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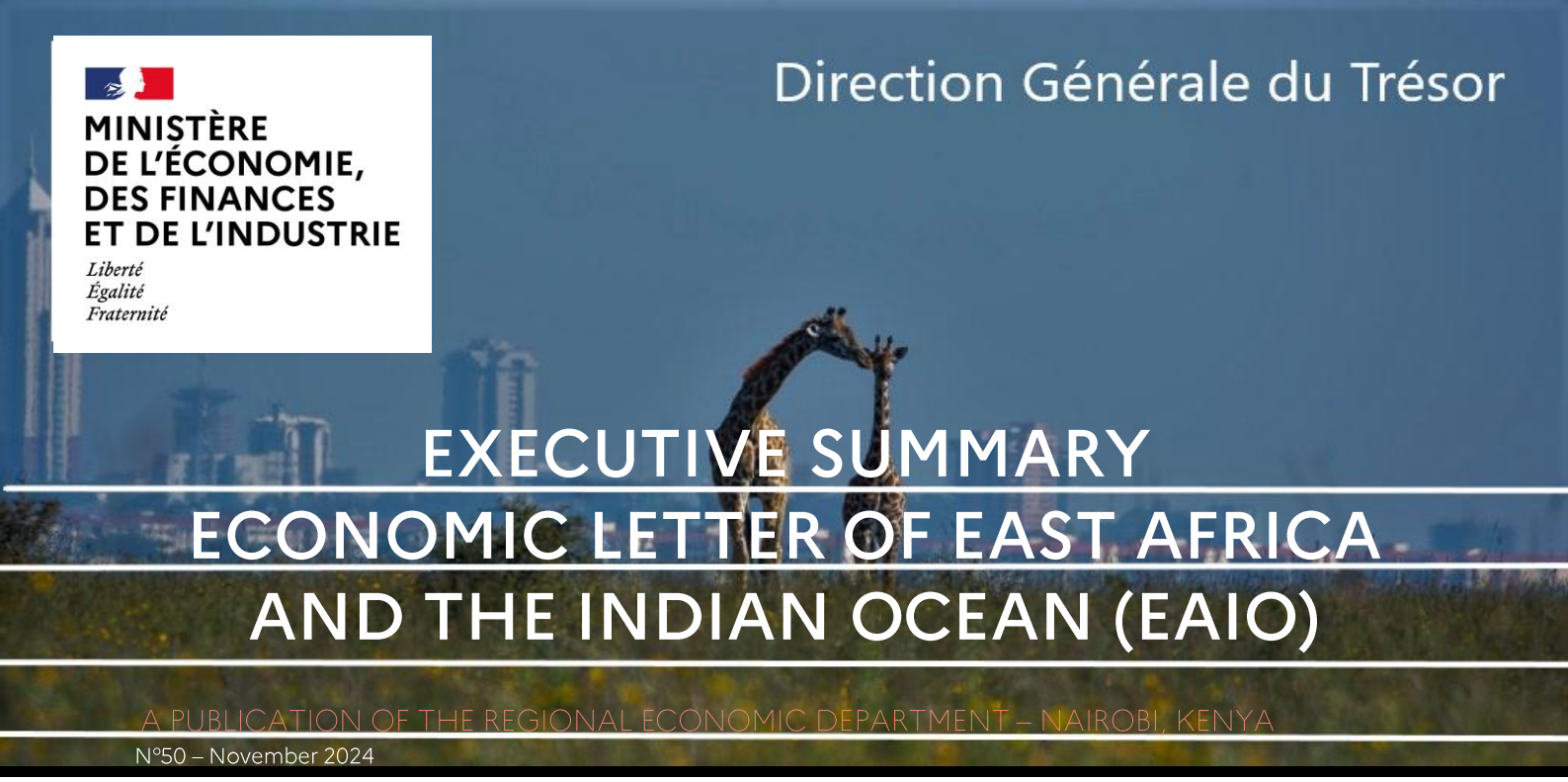

EXECUTIVE SUMMARY
ECONOMIC LETTER OF EAST AFRICA AND THE INDIAN OCEAN (EAIO)

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Irrigation Sector in EAIO

Key numbers

- **The EAIO region's countries, where agriculture is a key economic driver, have highly variable levels of irrigation, ranging from 0.5% in Uganda to 79% in Madagascar,** despite its importance for food sovereignty and resilience in the face of climate change.
- **A lot of equipped lands remain unirrigated, with utilization rates below 10% in Eritrea and close to 50% in Ethiopia and Sudan**, due to inadequate infrastructure and obsolete data.
- The irrigation sector, supported by donors, government programs and private initiatives, presents limited opportunities for French companies, but **climate finance could foster its development in the face of growing demand for innovative irrigation solutions to adapt to climate change.**
- **Local private initiatives finance solar irrigation systems for small-scale producers supported by donors,** while large-scale farms receive private financing for export crops.

In summary…

Irrigation in the EAIO : A Strategic Sector for Economies and Societies, Key for Food Sovereignty and Climate Resilience, Yet Confronted with Major Challenges in terms of Knowledge, Governance, and Investment.

The EAIO economies - with the exception of Djibouti, Mauritius and the Seychelles - are highly dependent on agriculture to provide jobs, earn foreign currency and ensure food and nutritional security for their populations. Against a backdrop of climate change and demographic growth, agricultural productivity is a major challenge for both food crops and export markets: the availability of water resources in the right quantity and quality, at the

right times and in the right places, and at the right price, is one of the mainstays of many agricultural policies in the region's countries. Yet, overall, the results fall far short of the considerable stakes and challenges to be met. Irrigation levels vary widely across the region, from the lowest in the world to the highest in specific contexts (Sudan and Madagascar). Similarly, within a given country, depending on the territory and type of agriculture, irrigation levels and types vary widely.

In detail...

Highly contrasting realities in the EAIO region

The world of agriculture is governed by a physical reality: there can be no agriculture without water, and therefore without rainfall. When we talk about agriculture in the AEOI, we're essentially talking about rain-fed agriculture: most crops are grown using only rainwater. In fact, the AEOI climate is highly diversified, with average annual rainfall spread over one or two periods ranging from 100 millimetres to over 3,000 millimetres per year, depending on the area. Renewable water resources can thus range from scarce (Sudan) to very abundant (Uganda), with significant variations depending on the year and the geography. As a result of climate change, rainfall patterns are no longer regular, with, for example, droughts in the wet season and torrential downpours in the dry. Rising average temperatures also mean that plants need more water, to compensate for greater evapotranspiration.

In this context, irrigation, which is the artificial supply of fresh water to land for agricultural purposes (and which can also be used to spread various fertilizing agents), **is a critical factor in controlling agricultural production.** It is either indispensable for farming in arid zones (e.g. Sudan), or is a means of increasing the agricultural productivity of the land (annual added value in relation to the total surface area of the production unit) and the number of harvests per year. In theory, it can guarantee a high level of agricultural production in the face of climatic hazards, if - and only if - it is carried out under optimal conditions (farming practices, inputs, market functioning, etc.).

EAIO's irrigation potential (irrigable land and available renewable water resources) is estimated at just under 5 million hectares, or around 11% of Africa's potential. Only five African countries have an irrigated area of over 1 million hectares, including Sudan (2 million hectares, with the largest irrigated perimeter in Africa, the Gezira perimeter, at around 900,000 hectares) and Madagascar (with 1.1 million hectares).

Irrigation potential is more or less realized in terms of equipment (reservoir infrastructure for inter-seasonal storage, development of irrigated perimeters) depending on the country: see graph on page 2), ranging from 0.5% in Uganda and 1.4% in South Sudan to 72% in Sudan and 79% in Madagascar. These figures are "theoretical", however, and relate solely to investments made. In reality, many equipped surfaces are not irrigated. This is difficult to quantify, as country statistics are rarely up to date or complete, or even non-existent. Nevertheless, utilization rates are below 10% in Eritrea, and 50% in Sudan, Ethiopia, Somalia, Djibouti and Burundi.

Irrigation water in the EAIO comes mainly from surface water and, to a lesser extent, groundwater. The use of non-conventional water sources, such as treated wastewater, remains very marginal today, and few initiatives are underway (with the exception of Djibouti). **Surface irrigation is by far the most widely used agricultural irrigation technique in EAIO**. Sprinkler irrigation and micro-irrigation are still only marginally developed, and mainly for export crops with high added value. A few hydroponic crops (Djibouti) are also grown on the margins. Smallholders often use manual or gravity-fed irrigation, while larger farms and public perimeters use more advanced systems where infrastructures (and their state of repair) allow.

Nearly 50% of irrigated crops are cereals (wheat, maize, rice - note that Madagascar alone grows half the continent's rice acreage), industrial crops (cotton, sugar cane, tea, coffee, etc.), flowers (e.g. Kenya), fodder (mainly Sudan) and market gardening.

In this context of more water-intensive agriculture, which will have to meet the food needs of growing populations and less accessible water, irrigation is and will increasingly be a crucial component in

securing agricultural production. The majority of the EAIO countries are aware of this, and are promoting investment in irrigation.

Key challenges: knowledge, governance, investment and the environment

In all of the EAIO countries, the challenges to developing sustainable irrigation are both numerous and major.

The first of these concerns knowledge about irrigation and its dissemination: this varies greatly from country to country, and is generally inadequate. National statistics are generally neither complete nor recent, and therefore do not allow the development of appropriate policies and investment plans, nor the monitoring of their implementation. Knowledge of agricultural practices for irrigated crops is insufficiently comprehensive and popularized - with notable exceptions linked for the most part to private companies that contract with farmers and export premium vegetables to Europe (e.g. Kenya and Madagascar).

The irrigation sector's governance, and in particular the organization of water management at national, hydro-agricultural and perimeter levels, **can be significantly improved.** This has an impact, for example, on the definition of sectoral policies and the sustainability of irrigation systems. The organization of water management (institutional and regulatory frameworks) and irrigation competence differ from country to country: while irrigation is not always the responsibility of the ministry in charge of agriculture, as water resources have several uses, many institutions are in fact always involved, and the necessary coordination between them is not always functional. The implementation of policies and the enforcement of regulations remain incomplete due to limited human and financial resources, the fragmentation of responsibilities and, sometimes, a lack of real political will. The deterioration of irrigation infrastructures is also due to poor or no maintenance, insecurity, or political and economic contexts.

This situation does little to encourage the much-needed investment in the particular context of climate change and population growth, and with the exception of Sudan before the outbreak of hostilities, with significant investment supported by the Arab Gulf Funds and Saudi Arabia), the countries of the region generally invest little, and insufficiently, in irrigation. With the exception of Sudan, **the main technical and financial partners in the AEOI irrigation sector are the World Bank and the African Development Bank**, and to a lesser extent the Islamic Development Bank. The local private sector, including banks and agricultural companies, is currently too little involved in irrigation development. Investment levels appear to be too low given the stakes involved, and in particular the urgent need to adapt AEOI agriculture to climate change. The main reasons for this are a lack of prioritization by countries and results that have fallen far short of expectations over recent decades.

Finally, another challenge is for countries to take into account the possible negative consequences of irrigation on the environment: excessive water and solute inputs can lead to soil degradation (salinization, etc.), diffuse pollution and overexploitation of water resources. **Agriculture in AEOI is and will remain, by far, the main consumer of water:** appropriate policies will need to be defined and implemented by countries, and major investments (governance, training, extension, infrastructure, equipment) will be required to improve water management and the sustainability of irrigation systems. In particular, there are solutions for adapting rain-fed agriculture before resorting to irrigation, which can be optimized by promoting and developing agroecology and diversifying crop rotations to include more drought-tolerant species.