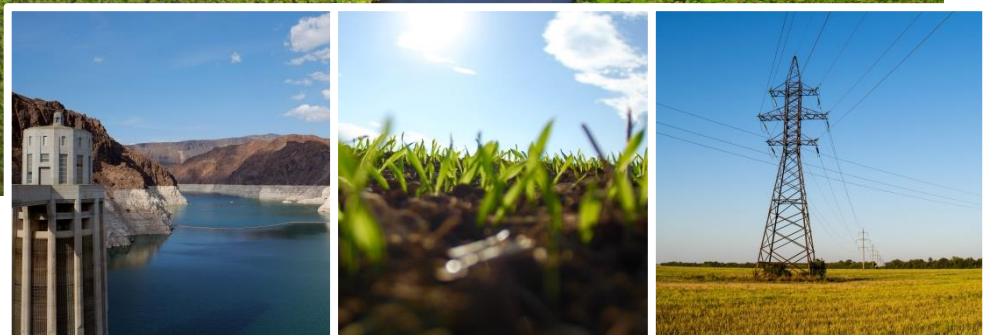




Nexus Trade-offs and Strategies for Addressing the Water, Agriculture and Energy Security Nexus in Africa

PHIL RIDDELL - ADDIS ABABA 25TH FEBRUARY 2016



OUTLINE

1. Background to the Study
2. Stakeholders and Perceptions of Security
3. A Draft Intervention and Impact Typology For Nexus Water Infrastructure
4. Research
5. Analysis and Use of the Results
6. Conclusions and Recommendations
7. Next Steps

BACKGROUND TO THE STUDY

By addressing:

“Nexus challenges, trade-offs, possible synergies and project opportunities relevant for Africa (and its regions) in general, and two selected river basins in particular, namely: the Lake Victoria and Volta River basins.”

The study was intended to produce:

“An action oriented outlook for optimising multi-purpose water infrastructure and establishing the enabling environment to develop and implement such infrastructure”

and

“A Rapid Assessment Framework”

BACKGROUND TO THE STUDY – approach taken

1. Intellectual orientation by the development of a Draft Intervention and Impact Typology For Nexus Water Infrastructure.
2. Target basin profiles
3. Literature review
4. Stakeholder consultation
5. Case studies
6. Analysis of results
7. Real time peer review by Guy Pegram of Pegasys:<http://pegasys.co.za/>

STAKEHOLDERS AND PERCEPTIONS OF SECURITY

- **State Entities**, which are concerned about:
 - secure factors of production and output markets in order to maintain economic growth and in the case of Africa, to catalyse socio-economic transformation;
 - securing peace and stability in order to avoid military confrontation;
- **Populations**, which are concerned about:
 - secure family lifestyles in terms of shelter (homes and warmth), water supply and sanitation;
 - income security based on a choice of sustainable livelihoods and equitable and reliable access to the means of production.
- **The Private Sector**, which is concerned about:
 - Secure access to the factors of production
 - Secure markets and opportunities
- **The Environment**, managers of which are concerned about:
 - secure biodiversity, as a result of sustainable habitats;
 - sustainable ecosystem services.

STAKEHOLDERS AND PERCEPTIONS OF SECURITY

- ***Water Security***: is “the availability of and access to sufficient water for human and ecosystem use.”
- ***Agricultural security***: is “the availability of affordable agricultural commodities necessary for healthy, productive lives and profitable agricultural value chains.”
- ***Energy security***: is “access to clean, reliable and affordable energy for cooking, heating, lighting, communications and productive uses.”

STAKEHOLDERS AND PERCEPTIONS OF SECURITY

- **trade-offs** whereby a preferred objective is traded for another
- **compromises** whereby a result which is less than perfect for one or more stakeholders is accepted by all; and
- **synergies** where one intervention covers multiple Nexus objectives and as such would be the way that a “win-win-win” can be achieved

A DRAFT INTERVENTION AND IMPACT TYPOLOGY FOR
NEXUS WATER INFRASTRUCTURE

Security Pathways Involving Water Infrastructure

WATER SECURITY	AGRICULTURAL SECURITY	ENERGY SECURITY
large storage dams	intensification	large hydropower dams
water harvesting	spatial expansion	thermal power stations
irrigation on demand	crop diversification	mini-hydro
increased irrigation water use efficiency		run-of-river schemes
		tidal power stations
longitudinal rather than transverse water allocation for irrigation		
natural infrastructure		

A DRAFT INTERVENTION AND IMPACT TYPOLOGY FOR NEXUS WATER INFRASTRUCTURE

						economic growth and socio economic transformation						
						peace and stability						
						family and lifestyle						
						income						
						factors of productivity						
						markets and opportunities						
						landscape productivity						
						biodiversity						
MEASURE	TRADE OFF, COMPROMISE OR SYNERGY	RELEVANCE TO NEXUS COMPONENT			IMPACT							
					state entities		population		the private sector		environment	
		water	agriculture	energy	comment	security dimension	comment	security dimension	comment	security dimension	comment	security dimension
Measures to increase water security												
large storage dams	trade off	WINNER	potential WINNER if the water is used for irrigation, and even better if the dam increases fishery opportunities	LOSER if no power is generated, or if power is only a collateral benefit	increased water for production	positive	increased water for domestic use	positive	sustainable access to adequate quantities of water of suitable quality is a prerequisite for investment in any water dependent industry	positive	loss of landscape and streamflow, and possible morphological problems downstream	negative
					potential threat if downstream riparian rights are not honoured, or if any transboundary costs and benefits are not properly shared	depends on governance	increased water for production means increased and more secure livelihood	positive			biodiversity threat due to possible gene pool limitations, spawning runs and disrupted terrestrial migration routes	negative
water harvesting	trade off	WINNER	potential WINNER if the water is used for irrigation	LOSER as bulk water opportunities are foregone	increased water for production	positive	increased water for domestic use	positive			could increase landscape productivity	positive
							increased water for production means increased and more secure livelihoods	positive			but equally, could reduce streamflow	negative
											could provide a habitat benefit	positive
increased irrigation efficiency	trade off or synergy	WINNER, but only if if saved water is reallocated wisely (ie longitudinally not transversely)	potential WINNER if the saved water is used for irrigation, and if the more efficient use of water leads to yield increases and improved uniformity of distribution	LOSER because increased precision needs more energy (trade off), but potential WINNER if the saved water is reallocated via hydropower installations (synergy)	increased water for production	positive	increased water for domestic use	positive	if increased energy efficiency increases the reliability to supply, energy dependent commercial entities will benefit; but only if the costs of their own efficiency increases do not compromise profits	potentially positive		positive
					possible increase in transboundary flows	positive	increased water for production means increased and more secure livelihoods	positive			if saved water is reallocated wisely streamflows will increase and riverine/wetland habits will thrive (subject to water quality issues)	positive
irrigation on demand	trade off	WINNER, because withdrawals for irrigation will be minimised	potential WINNER because more water is available for irrigation expansion and every farmer gets the water he or she needs and has independent choice of farming system	LOSER, because irrigation on demand needs more energy	increased water for production	positive	increased water for domestic use	positive	"irrigation on demand" is another way of saying water security to any agribusiness dependent on irrigation directly or indirectly	positive		positive
					possible increase in transboundary flows	positive	increased water for production means increased and more secure livelihoods, and for the irrigating farmers, there is more control over farming system choices	positive				positive
longitudinal water allocation	trade off	WINNER, because distribution losses will be reduced and more water will remain available for non-consumptive uses in-stream	LOSER, because irrigation development potential will be sacrificed	potential WINNER, because more water will be available for energy generation	depends on the trade off weighting between water and agriculture	neutral to positive	increased water for domestic use	positive	increases water availability for industrial parks/areas in or adjacent to urban areas that have developed around rivers	positive	reduced landscape change but not increase in productivity	neutral
					significant possibility of increased transboundary flows	positive	depends on the trade off weighting between water and agriculture	neutral to positive			streamflows maintained	positive
natural infrastructure	synergy	WINNER, because supply of water is increased	WINNER, because there is more water available for agriculture, including fisheries	potential WINNER because - depending on local hydrology, there may be more water for energy production	increased water for production	positive	increased water for domestic use	positive	sustainable access to adequate quantities of water of suitable quality is a prerequisite for investment in any water dependent industry	positive	possible increase in landscape productivity	positive
					possible increase in transboundary flows	positive	increased water for production means increased and more secure livelihoods	positive			possible habitat enhancement and new habitats such as manufactured wetlands	positive

RESEARCH – target basins

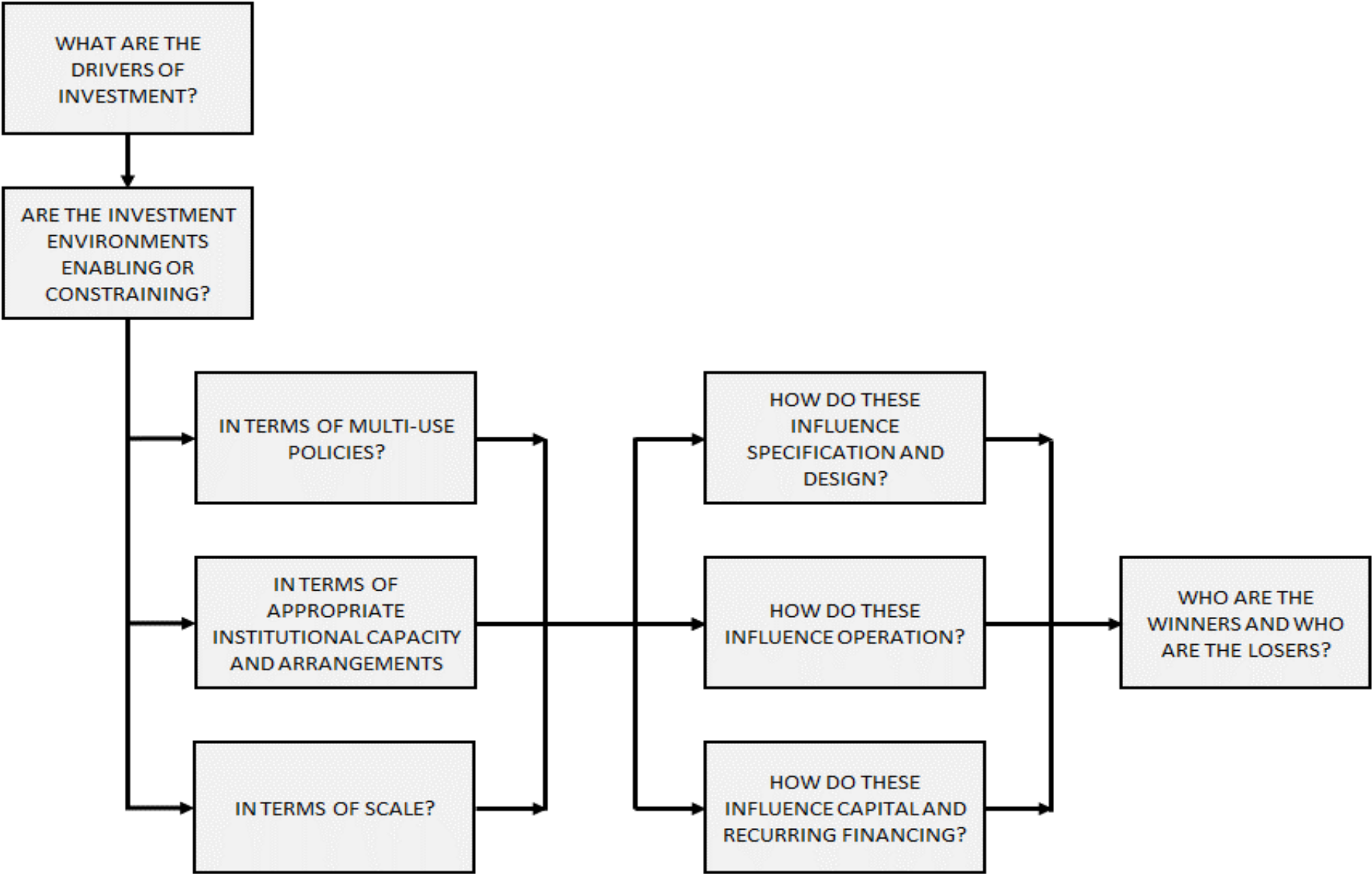
Volta River Basin, key issues:

- floods
- energy inadequacies
- irrigation expansion
- (possibly) demands accruing to urbanisation

Lake Victoria Basin, key issues:

1. energy inadequacies
2. irrigation expansion
3. wetland degradation
4. droughts and floods
5. water resource availability

RESEARCH – literature review structure



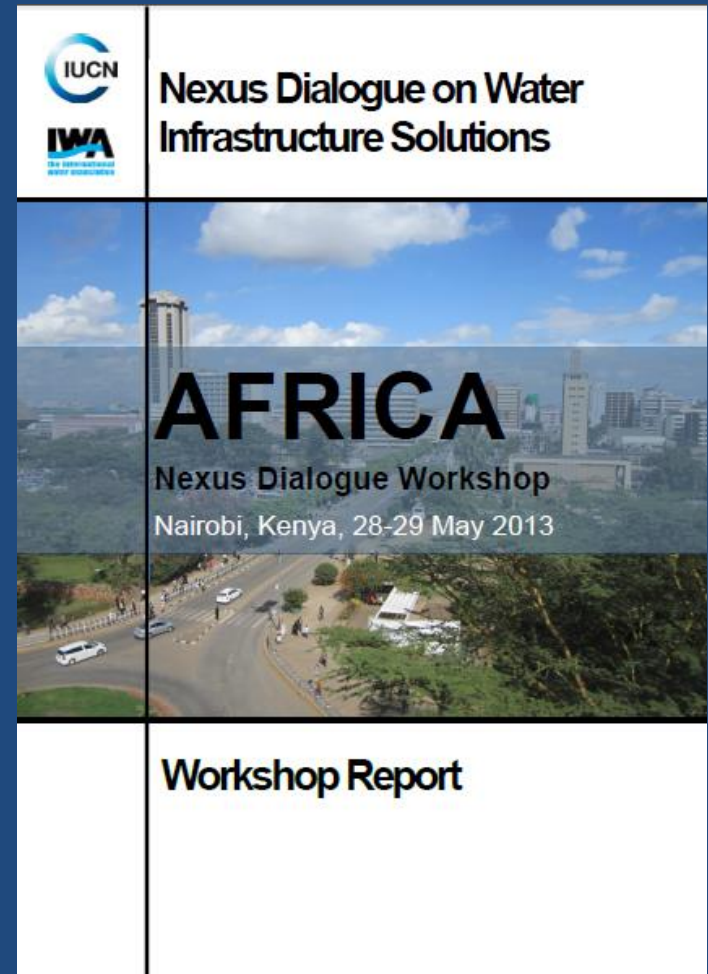
RESEARCH – case studies

From the Nexus Dialogue Africa May 2013 Workshop:

- The Lake Victoria Basin
- The Niger River
- Orange Senqu
- Pangani

From other sources:

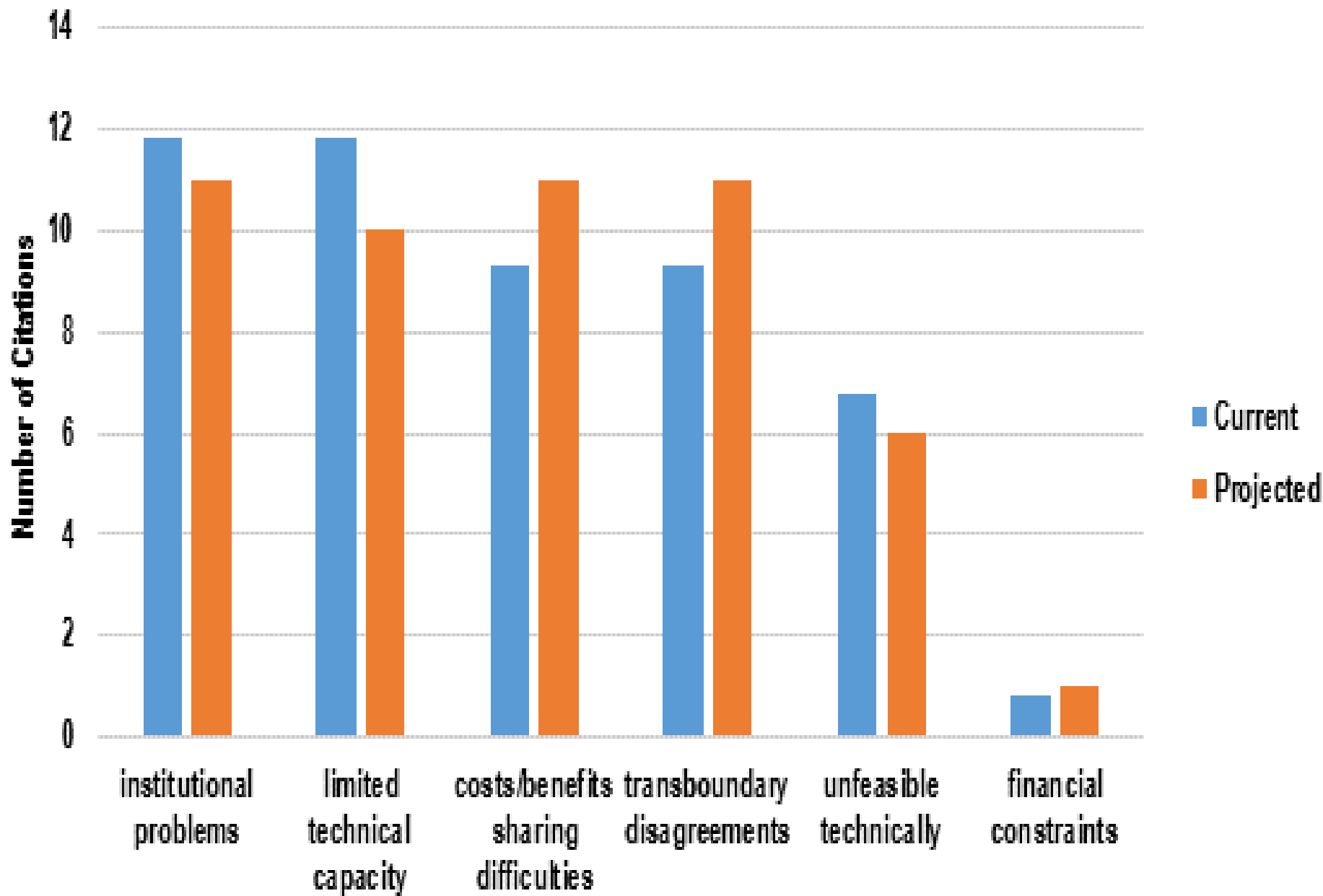
- The Zambesi River
- The Volta River
- The Blue Nile



According to stakeholders that responded to the questionnaire:

- in the short term (within five years) competition will increasingly emerge between bulk water and agriculture, and between agriculture and energy.
- But within fifteen years, difficulties with water versus energy are also expected.

RESEARCH - stakeholders



ANALYSIS AND USE OF THE RESULTS

EMERGING THEMES

- Silos and Linear Thinking
- Political Economy
- Political implications of choice
- “Donor Drag”

THE RAPID ASSESSMENT FRAMEWORK, for a given infrastructure intervention scores:

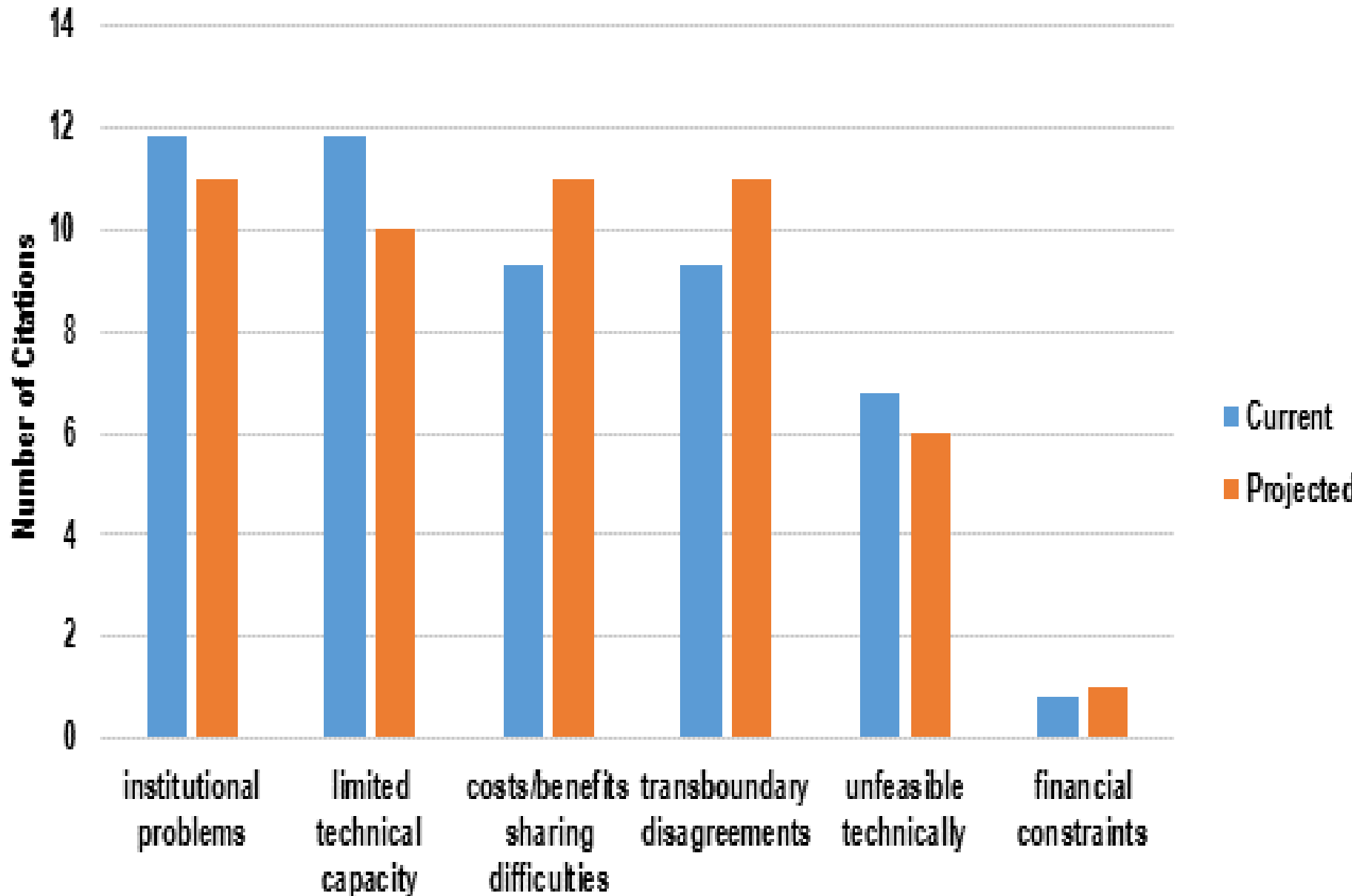
- geography, politics and development trajectory
- technical characteristics
- economics

and allows alternatives to be ranked.

ANALYSIS AND USE OF THE RESULTS – rapid assessment framework

PROJECT PROFILE					
Topic Cluster (from the ToR)	Question	Response			
geography and politics	Where is the infrastructure?	Lesotho			
	What is the development status of the country in terms of:				
	political system and stability?	Functional democracy, disrupted from time to time by political turf wars and protectionism			
	level of development?	Low to moderate, but with certain advanced elements such as state of the art resettlement modalities (where needed)			
	economic development trajectory?	Sub-optimal, not well defined and heavily constrained by silo thinking and political economy			
	main economic sector?	Agriculture, livestock, manufacturing, mining and remittance incomes (largely from miners in South Africa)			
	What is the natural resource endowment of the country in relation to:				
	water?	Large quantities of unallocated renewable water resources			
	agricultural potential?	Vast and undeveloped, at least in terms of non-traditional crops and value chain inputs			
	energy?	Considerable undeveloped potential in terms of both hydropower and bioenergy			
general information	What kind of infrastructure is it/will it be?	A combination of natural and built infrastructure increasing bulk water supply and contributing to a value chain approach to catchment restoration, management and productivity			
	What sectors does/will the infrastructure serve and how:				
	water?	Increased supply of water for households, industry, agriculture and transboundary trade			
	agriculture?	The investment will increase the availability of water for small-scale, high value crop production, including irrigated fodder to take the strain of natural grazing areas			
	energy?	By increasing the supply of water for hydropower, and by mobilising the considerable bioenergy potential in the country's agriculture and rangeland management sectors			
	What were/are the drivers of investment?	Economic growth, socio-economic transformation driven by catchment restoration and management, and investments in non-traditional value chains			
	What were/will be the attributable Costs in terms of:				
	finance and economics?	Currently unallocated budget of €78 mill in grant aid, and up to approximately € 300 mill in soft development bank loans			
	social issues?	Small and highly localised if any			
	the environment?	Small and highly localised if any			
	What are/will be the attributable Benefits in terms of:				
	finance and economics?	Yet to be determined			
	social issues?	Increased and diversified livelihoods, especially in the rural areas			
	the environment?	Urgently needed, major benefits by securing the sustainability and productivity of the Southern Africa water tower			
	What were/will the sources of finance	European Union grant aid and leveraged European Investment Bank soft loans			
MULTI-CRITERIA ANALYSIS					
TOPIC CLUSTER (from ToR)	QUESTION	RESPONSE	SCORE -1 0 +1	WEIGHT	RESULT
policies and institutions	Was or will the investment be enabled or constrained in terms of:				
	multi-use policies	Enabled as a result of the proposed demand driven, district level disbursements proposed will avoid the problems of silo thinking and limited multi-purpose investment appraisal capacity at the centre	1	0.75	0.75
	appropriate institutional capacity and arrangements?	Enabled because of the decentralised approach, which includes comprehensive capacity building	1	1.20	1.20
	scale?	The programme is multi-scale as opposed to scale defined	1	1.50	1.50
	How did or will these factors influence:				
	specification and design?	Not significantly because of the heterogeneity of the programme	0	0.50	-
	operations?	Potentially beneficially because of the decentralised approach	1	1.00	1.00
	capital financing?	Favourably because of the ability of the grant support to lever and indeed soften the loan financing	1	1.50	1.50
	operational financing?	To soon to tell	0	1.50	-
		nominal	1.1	0.50	0.55
benefits and trade offs	What is the actual or target cost/benefit ratio				
	Who are or will be the winners and losers?				
	state entities?	Depends on the amounts of political that is willingly expended, there may be some losers	0	1.50	-
	populations?	Increased, diversified livelihood opportunities	1	1.50	1.50
	business?	Potential winners, but this depends on response to new opportunities and the appetite of potential investors and any significant benefits are only assumptions at this stage	0	1.00	-
	the environment?	In macro terms, the environment is the principal beneficiary	1	1.50	1.50
TOTAL SCORE					9.50

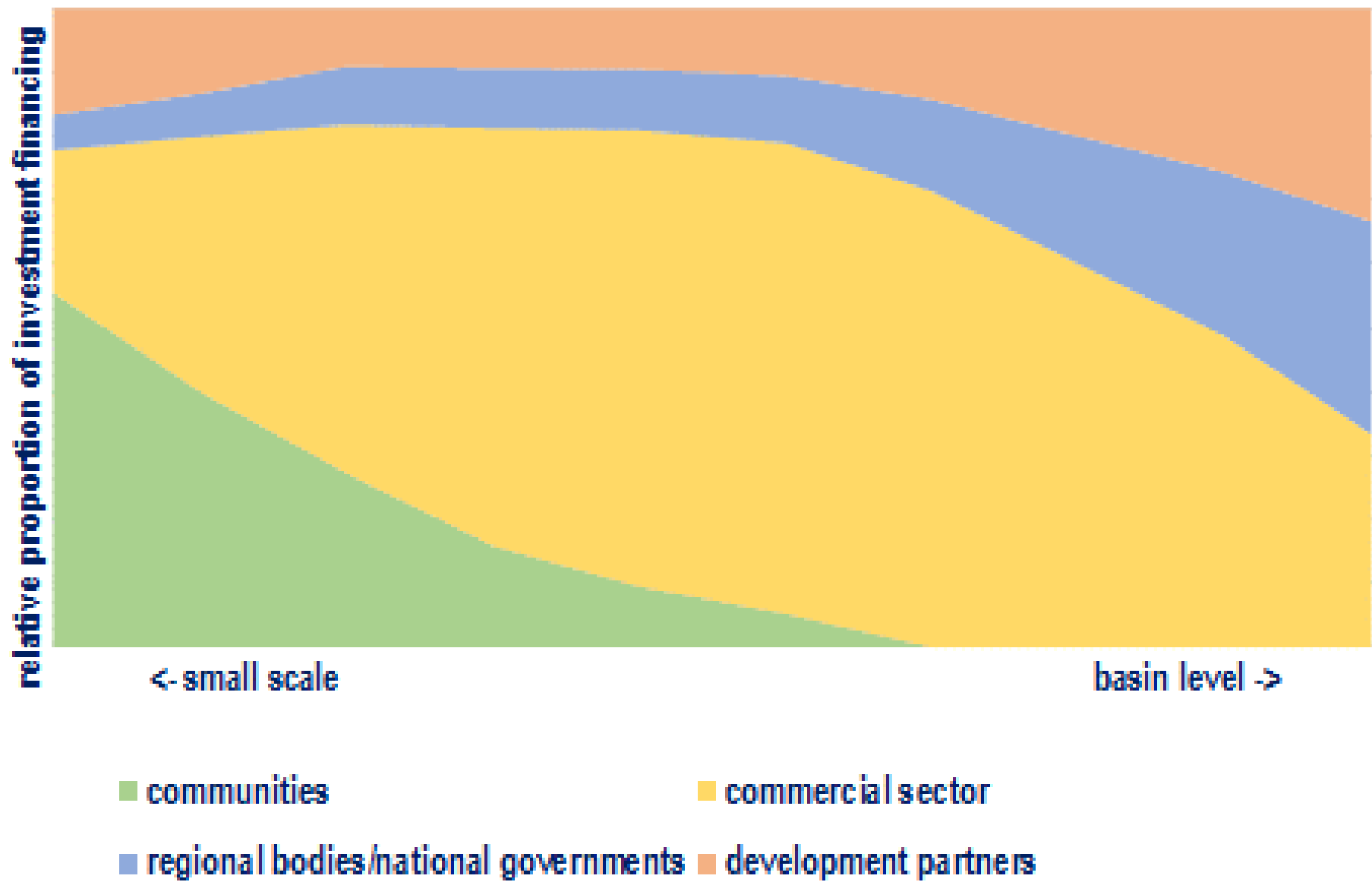
CONCLUSIONS AND RECOMMENDATIONS – priorities and options



ANALYSIS OF THE RESULTS – priorities and options

PRIORITIES	OPTIONS	RELEVANT THEMES	ASSOCIATED CHALLENGES
Institutional Problems			
A range of institutional issues constrain the mainstreaming or achievement of trade-offs, compromises or synergies as a means by which to resolve competition between the three nexus elements.	Institutions, including development partners need common objectives, and new metrics such as the economic efficiency of water or power use.	silos and linear thinking	Institutions might resist the introduction of common objectives and metrics as a result of perceived reputation risks, especially with respect to "non-traditional" business.
<ul style="list-style-type: none"> institutional and policy silos; national and development partner institutional arrangements that do not favour integrated thinking; 	Policy makers and planners need capacity building that goes beyond their day-to-day remit. This includes A new type of capacity building, including curricula at single subject university need massive diversification	silos and linear thinking	Expert professionals in one particular field are likely to resist being seen perceived, or even failing as "amateurs" in another.
<ul style="list-style-type: none"> limited technical capacity, especially with respect to lateral thinking; 	Improve employment packages at public institutions	political economy	Improved employment packages will be perceived as being unaffordable, but if implement could mitigate the challenge immediately above. There is also a risk that political economy will constrain options for enforcing improved service cost recovery or tariff based cross-sectoral subsidies.
<ul style="list-style-type: none"> slow institutional evolution; rigid development plans and associated milestones that are unable to adapt to new policy frameworks; 	Acknowledge importance of scale and go for decentralised planning and implementations	political economy	Smaller scales, decentralised approaches may reduce budgets and influence and hence may be resisted by large incumbencies.
		donor drag	Although scale advantages might be consistent with donor policy, they might be questioned if they reduce disbursement flow rates.
<ul style="list-style-type: none"> the fact that even the best economic or technical approaches may be inadequate to fix problems of political economy; 	Enforce regulations and cost recovery mechanisms	political economy	Politicians are tempted to see political advantage if they reduce fiscal and/or increased operational demands on their electorate
<ul style="list-style-type: none"> and power relationships (between national institutions and transboundary interests) that are unlikely to be softened in the short to medium term. 	Look for compromise	political economy	Planners may not see any advantage in the yielding of influence implicit in a compromised based solution, even if they understand the rationale involved

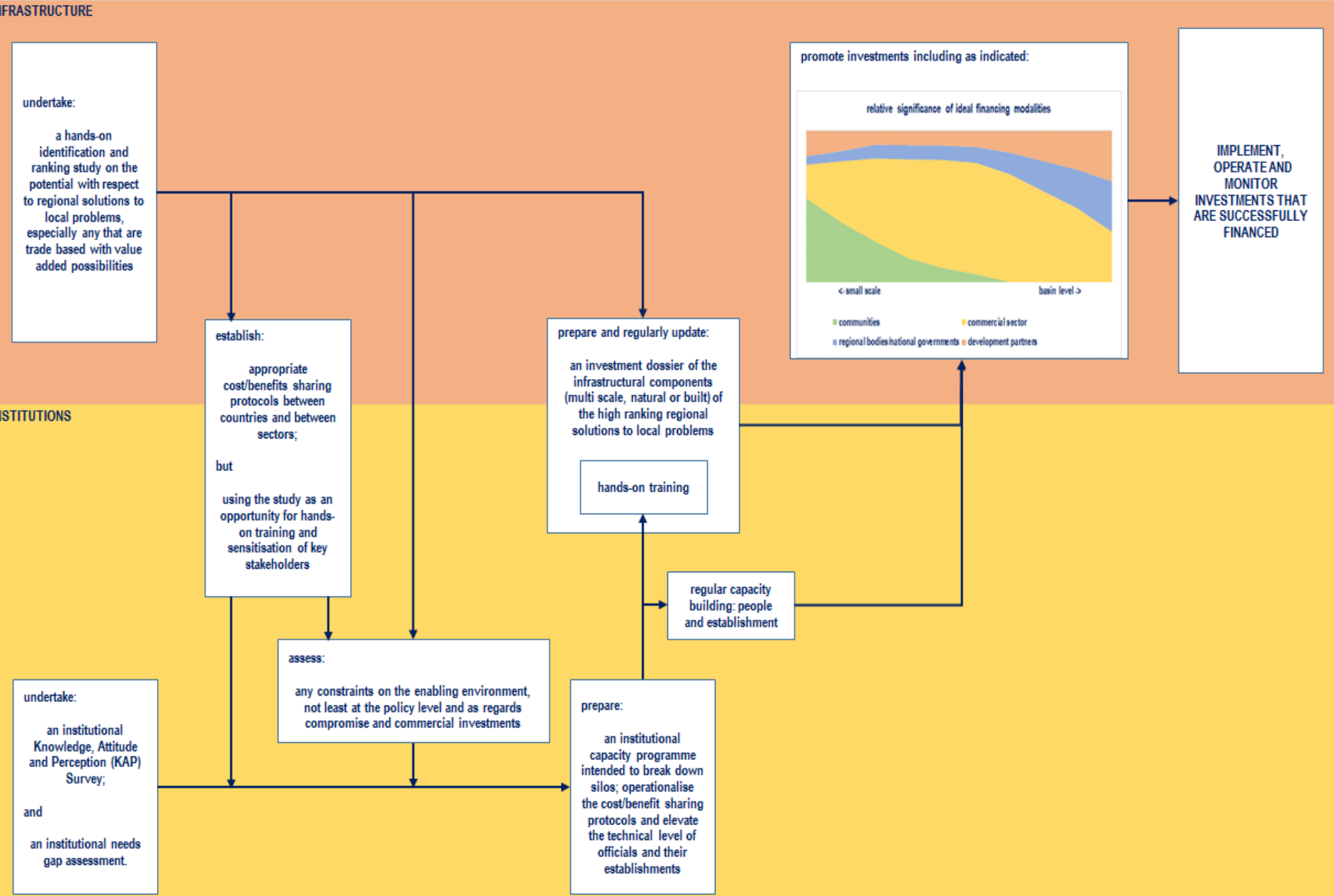
CONCLUSIONS AND RECOMMENDATIONS – funding trajectory



CONCLUSIONS AND RECOMMENDATIONS – “Basin Concept Notes”

PROFILE ELEMENTS					
Physical Features, Politics, Demographics and Development	Water, Agriculture and Energy Security	Key Nexus Institutions	Current Initiatives	Investment Opportunities for Natural and Built Infrastructure	Resource Mobilisation Options
Catchment area: 400,000 km ²	Although it has been estimated by FAO that the basin's entire irrigable area could be developed with only 75% of the annually renewable water, irrigation development has been generally minimal. Without irrigation however, rising populations will begin to result in widespread food insecurity	<ul style="list-style-type: none"> • Volta Basin Authority; but regulation is reportedly difficult at • West African Power Pool 	<p>In terms of the enabling environment:</p> <ul style="list-style-type: none"> • Ghana has a new irrigation policy, and a senior PPP policy which awaits a sector specific “junior” policy for the agricultural water management sector 	Localised investments in watershed rehabilitation based on a combination of community based investments in natural infrastructure and agricultural value chains which include small producers.	<ul style="list-style-type: none"> • Communities • Commercial Sector
Six riparian states; Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali and Togo, but the river flows mainly through just two of them: Burkina Faso and Ghana.		Communications between stakeholders is often limited and any resulting actions are uncoordinated.			<ul style="list-style-type: none"> • National Governments • Development Partners
Four of the six riparians are functioning democracies, Burkina Faso and Togo are regarded as emerging and transitional democracies respectively. But typically, VBA riparians are among the poorest, especially in the rural areas.		Data and information scope, quality and availability is reportedly low in the basin.			
	Demand for energy exceeds supply, especially in Ghana		<p>In terms of basin plans:</p> <ul style="list-style-type: none"> • VBA has developed a new Strategic Plan, 2015-2019 that would contribute to changes at the institutional and policy levels by developing a Water Charter and Master Plan incorporating nexus issues • VBA “Observatory for Water Resources and Related eco-systems”. • Flood and Drought Management Tools Project • Volta HYCOS Project 	Localised investments in agricultural value chains which include small producers and increase the agricultural productivity of water	<ul style="list-style-type: none"> • Communities • Commercial Sector
	Poor water quality is a problem and arises, not least, because of inadequate regulations and standards.				

CONCLUSIONS AND RECOMMENDATIONS – a possible road map



NEXT STEPS

Continuing discussion between IWA, IUCN and ICA:

1 COMMUNICATIONS:

- facilitate broader dialogue with stakeholders & sectors
- promote “nexus” opportunities with investors (public and private)
- produce a short summary of the full report to share more broadly and at higher levels
- Highlight nexus opportunities and drivers identified at different events (Africa and Stockholm Water Week, Energy fora, etc).

NEXT STEPS

2 IF POSSIBLE, ICA (with IWA and IUCN) WOULD LIKE TO:

- Focus in-depth on two strategic and demand driven basins
- work with RBOs and multi-stakeholders develop a portfolio of investment opportunities to full economic feasibility level
- present a ranked list of nexus investment opportunities to a range of investors
- roll out the approach with other RBO's for their uptake, development, and use to mobilise resources

THANK YOU

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the document can be found at:

http://www.waternexussolutions.org/contentsuite/upload/wns/all/Nexus%20Trade-off%20and%20Strategies_%20ICA%20Report_%20Jan%202016.pdf