POLICY BRIEF

Advancing Agrisolar Adoption in East Africa

Policy Landscape in Kenya, Uganda, and Tanzania

African Centre for Technology Studies (ACTS): 2026

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Abstract

Agrisolar, the productive use of solar energy across agricultural value chains for irrigation, agro-processing, cooling, and storage, offers a transformative pathway to address the water-energy-food (WEF) nexus in East Africa. Harnessing the region's high solar irradiance (2,000–2,500 kWh/m²/year), solar-powered technologies can simultaneously reduce production costs, strengthen food security, and advance national climate commitments.

Yet Kenya, Uganda, and Tanzania each lack the explicit policy recognition and enabling environment needed to catalyze agrisolar as a strategic development priority. Despite established frameworks in the energy, agriculture, and climate sectors, no country has mainstreamed productive-use solar into core agricultural or irrigation policy. Institutional fragmentation, inconsistent fiscal incentives, high upfront costs, and inadequate financing mechanisms compound this policy gap, particularly for smallholder farmers who face additional barriers, including limited technical awareness and weak after-sales support.

This brief assesses the current policy landscapes, identifies enabling and constraining factors, and presents a targeted roadmap of recommendations. By fostering coordinated action through the East African Community (EAC) and embedding agrisolar within existing policy instruments, the region can reduce production costs, build climate resilience, and empower youth and women to lead an inclusive agricultural transition.

The Agrisolar Opportunity in East Africa

Why Agrisolar, Why Now

Sustainable agrifood systems are a critical global imperative. Feeding a rapidly growing global population while simultaneously reducing greenhouse gas emissions, protecting ecosystems, and improving the livelihoods of millions of smallholder producers requires integrated, cross-sectoral solutions. In East Africa, where smallholder agriculture underpins food security and rural economies, the challenge is acute.

Agricultural production across Kenya, Uganda, and Tanzania faces compounding threats: climate-induced shocks, including prolonged droughts and acute water scarcity; declining soil moisture; insufficient irrigation infrastructure; and pervasive energy poverty. In Arid and Semi-Arid Lands (ASALs) in particular, energy is the highest operational cost in agricultural production (Alila & Atieno, 2006). Smallholder farmers rely on expensive, unreliable, and emissions-intensive diesel-powered systems, from irrigation pumps to milk-cooling generators and thermal drying equipment, with no affordable alternative in sight (Wakweya, 2023).

Agrisolar directly addresses this energy-poverty trap. By integrating solar photovoltaic technology into agricultural value chains, agrisolar decouples food production from fossil-fuel dependence. The term encompasses solar-powered irrigation, cold storage and milk cooling, grain and crop drying, and solar-driven agro-processing systems. East Africa's exceptional solar resource, averaging 2,000–2,500 kWh/m² of global horizontal irradiance annually, makes this transition not only technically feasible but economically compelling (Global Solar Atlas, 2025; Ongalo, 2025).

Key Messages

1. No country in East Africa currently prioritizes agrisolar explicitly within core energy, agriculture, or climate policies, creating a strategic gap for private investment and coordinated action.
2. Solar-powered irrigation, cooling, drying, and agro-processing can reduce operational costs by up to 91%, strengthen food security, and advance national climate commitments.
3. Policy integration across energy, agriculture, and climate frameworks is the single most critical lever to unlock agrisolar scale.
4. Stable fiscal incentives, tailored financing, and certified technical capacity are necessary complements to policy reform.
5. EAC regional coordination can harmonize standards, reduce investment fragmentation, and accelerate cross-border deployment.

Evidence in Numbers

The economic case for agrisolar is compelling and growing.

For smallholder farmers currently dependent on diesel-powered pumps, switching to solar irrigation is not merely an environmental choice; it is an economic imperative. Solar-powered irrigation has been shown to cut energy costs by up to 91% compared to diesel, and 58% of solar pump users report significant improvements in quality of life (CLASP, 2021). These are not marginal gains; they represent a structural shift in the economics of smallholder agriculture.

The supply side is equally encouraging. Africa installed 4.5 GW of new solar PV capacity in 2025, a **54% year-on-year increase,** with East Africa leading in productive-use and off-grid applications (Global Solar Council, 2026). The hardware is arriving. The market is moving. What is missing is the policy signal to direct it toward agriculture.

Agrisolar's Triple Dividend: Food, Climate, and Inclusion

Beyond cost savings, agrisolar delivers co-benefits across three development priorities:

- **Food Security.** Reliable, year-round irrigation reduces post-harvest losses, increases crop yields, and lowers production costs, advancing food security in rain-fed and arid regions alike (Geronimo & Mallari, 2025; World Bank, 2024).
- **Climate Resilience.** Solar-powered systems reduce reliance on diesel machinery, directly lowering emissions and advancing progress on Nationally Determined Contributions (NDCs) for mitigation and adaptation (IPCC, 2023; UNFCCC, 2022).
- **Inclusive Growth.** Agrisolar expansion creates income streams through agro-processing and value addition, generates youth-led employment in installation, operations, and maintenance (O&M), and PAYGO networks, and reduces physical drudgery in irrigation, disproportionately benefiting women (Lolo, 2025).

Africa's solar market experienced its fastest growth on record in 2025, with 4.5 GW of new PV capacity installed continent-wide, a 54% year-on-year increase, driven by off-grid, commercial and industrial, and productive-use applications. East Africa is leading in these segments (Global Solar Council, 2026). This growth signals strong market readiness and a critical window for policy action.

Policy Landscape: Enablers and Constraints

Despite robust frameworks in energy, agriculture, and climate policy, none of the three countries currently provides explicit policy direction for agrisolar as a productive-use technology. The following section maps the key instruments in each country, identifying entry points and critical gaps.

Uganda

Uganda's energy policy has evolved significantly but provides limited traction for agrisolar adoption. The Energy Policy (2002, revised 2023) and Renewable Energy Policy (2007) aimed to enable private renewable energy investment, with a 1,420 MW renewable target now achieved. However, these policies prioritized household electrification over productive agricultural applications. The Electricity Connections Policy (2018–2027) and Rural Electrification Strategy similarly focus on domestic consumption.

Uganda's development vision (Vision 2040) and the National Development Plan IV (NDP IV, 2025/26–2029/30) both acknowledge productive use of energy within broader sustainable development goals but stop short of articulating specific agrisolar targets or implementation pathways.

The most directly relevant instrument is the National Roadmap for the Productive Use of Solar Energy (NR-PUSE, 2023), which provides situational analysis, identifies barriers, and proposes strategic interventions and financing options (GOGLA, 2024). However, the roadmap faces critical implementation constraints: no dedicated budget line, weak inter-ministerial linkages, and limited integration with agricultural sector planning. Climate-smart agriculture frameworks, the National Climate Change Policy (2015), Climate Change Act (2021), National Agriculture Policy (2013), Agriculture Sector Strategic Plan (ASSP, 2020–2025), and Irrigation Policy (2018), promote mechanization and renewable-energy-based irrigation, but none elevates agrisolar as an explicit strategic tool (Ministry of Water and Environment, 2015; Ministry of Agriculture, Animal Industry and Fisheries, 2013).

For agrisolar, this means: *Uganda has a productive-use roadmap but lacks the policy integration, dedicated financing, and institutional coordination needed for scaled deployment. Operationalizing NR-PUSE, with a budget line and cross-ministerial accountability, is the next critical step.*

Kenya

Kenya is a regional leader in renewable energy deployment, yet existing policy frameworks do not explicitly prioritize agrisolar solutions such as solar-powered irrigation, cold storage, or agro-processing.

The National Energy Policy (2019) recognizes stand-alone solar systems but focuses on household electrification (Ministry of Energy and Petroleum, 2019). The Kenya National Electrification Strategy (KNES, 2018) targets 1.9 million household connections without addressing productive-use technologies for farming. The National Energy Efficiency and Conservation Strategy (NEECS, 2020) is more relevant, outlining a national shift from fuel-based to solar-powered systems across five sectors, including agriculture, but regulatory instruments such as the Draft Energy (Solar PV Systems) Regulations (2020) and Draft Mini-grid Regulations (2021) remain silent on agrisolar-specific standards (Ministry of Energy and Petroleum, 2019).

A significant advance is the National Energy Policy 2025–2034 (Final Draft), which explicitly promotes productive use of energy in agriculture and solar-powered appliances for irrigation and cold chain, and establishes an Inter-Governmental Committee on Productive Uses of Renewable Energy (PURE, created 2024) (Ministry of Energy and Petroleum, 2025). However, budgetary commitments and implementation timelines are yet to be confirmed.

Agricultural policies acknowledge modernization goals but fall short. The National Agricultural Mechanization Policy (2021) mentions renewable energy as an enabler but does not specify solar-powered machinery or provide integration guidance (Ministry of Agriculture, Livestock, Fisheries and Cooperatives, 2021). The Irrigation Act No. 14 of 2019 establishes a framework for smallholder irrigation but does not identify climate-resilient energy options, a missed opportunity to position solar-powered irrigation as the preferred modality (National Assembly of Kenya, 2019). Kenya's climate frameworks, the Climate Change Act (2016), NCCAP 2023–2027, and updated NDCs, provide a strong foundation for clean energy and climate-smart agriculture but do not specifically identify agrisolar as a priority mitigation or adaptation measure (National Assembly of Kenya, 2016; Ministry of Environment, Climate Change and Forestry, 2023; Government of Kenya, 2020). Tanzania's Agricultural Transformation Strategy provides a useful reference point: it explicitly targets expanded irrigation, reduced post-harvest losses through cold storage, and agro-processing development, all areas where solar energy integration is natural, yet the strategy omits it (Verasol, 2024).

For agrisolar, this means: *Kenya's policies are evolving toward explicit recognition of productive-use solar, but implementation frameworks, dedicated standards, and financing mechanisms for agrisolar are not yet in place. Finalizing and resourcing the 2025–2034 National Energy Policy and activating the PURE Committee are immediate priorities.*

Tanzania

Tanzania has established a policy and regulatory framework across the energy, agriculture, and climate sectors, creating a solid foundation for renewable energy deployment and rural development. While these policies generally promote clean energy and agricultural modernization, they do not yet articulate agrisolar as a strategic solution.

The National Energy Policy (2015), Electricity Act (2008), and EWURA Act (2001) promote renewable energy for national energy security (Ministry of Energy and Minerals, Tanzania, 2015; Parliament of Tanzania, 2008, 2001). The Ministry of Energy, Rural Energy Agency (REA), and EWURA facilitate clean energy access, particularly in rural areas, but without specific mandates for productive-use agricultural applications. The National Agriculture Policy (2013) underscores the need to modernize the sector through improved technologies and expanded irrigation; however, it does not reference solar-powered technologies, leaving implementation dependent on broad interpretations of 'modernization' (Ministry of Agriculture, Food Security and Cooperatives, Tanzania, 2013).

Tanzania's irrigation frameworks are most closely aligned with agrisolar potential. The National Irrigation Policy (2010) and National Irrigation Act (2013), implemented through the National Irrigation Commission (NIRC), promote climate-resilient irrigation infrastructure (Parliament of Tanzania, 2013).

Solar-powered pumping aligns strongly with their objectives, particularly for off-grid smallholder farmers in remote areas. The Five-Year Development Plan III (FYDP III, 2021–2026) prioritizes increased agricultural productivity, expanded irrigation, and improved energy access, three areas where agrisolar can deliver significant impact (Ministry of Finance and Planning, Tanzania, 2021).

Tanzania's regulatory environment also includes a Renewable Energy Feed-in Tariff Framework (Small Power Producers Framework, 2015) under EWURA and TANESCO, which allows small-scale producers to sell surplus solar electricity (EWURA & Ministry of Energy and Minerals, Tanzania, 2015), a potentially important incentive for cooperative-scale agrisolar investment that has not yet been leveraged.

For agrisolar, this means: *Tanzania's policy framework offers multiple entry points for agrisolar integration. The Feed-in Tariff Framework, FYDP III priorities, and irrigation legislation each create hooks for explicit agrisolar provisions, but dedicated recognition, incentives, and coordinated implementation remain absent.*

Crosscutting Policy Gaps and Recommendations

Across all three countries, five structural gaps consistently limit agrisolar adoption:

- **Absence of explicit policy recognition.** No country explicitly prioritizes agrisolar within its core energy, agriculture, or climate policies, creating uncertainty for private investors and a lack of coordinated policy direction.
- **Fragmented institutional coordination.** Coordination mechanisms between energy, agriculture, water, and finance ministries are weak, with no single-window approach for agrisolar licensing or investment facilitation.
- **Inadequate and unstable fiscal incentives.** VAT exemptions are inconsistent; targeted subsidies, grants, or concessional finance for agrisolar are absent in all three countries.
- **Limited tailored financing mechanisms.** High upfront costs, limited smallholder credit access, and underdeveloped PAYGO and leasing markets restrict farmer investment.
- **Insufficient technical capacity and support.** Shortage of certified solar technicians, limited farmer training on O&M, and weak after-sales support systems reduce technology reliability and farmer confidence.






Table 1 below provides a country-by-country mapping of specific gaps and actionable recommendations. Regional recommendations for EAC-level coordination are also included.

Country	Key Policy Gaps & Challenges	Recommendations
Kenya	• Agrisolar not explicitly integrated into energy, irrigation, or agricultural policies • Weak coordination between national ministries and county governments • Inconsistent VAT exemptions; no targeted agrisolar incentives • High upfront costs and limited access to affordable credit for smallholder farmers • Insufficient certified solar technicians and limited farmer O&M training	• Mainstream agrisolar into national and county policies (energy, agriculture, irrigation) • Establish inter-ministerial and national-county coordination frameworks • Ensure stable VAT exemptions; introduce subsidies and grants for agrisolar • Create guarantee funds and risk-sharing mechanisms; expand PAYGO and microcredit • Develop certified technician programs; allocate county budget lines in CIDPs
Uganda	• Energy and agriculture policies do not recognize agrisolar as strategic • NR-PUSE roadmap exists but lacks budget, inter-ministerial linkages, and agriculture sector integration • No targeted incentives or national agrisolar program • High cost of credit; financial institutions treat agrisolar as high-risk • Low farmer awareness and insufficient technical capacity at the district level	• Update energy and agriculture policies to explicitly include agrisolar • Operationalize NR-PUSE with a dedicated budget and cross-sector implementation plan • Introducing tax exemptions, subsidies, and a national agrisolar demonstration program • Promote blended finance, SACCO-based lending, and seasonal repayment schemes • Implement district-level training for technicians and extension officers
Tanzania	• Agrisolar is not explicitly addressed in agriculture, irrigation, or energy policies • Multi-agency overlaps and weak coordination slow implementation • Limited fiscal incentives for solar irrigation and agro-processing • Minimal farmer financing options: PAYGO and leasing models underdeveloped • Insufficient technical expertise and weak after-sales support in rural areas	• Revise agriculture, irrigation, and energy policies to integrate agrisolar / PUE • Establish a single-window licensing system to reduce bureaucratic overlap • Reinstate VAT exemptions; create concessional financing schemes • Promote PAYGO, leasing, and asset-finance models; expand TVET technician training • Integrate agrisolar into rural electrification and productive-use strategies
Regional (EAC)	• No harmonized standards or cross-border coordination on agrisolar • Fragmented market limits economies of scale • Limited regional knowledge sharing and best-practice exchange	• Develop regional agrisolar standards and certification frameworks via EAC • Establish regional financing mechanisms and investor coordination platforms • Create cross-border knowledge networks and demonstration sites • Harmonize fiscal incentives and tax regimes to facilitate trade and investment

Conclusion

Agrisolar stands at the intersection of East Africa's most urgent development priorities: food security, reliable and affordable energy access, climate resilience, and inclusive rural economic transformation. The technology is proven, the market is growing, and the region's solar resource is exceptional. What is missing is deliberate and coherent policy action.

Kenya, Uganda, and Tanzania have each built important foundations in renewable energy and agricultural modernization. Yet the persistent absence of explicit agrisolar provisions across energy, irrigation, and agricultural policies continues to limit investment, constrain adoption, and prevent the technology from reaching the farmers who need it most.

Three interventions stand out as highest priority across all three countries: first, mainstreaming agrisolar explicitly into existing energy, agriculture, and climate policy instruments without waiting for new legislation; second, establishing or activating cross-sectoral coordination bodies (such as Kenya's PURE Committee or Uganda's inter-ministerial NR-PUSE implementation structure) with clear mandates and budgets; and third, designing and deploying tailored financing mechanisms, including VAT exemptions, guarantee funds, and PAYGO models, that reduce the cost barrier for smallholder farmers.

Regional coordination through the EAC can compound these gains by harmonizing standards, reducing investment fragmentation, and creating a unified market signal that attracts private capital. Agrisolar is not merely a technological choice; it is a strategic development imperative. With deliberate policy alignment and sustained investment, it can become a cornerstone of East Africa's transition to a productive, climate-resilient, and low-carbon agrifood future.

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