United Nations University
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POLICYBRIEF

Implementing the IDAWM Framework to Enhance Agricultural Water Management in the African Union

Executive Summary

1. Approximately 90% of agriculture in sub-Saharan Africa is rainfed, making it highly vulnerable to impacts of climate change and variability, with significant implications for agrarian communities.
2. If effectively implemented, the African Union's Framework for Irrigation Development and Agricultural Water Management (IDAWM) has the potential to catalyse food systems transformation by fostering systems integration, mitigating environmental trade-offs and enhancing climate change adaptation and mitigation.
3. Addressing and balancing trade-offs that may arise from irrigation expansion - such as reduction of environmental flows and improvement of irrigation efficiency, becomes important in operationalising the framework.
4. Adopting systems approaches that acknowledge the interlinked and catalytic nature of AWM is essential to support investments that deliver benefits for humans and nature.
5. Holistic policies covering multiple sectors such as agriculture, health, environment, water, and energy are needed to promote and strengthen integrated, inclusive and comprehensive cross-sectoral and multi-stakeholder collaboration.
6. Strengthened institutional arrangements to support local-level decision-making, management and capacity building are crucial to ensure efficient, inclusive and equitable water use.

Context

Africa's predominantly rainfed agricultural sector is highly vulnerable to erratic rainfall and the impacts of climate change. Despite having significant irrigation potential, only a small fraction of Africa's arable land is currently equipped for irrigation. Expanding Irrigation is, therefore, considered a key adaptation strategy for de-risking rainfed systems and improving productivity. However, this limited capacity and fragmented development of irrigation systems constrain efforts to enhance agricultural productivity and food security. While there is potential for irrigation development, careful conceptualisation and management are needed to address and balance trade-offs. With irrigation comes environmental (e.g., land use change, degradation, increased water abstraction and pollution), social (power and gender shifts within communities) and governance (water access and rights) challenges. Addressing these challenges requires systematic and practical approaches to ensure the benefits of irrigation are realized while minimizing and/or halting the adverse effects.

When well-conceptualised, agricultural water management (AWM) can be an adaptation strategy for smallholder farming systems that de-risks rainfed food production and enhances socio-economic and ecosystem benefits. In doing so, AWM can be catalytic to stabilising and improving crop yields, minimising yield penalties, and averting crop failure while enhancing water productivity and increasing environmental flows[1].

To systematically address irrigation development and AWM challenges across the continent, the African Union Commission (AUC) has developed an irrigation development and AWM (IDAWM)[2] framework to support and coordinate evidence-based regional and national agricultural water strategies and project implementation to achieve continental food security goals.

The framework is broadly categorised into four strategic agriculture water development pathways, namely:

i. Improved Water Control and Watershed Management in Rainfed Farming with a focus on optimising water use in predominantly rain-fed agricultural systems.
ii. Farmer-led Irrigation Development (FLID), encouraging smallholder farmers to adopt irrigation practices using locally available resources and technologies.
iii. Irrigation Scheme Development and Modernization, aiming to enhance and upgrade existing irrigation infrastructure to boost agricultural productivity.
iv. Unconventional Water Use for Irrigation, promoting using non-traditional water sources, such as treated wastewater, to supplement freshwater supplies for irrigation.

Currently, AWM pathways and associated practices vary widely across Africa's geopolitical regions, each facing unique challenges such as low investment, poor institutional coordination, and inadequate extension services[3]. For instance, North Africa relies heavily on major river systems like the Nile for irrigation but faces policy and energy cost constraints. Sub-Saharan Africa, in contrast, exhibits a more diverse set of AWM practices, often constrained by limited investment and poor access to extension services. Given these regional disparities, there is a need for targeted, region-specific and fit-for-purpose scalable investments. Additionally, strengthening institutional frameworks and arrangements (structures?) is vital to coordinate efforts toward sustainable and equitable AWM across the continent.

Problem Statement

Approximately 90% of agriculture in Sub-Saharan Africa is rainfed and predominantly run by smallholder farmers[3]. The smallholder farming community constitutes approximately 60% of the continent's population and relies on agriculture for livelihood. Rainfed agriculture is threatened by climate variability and change, exposing vulnerable smallholder farmers to repeated crop failure, hunger, malnutrition, and economic stresses. This situation is exacerbated by population growth, urbanisation, and environmental degradation, making rainfed agriculture more uncertain and challenging to achieve food security. Currently, the area under AWM in Africa is approximately 39%, covering an estimated 18.8 million hectares. This is significantly lower compared to Asia, which has about 68% (212.3 million hectares)[4]under AWM. Under these circumstances, access to water for irrigation, including supplemental irrigation, is essential to increase crop productivity and an essential climate change adaptation strategy across Africa. Evidence shows that despite Africa's substantial irrigation potential, only about 6% of the continent's land is currently equipped for irrigation – a figure significantly lower than regions like Asia[5]. These statistics highlight the need to improve irrigation and AWM across the continent sustainably. It is evident that irrigation and AWM are central to the African (development) agenda. However, the call to increase access to water in agriculture for irrigation should not result in increasing agriculture's share of water use, which is already the highest in many countries. Achieving this balance is critical to ensuring sufficient water for people, nature and other users.

The Solution

The Irrigation Development and Agricultural Water Management (IDAWM) framework[2] systematically identifies and addresses AWM challenges across Africa, providing a basis for discussions and developing evidence-based AWM priorities. By identifying four strategic AWM pathways, the framework fosters a shared understanding of irrigation development and AWM. This shared understanding is necessary for the co-development of context-specific and fit-for-purpose AWM guidelines, scenarios, and investment plans that will, in turn, guide the prioritisation and operationalisation of sustainable irrigation development across Africa. The Framework also presents a range of cross-cutting issues and interventions to consider in AWM, including inclusiveness and gender mainstreaming. When effectively implemented, these approaches can help close the gender gap in the agricultural sector and contribute to productivity overall. Importantly, the focus on evidence-based interventions allows for a clear understanding of the status of irrigation development and AWM, allowing stakeholders to identify and analyse possible synergies that could arise from pursuing the four strategic pathways and to balance these with other socio-economic and socio-ecological goals such as food security, poverty, job creation, environmental health, land use and sustainability. For example, promoting farmer-led irrigation development through solar-based irrigation can lead to unintended consequences, such as over-abstraction due to the perceived

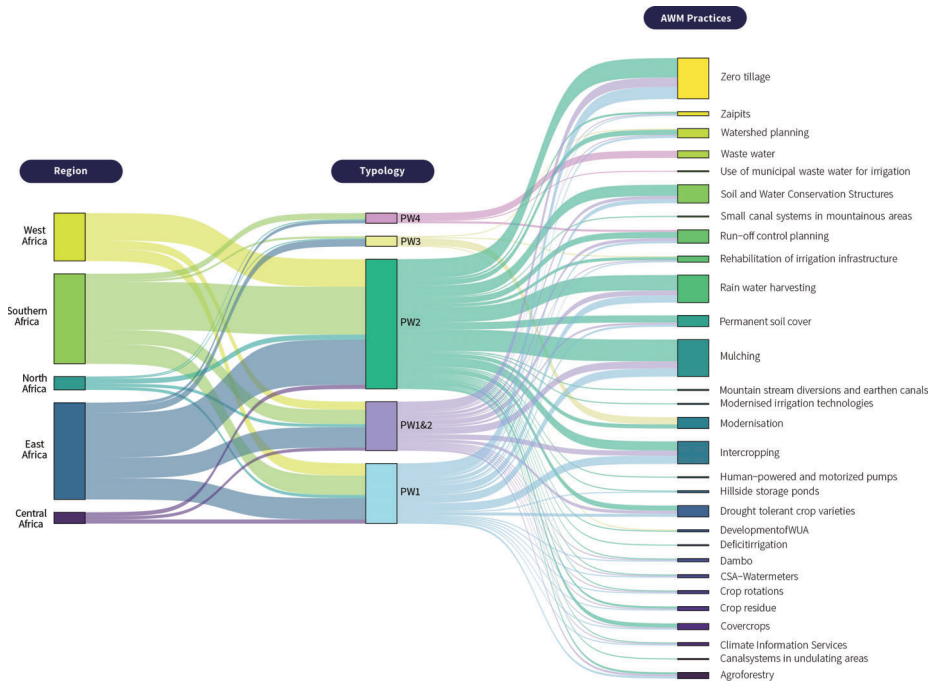

Figure 1. Relationship between the four IDAWM strategic pathways and AWM practices across Africa's geopolitical regions. The various pathways are linked to the different climate-smart practices for optimal AWM. For example, the FLID is the dominant pathway, where farmers self-organise to acquire movable and immovable assets to set up their farming enterprise. Although the FLID pathway dominates the production pathways, careful consideration is needed in managing ground and surface water resources to prevent over-abstraction, as farmers tend to use "free" solar energy to over-apply irrigation water. Across Africa's arid and semi-arid regions, a combination of rainfed and supplementary irrigation (PW1&2) is dominant. Combining green (rainfall) and (blue) water requires careful balancing to mitigate the overuse of blue water. Therefore, across all IDAWM strategic pathways, an understanding of trade-offs is needed to mitigate increasing water use in agriculture and harming environmental flows.

"free" nature of solar energy. At the same time, the lack of regulation may lead to the proliferation of predatory micro-financing institutions. Thus, in operationalising the IDAWM, it will be important to adopt systematic approaches to identify both trade-offs and synergies.

Policy Recommendations

Develop national irrigation policies and master plans that emphasise investment in irrigation development:

i. Revitalise, rehabilitate and modernise existing irrigation infrastructure, especially in regions with high potential but low utilisation.
ii. Incentivise and support member states willing to translate policy into action by helping them set up robust monitoring and evaluation frameworks for IDAWM.

Strengthen Water Governance:

i. Promote harmonised and integrated policies across agriculture, health, environment, water, energy and other sectors to facilitate sectorial alignment and improve coordination among institutions. This should include inclusive and comprehensive multi-sectoral and multi-stakeholder national water policies to promote synergies and minimise trade-offs along food production value chains[1].
ii. Decentralise water governance structures to promote lower-level decision-making and management. Coupled with contextual capacity building, this will foster gender inclusion and promote social justice and equity.

Promote Farmer-Led Irrigation Development (FLID):

i. Provide access to affordable and sustainable irrigation technologies and training through transparent and flexible lending schemes that promote asset ownership.
ii. Promote smallholder farmer autonomy without forcefully conflating it with a multilateral donor agenda[6]. Decision-making should reflect key preferences in smallholder farming enterprises.

Encourage Best Management Practices on Unconventional Water Use:

i. Foster the adoption of unconventional water sources, such as treated wastewater, for irrigation. This can help

alleviate localised freshwater demands[7] and enhance water availability for agriculture.

ii. Promote research on the implications of wastewater use on soils and ecosystems and develop irrigation guidelines that preserve ecosystem health.

Promote decarbonisation along the food systems value chain:

i. Invest in sustainable green energy solutions by providing import rebates on solar panels and establishing a transparent carbon credit system to incentivise farmers to use green energy, contributing to the decarbonisation of food systems.

ii. Develop and enforce policies and regulatory mechanisms that discourage excessive water abstraction driven by low energy costs.

Improve Extension Services:

i. Promote the digitalisation of agricultural extension services[8] to disseminate knowledge on best practices and climate-smart agriculture. This includes training various stakeholders on new technologies, sustainable farming practices, and efficient water use to adapt to climate change conditions and improve agricultural productivity.

ii. Improve digital infrastructure to improve internet and GSM connectivity in rural and remote areas and co-develop digital tools (apps, information exchange platforms, etc.) coupled with digital literacy programmes targeting extension workers and the end user, i.e. farmers.

Targeted Scalable and Inclusive Investments[9]:

i. Prioritize regionally differentiated, gender-inclusive and context-specific investments, considering each geopolitical region's unique needs and conditions in Africa.

ii. Encourage collaboration between public and private sectors to drive investments in AWM and irrigation development. Public-private partnerships (PPPs) can facilitate financial flows, improve market access, and support adopting innovative technologies and practices.

Support Capacity Building and Training:

i. Support and dedicate national investments to training the next generation of water managers across the knowledge value chain (Diploma – Degree), which are critical to developing a water-secure Africa[10].

ii. Connect well-trained extension workers and digital tool developers[8] to Water User Associations (WUAs) to bridge technological and management gaps. This collaboration will strengthen these institutions, enhancing their ability to manage water resources effectively and operationalize irrigation schemes.

Facilitate Inclusive and Gender-Responsive Irrigation & AWM Plans:

i. Develop gender-responsive irrigation plans that are inclusive, ensuring equitable access to resources and opportunities for all farmers, including women, youth and marginalised groups.

ii. Co-develop gender-responsive digital training programmes aimed at (1) bridging the gender gap in digital literacy through tailored training for women farmers and other relevant stakeholders and (2) enhancing the active involvement of women in the design and implementation of digital solutions in agriculture[8].

Final Remarks

If properly implemented, the African Union's IDAWM framework can support the continent's multiple development agendas by unlocking its agricultural potential. This framework[2] implicitly acknowledges the centrality of AWM and its potential to solve economic, social and environmental issues and tackle poverty and hunger[1]. A systems thinking approach can facilitate policy harmonisation across sectors to achieve desired synergetic outcomes. Beyond AWM addressing food and nutrition security, the effective implementation of the framework could have additional synergistic benefits, such as:

Integrity of the environment and ecosystems: Sustainable AWM practices promote responsible surface and groundwater withdrawal and subsequent "in-lieu conjunctive" use, thus releasing water for environmental flows to maintain ecosystem services and biodiversity. To achieve this, systems approaches combined with good governance should be adopted to avoid increased water use and groundwater abstraction. This includes managing risks associated with irrigation expansion, the shift to water-intensive high-value crops, and groundwater overexploitation.

Human health and wellbeing: Effectively linked to food and nutrition security, AWM enhances nutrition by increasing food availability and improving diets. Effective AWM promotes planned and responsible irrigation that does not drive contamination of ground and surface water bodies, thus helping to avoid public health-related problems such as cholera, malaria, other waterborne diseases, and chemical pollution.

Poverty alleviation, employment & economic development: Sustainable irrigation development and agricultural water management can catalyse rural economic development,

job creation, poverty alleviation and reducing inequalities. This would catalyse positive outcomes for resilience, peace, prosperity, and sustainable development.

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