



# trade-offs Nexus & strategies

for Addressing the Water, Agriculture and Energy Security Nexus in Africa



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# Water, Agriculture and the Energy Security Nexus in Africa

The “Nexus” is the place where water, energy and agricultural security intersect. The nexus can be used as a process for allocating and using resources to ensure water, energy and food security for an ever-growing population at a time of climate change, land use transformation, economic diversification and the need to make development pay.

Understanding the interdependencies between water, energy and food are especially crucial in African river basins – which are amongst the most vulnerable to climate change impacts, and other drivers as changing land use and increased urbanization. These dynamics will likely have consequences on water, energy and food security with wider economic development impacts and damage to ecosystems. In the next five years competition is likely to increase between bulk water supply and agriculture (the biggest water user), followed by competition for water between agriculture and energy. Within fifteen years, increased competition between water and energy is also expected.

Increasing competition and perceptions of insecurity lie behind the need for water, energy and agricultural trade-offs, compromises and synergies. The nexus concept provides a means by which stakeholders can deliver on all 3 sectors in the most economically efficient, socially equitable and environmentally responsible fashion.

Technical feasibility and water availability are not yet major constraints; but will be in the future. Countries need targeted and sustained nexus investments to protect their most important natural and built assets, seize their greatest water-related opportunities, and build resilience to water-related disasters and shocks.

## Investing in water-energy-food nexus infrastructure to shape sustainable growth

Investing existing scarce resources (financial and water) into single use infrastructure may only be useful short term and can lock-up resources in sub-optimal uses. Instead, similar investments in multi-purpose infrastructure can produce longer term benefits for water, energy and food, offering significant opportunities for building climate resilience. Today only some 2.5 % of investments in (water) infrastructure address this opportunity in Africa (ICA, 2012).

Active management of resources across the nexus requires analytical tools, holistic perspectives, innovation and continuous monitoring, assessment, and adaptation. Special consideration should be paid to the interlinkages between stakeholders and how they cooperate to maximize benefits, which will differ from

location to location as do challenges and opportunities. The scale of interventions and impacts that accrue are also crucial. The transboundary nature of most African water resources demands harmonized approaches among riparian states to evaluate trade-offs and optimize benefits to derive more impactful and resilience-building outcomes. Institutional coordination and capacity are essential. Dialogue needs to be centred on how these institutions will plan, finance and maintain infrastructure itself.

## Infrastructure Consortium for Africa Nexus study

Nexus investments will need innovative, visionary investors with long term strategies, including the use of blended finance options. To enable such strategies ICA, with IWA and IUCN, commissioned the study “**Nexus trade-offs and strategies for addressing the water, agriculture and energy security nexus in Africa**”. The study provides an overview of selected regional challenges and opportunities for multipurpose water infrastructure and outlines approaches for better integrating a multi-sectoral approach into infrastructure planning and development.

A range of possible infrastructural measures (e.g. storage dams, irrigation efficiency, rainwater harvesting, etc) was compiled for each nexus sector and assessed with respect to the security expectations of different stakeholders - state entities, populations (focusing on basin needs and income security), private sector and environmental managers. This provided an analysis which identified the trade-offs and benefits on the water, energy and agricultural sectors, as well as the positive and negative impacts on stakeholders.

The study also introduces a Rapid Assessment Framework (RAF) tool with which stakeholders can assess how current and upcoming infrastructure projects address nexus challenges. The RAF provides general information about current and future investments in infrastructure, and includes a suite of criteria capturing financing, costs and benefits, policies, benefits and trade-offs.



## Key findings

**1. Water can be considered the most cross-cutting nexus element.** Consequently, water sector infrastructure (both engineered and natural) is a strong entry point for multi-functionality.

**2. Silos and linear thinking are encountered behind and across national or regional boundaries and within institutions,** with the following implications:

- Single solutions to multiple problems remain elusive.
- Efforts to solve watershed problems are usually limited to watershed solutions, however this may be impossible as the problems may be actually at the problemshed level, such as lack of alternative employment opportunities which means over-reliance on activities that require excessive water abstraction.
- Value chains for water and energy increase the unit productivity of both; while increasing employment opportunities within the overall river basin and beyond.

**3. Political Economy** – which refers to the way that political forces affect the choice of economic policies, especially as to distributional conflicts **may lead to short term thinking for long term needs/solutions**, and can have the following implications:

- Politicians and planners compete over limited budgets and resources, leading to inefficient allocation.
- Rejection of productive comparative advantage in favour of politically convenient or affordable alternatives such as “self-sufficiency” introduces a third manifestation of water scarcity: namely political scarcity whereby water productivity (and sustainability) is sacrificed in favour of politically cheap solutions (which often have a short term focus).
- Political economy can constrain the establishment of regional solutions to local problems, which based on productive comparative advantage, would increase total factor productivity while increasing livelihood opportunities and differentiation along many market chains.

**4. Which is the most effective: trade off, compromise or synergy?** – A political compromise between agricultural self-sufficiency (as referred above) and agricultural sector makeovers could make investment in combined energy and agriculture infrastructure desirable rather than controversial – if correctly crafted and acknowledging a well regulated market.

**5. Donor Drag – is manifested in three ways:**

- Donors and development finance institutions policies lag behind the circulation of promising new policy frameworks, or may fail to adapt and work with them.
- Donors and development finance institutions operating in a particular country can have incompatible and even opposing objectives.
- At times donors and development finance institutions are unable or fail to adapt their products to actual challenges and opportunities: tending instead to stick with a “one size fits all” approach.

### WATERSHEDS AND ‘PROBLEMSHEDS’

The term “Problemshed” refers to the possibility that problems accruing to the management, availability or productivity of water within a catchment might be solved either outside of the catchment or by other sectors such as energy providers, land managers, and farmers.

For example, severe flooding has been a problem in the Volta River Basin while Burkina Faso is intending to transform itself into a major rice producer. Two possible problemshed approaches are that (1) rice basins can attenuate floods and as such represent a multi-purpose opportunity; and (2) the other is to invest scarce water in crops that make best use of available water, and import those that don’t. Not only would this increase the agricultural productivity of the water involved, the expanded and diversified livelihood opportunities along the market chain would contribute to economic growth and socio-economic transformation – ‘more jobs per drop’.

# Recommendations and Next Steps

The study outlines a roadmap for better integrating a multi-sectoral approach into infrastructure planning and development.

## RECOMMENDATIONS FOR NEXUS INVESTMENTS:

### Development Partners

(development banks and bilateral donors) – as scale increases, the focus should be on policy and institutional measures needed to establish an enabling environment for multi-purpose infrastructure, especially for large scale and transboundary basin level investments.

### Regional Bodies and National Governments

should be involved in the counterpart funding of both capacity building for and investments in multi-purpose infrastructure. National governments (and decentralised structures) should remain involved at the grass roots level, not just with respect to improved service delivery and beneficiary capacity building, but also with innovative financing models that facilitate equity participation by small producers in value chains.

### The Commercial Sector

either independently or in partnerships with Governments, can invest at any scale in both commercial agriculture and electricity supply. At a small scale, the focus could be out-grower programs and value chains which include small producers. As scale increases, there will be various opportunities for commercial investments including Public Private Partnerships.

### Communities

participate financially in all publicly funded projects from which they benefit through labor or kind, if cash is not available. Or the innovative financing mentioned above could be used to increase accessibility and affordability of loans that allow small producers to purchase high precision irrigation equipment; obtain equity in value chains and diversify their farming systems towards water 'smarter' agriculture.

## NEXT STEPS

Building on the outputs of the study, next steps should focus on facilitating an approach to develop guidance on integrating the nexus into investment plans and the economic analyses required to support such plans. This ultimately entails understanding what are the specific trade-offs and co-benefits across sectors when implementing water infrastructure projects.

## INVESTING IN NEXUS INFRASTRUCTURE ROADMAP

### 1. Activities that will enable investment opportunities

- a. Identification and ranking study on potential solutions, especially trade based with value added possibilities;
- b. Institutional Knowledge, Attitude and Perception (KAP) Survey; and
- c. Institutional needs gap assessment.

These activities will provide a ranked list of investment nexus opportunities and an institutional prescription with respect to how best these opportunities could be seized.

### 2. Joint investment activities

- a. Establishment of agreed cost/benefits sharing protocols, which itself provides an opportunity for
- b. hands-on training and sensitisation of key stakeholders.

### 3. Institutionally oriented activities

- a. identify constraints on the enabling environment including investments;
- b. institutional capacity programme to break down silos; operationalise the cost/benefit sharing approaches and elevate the technical level of officials and their establishments;
- c. preparation of an investment dossier with respect to the infrastructural components (multi scale, natural or built).

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