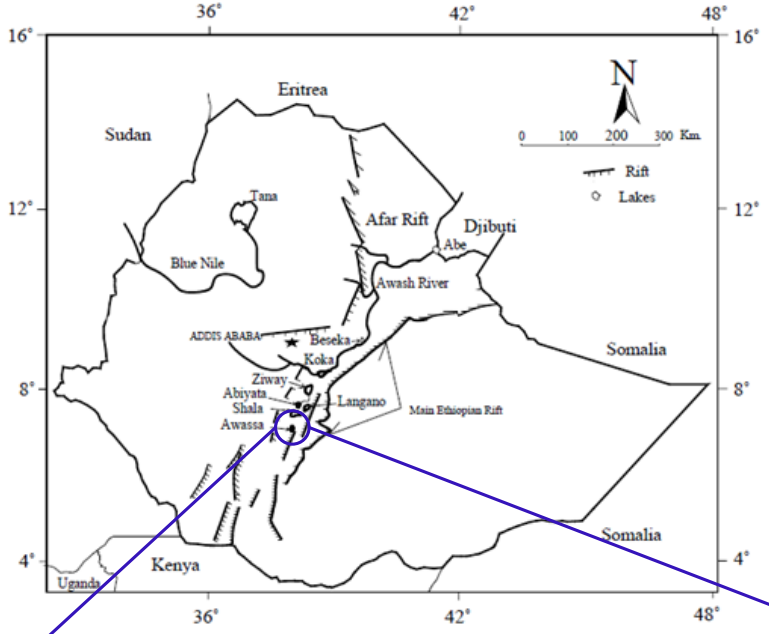
Here, particular focus was given on how this approach fitted to:

= the purpose of generating in-depth knowledge on sediment flows (characterise),

= the need for a more comprehensive stakeholder (engage) and governance analysis (diagnose), and

= formulation of a theory of change (design) toward sustainable management of the sub-basin.

Study area @ Ethiopian Rift Valley Basin



Research method

= A combination of primary data, meta-analysis, systematic review, interviews, focus group discussion, field visits, and consultation of the stakeholders was employed

Results

Hill sides

Gullied agricultural lands

Actively eroded water ways

Buffer Zones

Lake Hawassa

Three continuums were identified

Characterization: source, magnitude, and impact of sediment erosion in the drainage area

In terms of gully erosion, which is the main source of sediment flow into Lake Hawassa, there exist

= more than 750 segments of active gullies that dissect the landscape = with a total linear length of more than 668 km = mainly concentrated on the western side = an estimated annual sediment yield of 68,575 m^3/yr

= about five-fold of the sediments generated by sheet and rill erosion (=14,039 m^3/yr) and

= 3.4 times the amount of solid waste leaking into the environment from Hawassa City (=20,166 m^3/yr).

= Due to sedimentation, Lake Hawassa has lost an estimated 4% in its storage capacity

Engage: mapping the stakeholders

Categories	Role/position/interest/concern
Primary stakeholders	
Farmers	Farmers along the continuum who have lost arable and grazing lands due to gully erosion and their economic productivity is reduced due to sheet and rill erosion
Fishermen	The lake provides a source of income for this group of stakeholders and any ecosystem alteration due to sedimentation affects their livelihoods
Hotel owners	Hotels and resorts around the lake whose business activities are connected to Lake Hawassa remaining an attractive location
Boat renters and lakeside enterprises	Owners and operators of tourist boats and other lakeside businesses that are dependent on scenic lake values for attracting customers
Fish sellers and consumers	Small businesses trading in fish caught from Lake Hawassa as well as the consumers
Urban community	Local residents that rely on the lake for fish protein and enjoy the lake's recreational values
Rural community	The lake is a source of fish protein, water supply, clothes washing
Targeted stakeholder	
Farmers	Farmers, mainly in the upper catchment, whose inappropriate land management practices contribute to sediment erosion
Sand miners	Legal and illegal extraction of sand resources along the continuum that exacerbates gully erosion by excavation in gully beds
Firewood traders	Retailers and wholesale traders in the cities/towns are indirectly encouraging deforestation through demand
Contractors in the construction industry	The urban areas have seen substantial growth, leading to increased demand for construction materials, many sourced from mountainous areas upstream of the gully network. Heavy trucks drive through the gully system that, in turn, triggers further erosion

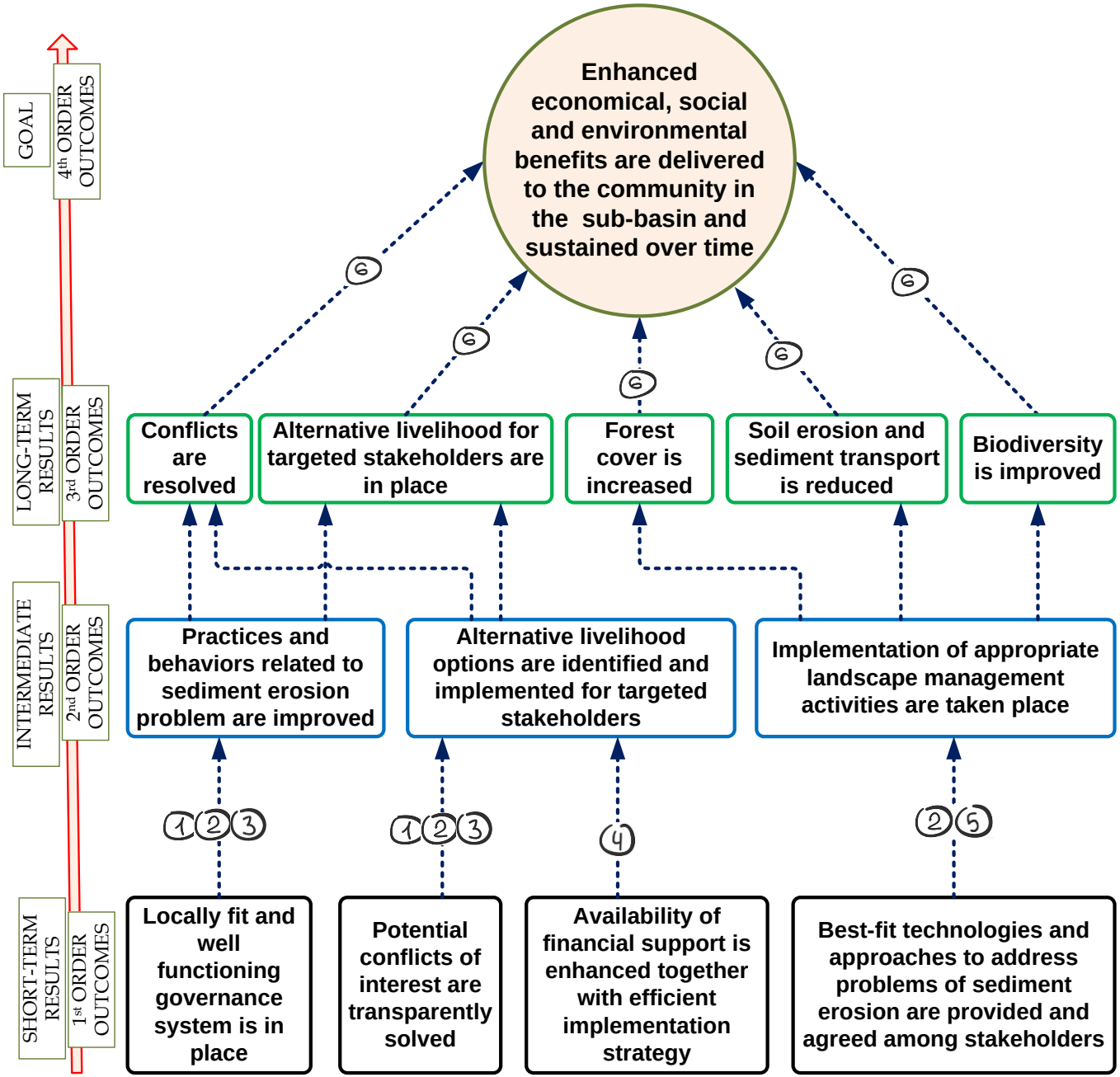
Engage: mapping the stakeholders ctd…

Categories	Role/position/interest/concern
Enabling stakeholders	
Ministry of water, energy, and irrigation	Federal mandated institution to manage water and energy resources
Basin development authority	Federally mandated institution to implement coordinate water resource use and management, including IWRM at country level
Rift Valley Lakes Basin Office	Federally mandated institution to implement IWRM at a local level in the Rift Valley Lakes Basin
Agriculture, land, and natural resources offices	Regional state-mandated institution to manage agricultural and natural resources management in the basin
Environmental authority	Regional state-mandated institution to protect the lake from pollution
Municipality	Regional state-mandated for solid waste management and lake protection
Culture & tourism bureau	Regional state-mandated institutions for developing the tourist sector
Investment Bureau	Regional State mandated institutions for governing the investments
Hawassa University	Higher education institution that provides technical support
Alliance of friends of Lake Hawassa	Volunteer group comprised of institutional representatives
Supporting stakeholder [ctd…]	
External stakeholder [ctd…]	

Diagnose:

Land use type	Slope category according to the **rural land use policy** ranges for comparison											
	0-3%		**3-8%**		**8-15%**		**15-30%**		**30-60%**		**>60%**	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Intensively Cultivated	28,313	51	26,909	79	15,299	72	**15,156**[a]	69 %	**6,720** [b]	71 %	**840** [c]	61 %
Moderately Cultivated	1,404	3	1511	4	412	2	103	0	2	0	-	-
Shrubland	3,937	7	2,332	7	2,530	12	2,662	12	554	6	40	3
Riparian Vegetation	822	1	-	-	-	-	-	-	-	-	-	-
Grassland	757	1	1,759	5	2,208	10	3,034	14	1,014	11	55	4
Urban Area	2,987	5	1,086	3	200	1	83	0	30	0	0	0
Forest	17	0	135	0	375	2	811	4	1138	12	430	31
Marshland	7,038	13	-	-	-	-	-	-	-	-	-	-
Water Body	9,719	18	-	-	-	-	-	-	-	-	-	-
Total=	**54,994**	**38 %**	**34,079**	**24 %**	**21,178**	**15 %**	**22,019**	**15 %**	**9,521**	**7 %**	**1,374**	**1 %**

Design: the theory of change



Discussion

= The S2S approach offers a wider perspective of an issue

= The S2S approach addresses the heterogeneity of viewpoints across continuums

= It identifies key issues at the early stage of the planning process

= Critical junctures or leverage points are identified before implementation to enable more targeted interventions

Conclusions and recommendations

= Environmental planning for governance and management of natural resources has long been a challenge for development actors spanning from global to community levels

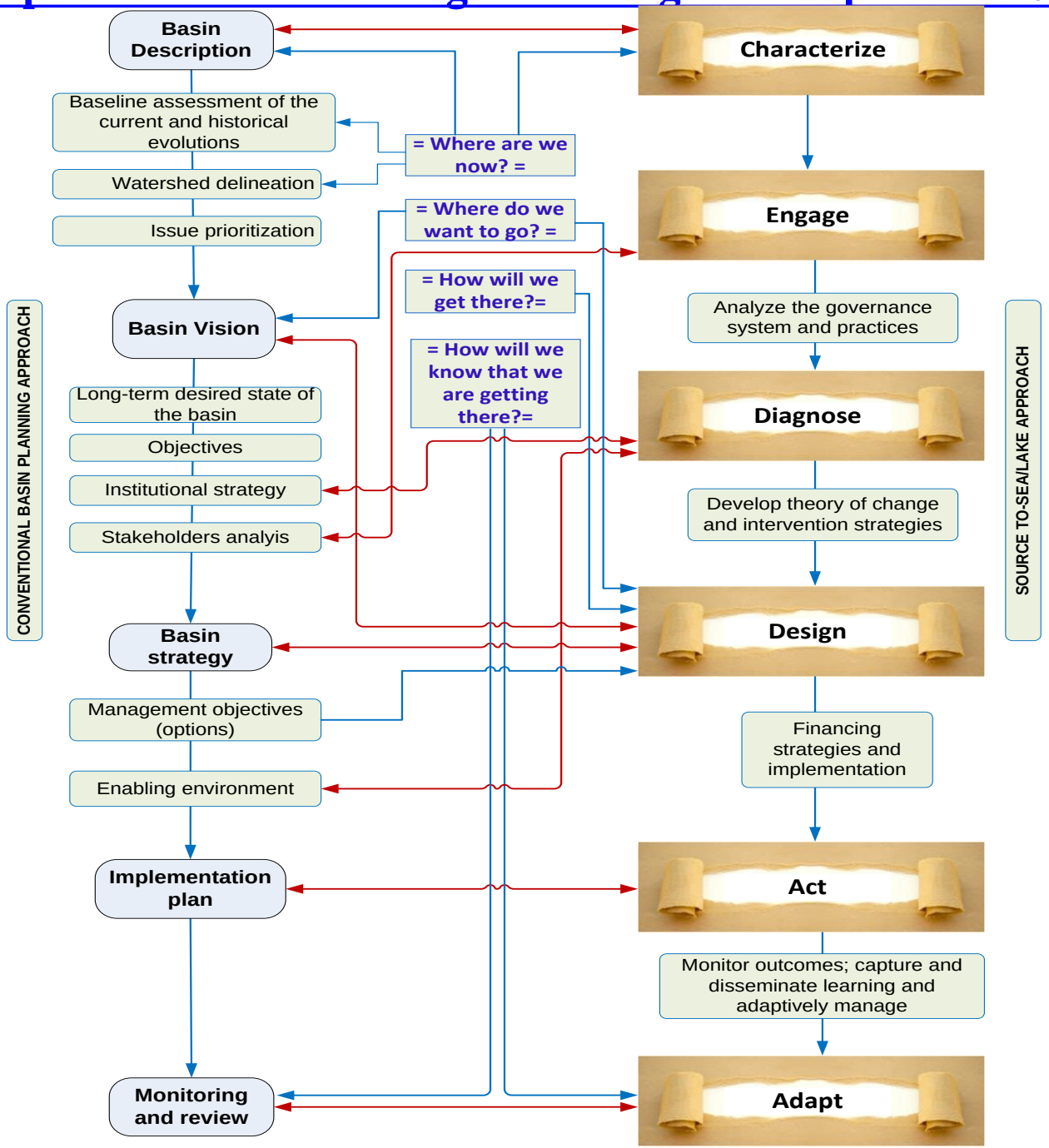
= One of the key challenges is planning capacity and intervention design, that are responsive to the complexity of social, political, environmental, and economic dimensions of water and land resource issues, risks and threats

= S2S approach to the planning and design of appropriate intervention strategies to solve significant water related problems

= training on how to work with and across similar water and land resources management approaches is needed to unlock the full value of the approach

S2S beyond this study…

Further adoption of S2S for Strategic Planning of Ethiopian Rift Valley Basin



Thank You!