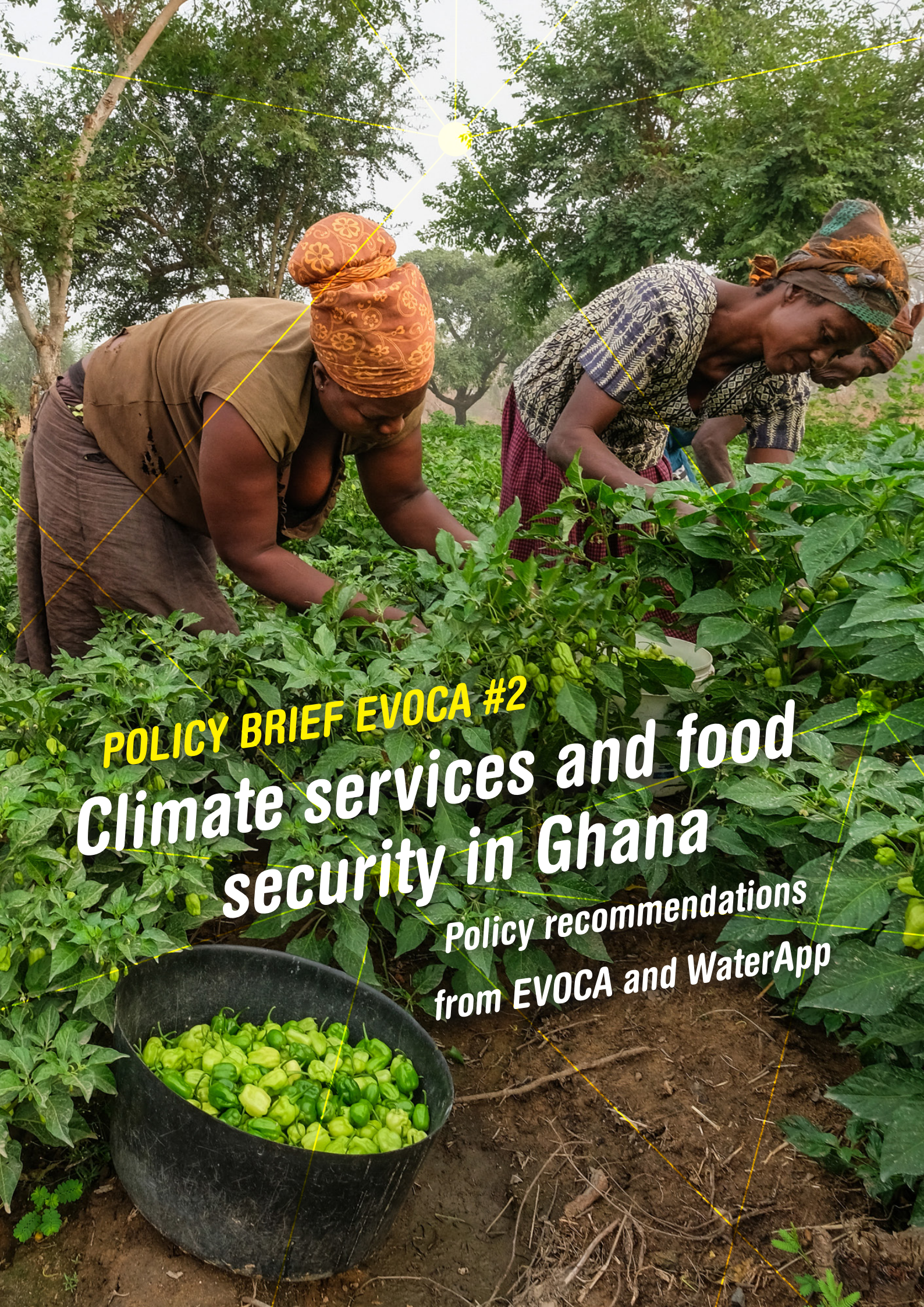


POLICY BRIEF EVOCA #2

Climate services and food security in Ghana

Policy recommendations from EVOCA and WaterApp

The climate-water-food nexus challenge

Climate change and climate variability continue to pose huge risks to food production in rural communities in Ghana. Farmers are threatened by conditions such as erratic rainfall, droughts, the outbreak of crop pests and diseases, and high temperature conditions. These can all increase their susceptibility to crop failure and loss of investment.

Central to farmers' activities is the urgency to meet water needs for irrigation in food crop production. For rainfed farmers, erratic rainfall presents uncertainties in regard to knowing what, when, and how to plant, with high risks of crop failure in case of bad decision-making.

The decision-making challenge is both an information problem and a problem of the of availability and access to farm inputs. Smallholder farmers resort to exploring available information services (ICT (Information and Communication Technology) and non-ICT based) hoping to secure insights into future and seasonal weather forecasts at the onset of the season. Farmers' additional information needs include information on market prices, financial capital, farm machinery, fertilizer, weedicides and pesticides.

< *A rice farmer in Kumbungu district shows the rice that she harvested from her farm.*

African case studies provide scientific insights

This policy brief shares research findings of an interdisciplinary research programme titled 'Responsible life-science innovations for development in the digital age: Environmental Virtual Observatories for Connective Action' (hereafter referred to as EVOCA) that was implemented between 2016 and 2021 by Wageningen University and Research, together with international and local partner organizations. EVOCA developed and researched participatory monitoring systems, virtual platforms, and digital applications geared towards facilitating connective action regarding six different complex problems in four African countries (Rwanda, Kenya, Ghana, and Ethiopia).

This policy brief is based on EVOCA research that was undertaken in Ghana's Kumbungu and Ada districts between 2016 and 2020. Additionally, findings from a second project, WaterApp, which operated in the same districts are integrated in this policy brief. The objectives of both EVOCA's case study in Ghana and the WaterApp project were:

- To understand water challenges under both irrigated and rainfed farming systems;
- To explore the potential of ICTs in integrating indigenous and scientific forecast to improve accuracy and usefulness of forecast;
- To establish what governance arrangements can improve water and information governance;
- To propose strategies to better improve farmer adaptive practices given information.

Highlights

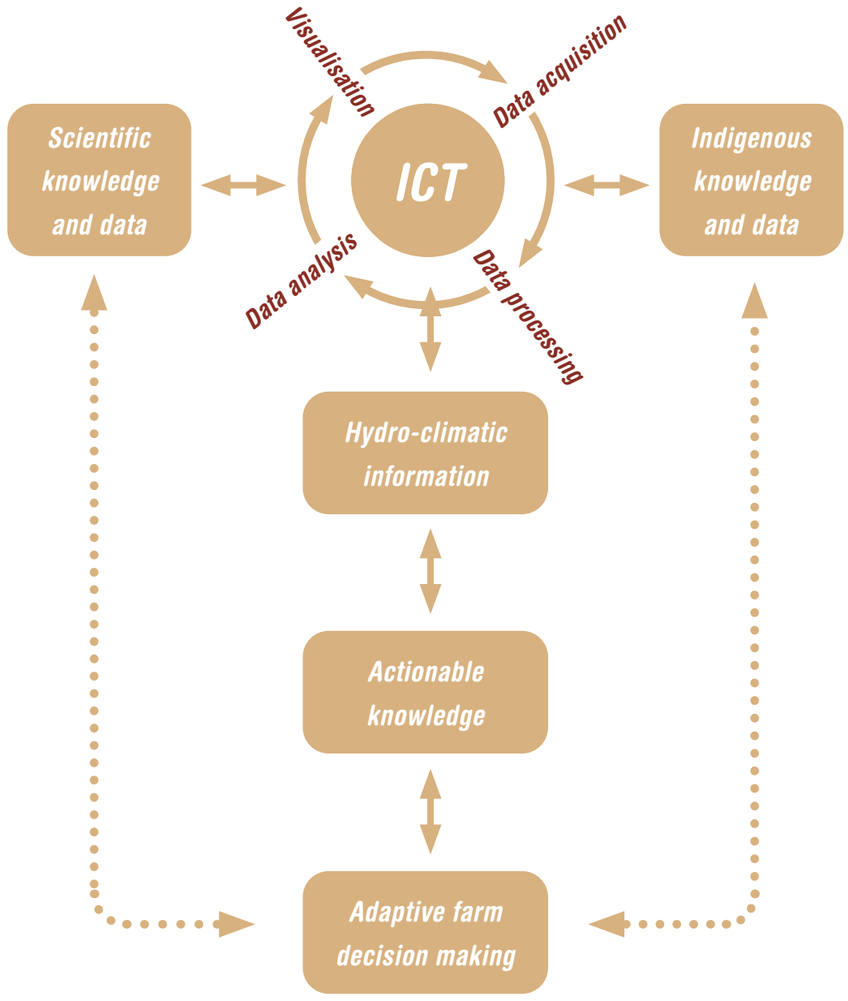
- Integrating indigenous and scientific data in climate forecast provision can enhance the accuracy and usefulness of forecasts.
- Collaborative governance in climate information provision should involve both formal and informal actors, especially at the local level, to enhance information uptake and use.
- The high level of mobile phone penetration in rural areas is an opportunity for designing mobile phone-based climate information systems that are anchored in citizen support systems.
- Farmer adaptation is not only a matter of availability and access to information, but just as much about uncertainty and lead times.

Indigenous knowledge is often overlooked

Diagnostic studies in Ghana with rice farmers showed that some farmers relied on indigenous knowledge, e.g. by observing ecological indicators such as temperature, clouds, wind direction, movement of ants, chirping of birds, among others. However, not much attention has been paid to how the local knowledge of farmers improves their adaptation to climatic and environmental change. Increasingly, emphasis is placed on scientific forecasts in an attempt to estimate seasonal and weather conditions.

Research from both EVOCA and the WaterApp project proposed the co-production of climate services. In this, farmers, researchers, district authorities, extension services and community leaders define contextual water challenges and design information systems that leverage both knowledge systems (as shown in figure 1).

Figure 1: Framework for co-produced climate services based on the research findings from EVOCA and WaterApp projects.



Ensuring local co-production and ownership of climate services

A stakeholder workshop held in Accra brought farmers, water managers, extension officers, researchers, information service providers, and civil society actors together in one meeting. They all deliberated on a proposed approach and model to harness indigenous and scientific data and to transform data from both sources into useful information for farmers.

All actors attest to the need to prioritize ICT-based information services

Key-learnings from the stakeholder engagement

- Farmers and water managers acknowledged an observed and intensified change in seasonal and weather conditions at the community level;
- All actors attested to the need to prioritise ICT-based information services and not just infrastructure and capital investment in the agricultural sector;
- There is the need to develop a strategic plan for ICT-based, digital services in the agricultural sector in Ghana to improve information access;
- Digital literacy is a major setback to digital agriculture efforts especially led by the private sector; w
- Digital technologies hold a lot of promise to sustaining the interest of the youth in rural areas in agriculture.

Recommendations for policy and practice across two themes

Government flagship programmes (such as planting for food and jobs, one-village-one-dam, one-district-one-factory, one-district-one-warehouse) are major interventions that signal future prospects for the agricultural sector in Ghana if well implemented and sustained. From both EVOCA and the WaterApp project, key suggestions and conclusions were drawn that provide relevant input for policy discourse related to ensuring that digital agriculture becomes pivotal in transforming the sector. At the consultative workshop, key suggestions were made that are relevant to transform the policy landscape in the agricultural sector, and to drive the use of digital technologies to enhance climate adaptation and productivity in the agricultural sector. In this final section we highlight these policy recommendations across two thematic areas:

1. Governance
2. Infrastructure & Services

Governance recommendations

- *Establish an enabling environment for public-private partnerships in digital service delivery*

  The government should design regulatory frameworks and enact laws that create a conducive environment for private investors who are interested in entering the market for digital services in Ghana. These could include tax holidays, the setting up of technology advancement zones, creating quotas for local digital entrepreneurs, among others. This may attract established and emerging businesses with the ultimate transfer of technical know-how, job creation and the realisation of the agenda of creating a digital economy.

- *Strengthen capacities of local governance institutions*

  Governments should embark on training programmes that enhance digital literacy among the key institutions that are responsible for programme implementation and governance at the local level. Training participants may include staff of district assemblies and sectoral agencies with the objective to improve their know-how of emerging technologies including artificial intelligence, internet-of-things, machine learning, mobile apps, etc. Actors should be exposed to the cross-sectoral and complex relationships between the agricultural and water sectors and the impact of those relationships when addressing problems in the agricultural sector.

Policy instruments should create opportunities for co-learning and decision-making

Group photo of participants in stakeholder consultative workshop on climate services and food security that was held in Accra in April 2019.

- *Establish policy venues or boundary institutions at district level*
  Local ownership and adoption of digital agriculture services should be accompanied by opportunities for both formal and informal actors to engage. Policy instruments should create opportunities for co-learning and decision-making by establishing policy venues in selected communities. As such quick learning by local stakeholders may be ensured, while such instruments can also inform local efforts concerning digital agriculture.

Infrastructure recommendations

- *Prioritize investments in rural internet and communication infrastructure*
  Governments should attract private sector investments in rural internet and communication infrastructure as this is relevant for effective deployment of digital solutions. This may require the enactment of instruments that incentivise telecommunication companies to extend internet coverage into rural areas.

- *Establish digital innovation hubs in rural areas to foster youth engagement*
  This far, government programmes have predominantly prioritized the youth in urban areas while less attention has been given to those directly engaged in farming or farm related activities. Now more now than ever, there is the need to extend such initiatives into rural areas to sustain youth interest in agriculture and create similar opportunities for building their capacities in agri-tech.

References

The content of this policy brief is based on the following four PhD research projects:

1. Agyekumhene, C. (2021). *Digitalization of smallholder value chain lending partnerships: An interplay of trust and inclusion*. Wageningen University.
2. Gbangou, T. (2021). *Designing agrometeorological information services in Ghana by combining local and scientific forecasting knowledge*. Wageningen University.
3. Nyadzi, E. (2020). *Best of both worlds: Co-producing climate services that integrate scientific and indigenous weather and seasonal climate forecast for water management and food production in Ghana*. Wageningen University.
4. Sarku, R. (2021). *Making weather information services usable to support adaptive decision-making in farming in Ghana*. Wageningen University.

Authors and picture credits

Andy Bonaventure Nyamekye, Emmanuel Nyadzi, Rebecca Sarku, Talardia Gbangou

Acknowledgements

This policy brief and the findings presented in it are based on research under the programme titled “Responsible life-science innovations for development in the digital age: EVOCA” which has been financially supported by the Wageningen University Interdisciplinary Research and Education Fund (INREF). In regard to the content of this policy brief, the authors especially acknowledge the support of our partner organizations; Kumasi Institute of Technology, Energy and Environment (KITE), MDF West Africa, Rabobank and Meteoblue.

Colophon

Text: Mariette McCampbell
Design: Luc Dinnissen (studio ds)

WAGENINGEN UNIVERSITY & RESEARCH

IITA Transforming African Agriculture

CGIAR

CIP INTERNATIONAL POTATO CENTER
A CGIAR RESEARCH CENTER