PROMOTING DIGITAL LITERACY AMONG FARMERS: UNLOCKING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE ENABLED CROP PESTS/DISEASE DETECTION MOBILE APPLICATION

African Technology Policy Studies Network (ATPS) TECHNOPOLICY BRIEF NO. 89

Patrick Mensah
Mighty Ayidzoe
Faiza Bawah
Elvis Bediako
Nicholas Ozor
Joel Nwakaire
Alfred Nyambane

PROMOTING DIGITAL LITERACY AMONG FARMERS: UNLOCKING THE POTENTIAL OF ARTIFICIAL INTELLIGENCE ENABLED CROP PESTS / DISEASE DETECTION MOBILE APPLICATION

Patrick Mensah[1]

Mighty Ayidzoe[1]

Faiza Bawah[1]

Elvis Bediako[1]

Nicholas Ozor[2]

Joel Nwakaire[2]

Alfred Nyambane[2]

[1]University of Energy and Natural Resources, Sunyani, Ghana

[2]African Technology Policy Studies Network (ATPS)

The African Technology Policy Studies Network (ATPS) is a transdisciplinary network of researchers, policymakers, private sector actors and the civil society promoting the generation, dissemination, use and mastery of Science, Technology and Innovations (STI) for African development, environmental sustainability and global inclusion. In collaboration with like–minded institutions, ATPS provides platforms for regional and international research and knowledge sharing in order to build Africa's capabilities in STI policy research, policymaking and implementation for sustainable development.

Table of Contents

About the Project

Africa's rapidly growing population, projected to reach 2.6 billion by 2050, posed significant challenges for agricultural and food systems. To meet the increased demand for food, production needed to rise by up to 70%. However, resource scarcity, climate change, the impact of the COVID–19 pandemic, and socioeconomic hardships made this a daunting task. Recognizing these challenges, the initiative focused on leveraging emerging technologies, particularly artificial intelligence (AI), to transform Africa's agricultural and food systems.

The project successfully advanced the responsible development, deployment, and scaling of AI research and innovations tailored to address Africa's agricultural challenges. A key achievement of the initiative was the establishment and management of the AI for Agriculture and Food Systems (AI4AFS) research network, which comprised ten innovation research projects. These projects focused on creating and implementing homegrown AI solutions that were tested, deployed, and scaled to meet Africa's specific agricultural needs.

The initiative deepened the understanding of how AI can be responsibly developed and scaled for sustainable agriculture in Africa. By building the capacity of African researchers and innovators, the project equipped them to create and apply AI solutions that had a tangible impact on agriculture and food systems. Moreover, the project contributed to shaping both African and international AI policy and practice by sharing valuable insights gained through research and innovation.

Throughout the project, several key activities were carried out, including issuing calls for Expressions of Interest (EOI), conducting training workshops for preselected consortia, and engaging with selected grantees. The project was overseen by the Hub Management Committee (HMC), which worked closely with a Hub Advisory Team (HAT) of experts to ensure strategic guidance and support. A robust Monitoring, Evaluation, and Learning (MEL) framework was implemented to track progress and ensure that the project remained on course. The initiative also fostered networking and collaboration through platforms for knowledge exchange, with quality assurance mechanisms in place to ensure transparency and credibility at every stage.

As a result of the project, African researchers and innovators were empowered with enhanced research infrastructure and a conducive environment to lead in AI for

Agriculture and Food Systems (AI4AFS). The research network was strengthened, generating new AI research and innovations that tackled pressing agricultural challenges in Africa. Additionally, the project contributed to the development of more inclusive policies and strategies that supported transformative change in AI for agriculture and food systems, based on the needs of African societies.

This initiative was part of the larger Artificial Intelligence for Development Africa (AI4D Africa) program, which was co–funded by Canada's International Development Research Centre (IDRC) and the Swedish International Development Agency (Sida). AI4D Africa aimed to create a future where Africans across all regions use AI to lead healthier, happier, and greener lives. Through this completed project, the mission to promote responsible AI innovation, improve quality of life, and drive sustainable development in Africa was successfully realized.

About Africa Technology Policy Studies Network (ATPS)

The African Technology Policy Studies Network (ATPS) is a transdisciplinary network of researchers, policymakers, private sector actors and civil society promoting the generation, dissemination, use and mastery of Science, Technology and Innovations (STI) for African development, environmental sustainability and global inclusion. The ATPS has over 5,000 members and 3000 stakeholders in over 51 countries in 5 continents with institutional partnerships worldwide. We implement our programs through members in national chapters established in 30 countries (27 in Africa and 3 Diaspora chapters in Australia, the United States of America, and the United Kingdom). In collaboration with like– minded institutions, the ATPS provides platforms for regional and international research and knowledge sharing in order to build Africa's capabilities in STI policy research, policymaking and implementation for sustainable development.

Promoting Digital Literacy Among Farmers: Unlocking the Potential of Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

Acknowledgement

Promoting Digital Literacy Among Farmers: Unlocking the Potential of Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

vii

Key Messages:

- The digital literacy rate among farmers in Ghana is low. Institutions like the National Communications Authority, and the Ministry of Gender, Children and Social Protection should take the lead in introducing initiatives to train farmers to acquire digital skills to take advantage of modern agricultural technology tools. In the UK, and Canada where digital literacy is high, institutions such as the Department of Digital, Culture, Media & Sport (DCMS) and Innovation, Science and Economic Development Canada have been given the responsibility to respectively oversee policies and activities related to digital literacy programs. Urgent steps need to be taken immediately to resource these ministries to develop digital literacy programs that will empower rural farmers to use their smartphones to eliminate crop pests/diseases.

- Many sole government-led initiatives in Ghana are stalled either due to a lack of funds or a change of government. A conducive atmosphere should be created to promote public-private partnerships. Establishing such partnerships is crucial to the sustainability of digital literacy initiatives through the commitment of resources for the affordable development of agricultural technology tools as well as the training of farmers. Partnerships between the UK's DCMS, the charity Good Things Foundation, and Local governments and libraries have created an ecosystem where digital literacy education is self-sustainable and affordable to ordinary citizens. Action is required in the immediate short term to put together the relevant government and private institutions and individuals to form partnerships to roll out ambitious digital literacy programs.

- Ghana has no digital literacy policy to serve as a guideline for players in the sector. The National Communications Authority should take the initiative to develop a national digital literacy policy for consideration by parliament. Countries such as Canada, the UK, and the USA, with digital literacy policies, restore orderliness in promoting digital literacy since the policy serves as a guide for all who want to empower citizens for critical thinking, collaboration, communication, and creativity. Urgent action is needed to avoid confusion and restore orderliness, fairness, and equity to prepare a level playground for all industry players in the sector

Promoting Digital Literacy Among Farmers: Unlocking the Potential of
Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

1. Introduction

Approximately 70% of Ghanaians are into the production of one crop or another (Asiedu–Darko, 2014). Unfortunately, the country still relies heavily on food imports. This is due to a barrage of challenges facing farmers during crop production. Some rural, less-educated farmers are genuinely ignorant of farm practices harmful to crop production. This ignorance is attributed to their inability to access the right information at the right time. Consequently, farmers develop an inertia towards adopting new technologies for farming; known to improve crop productivity (Javaid et al., 2023). The majority of ordinary Ghanaian farmers are less educated (Osei-Kofi et al., 2023). As a result, many of the farmers have low digital literacy skills. This serves as a hindrance to the adoption of agricultural-based technologies and innovations that have the potential to revolutionize crop productivity. Digital literacy is the ability to effectively navigate, evaluate, and create information via digital technologies (Martin & Grudziecki, 2006). Levels of digital skills include basic skills, internet skills, media literacy, data literacy, information literacy, social media literacy, cybersecurity awareness, and digital communication skills. Basic digital literacy skills are sufficient for a farmer to effectively use smartphones, computers, tablets, and basic software such as emails and web browsers.

This policy brief is based on a study that developed Artificial Intelligence-enabled mobile and web applications for crop pests/disease detection. The research questions in the study are provided below with item (4) being the key research question based on which this policy is developed.
a) Can an AI app be developed and installed on the phone and online for maize, cassava, tomato, and cashew pests/disease detection?
b) Can the results and recommendations of the apps be communicated to the user through voice in the local "Twi" dialect?
c) Can the apps provide access to extension officers online for further verification of the identified pest and disease?
Can 500 farmers cultivating maize, cassava, tomato, and cashew each be trained to adopt and use the apps effectively?

2. Rationale

The important roles that technology and digitization have played in the crop production sector in advanced countries cannot be underestimated (Javaid et al., 2023). Efficient farm management practices and access to crop and weather information lead to improved crop yield. Crop pests and diseases are known to be the major cause of low agricultural productivity in Africa (Liliane & Charles, 2020). Digital monitoring tools such as crop pests/disease detection apps are instrumental in early detection and eradication. Irrespective of their usefulness, they will not live up to their potential if improperly used. This is the challenge faced by farmers with low digital literacy.

One of the major challenges in implementing digital literacy programs is the availability of technological tools such as smartphones, and tablets. Fortunately, Ghana has seen a rise in smartphone penetration among farmers since 2021. The handset is affordable, with improved network connectivity, and low-cost internet. Studies show that 80% of farmers in Ghana own smartphones (Abdulai et al., 2023), however, they are used 85% of the time for calls with only 15% on online apps, emails, and social media.

Ghana has public and private institutions with the expertise to promote digital literacy. Public-private partnerships create opportunities for both parties to define the level of contributions, including resources, and expertise. Consequently, planning is improved, paving the way for digital literacy programs tailored to address farmers' needs and challenges.

Ghana has no policy on promoting digital literacy, even though various steps were taken through the National Digital Transformation Agenda (Pimpong & Mojom, 2024) to enhance digital inclusion for economic growth. A Digital Literacy Policy is necessary to provide regulations to guide all who want to empower citizens through the provision of digital literacy skills to have a level playground from the equity and uniformity the policy will introduce.

Evidence exists from several countries on the successes of promoting digital literacy programs among farmers leading to enhanced agricultural practices and improved crop productivity. M-Pesa (Van Hove & Dubus, 2019) Kenya, has enhanced farmers' financial literacy and market awareness while allowing them to participate in digital literacy services. e-Choupal (Mukerji, 2020) uses digital kiosks to empower farmers to access market prices, weather information, and agricultural best practices that lead to high productivity in India. Brazil (Martha & Alves, 2018), the Netherlands (Knierim et al., 2019), Rwanda (Van Keulen et al., 2022), the United States of America

Promoting Digital Literacy Among Farmers: Unlocking the Potential of
Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

(Astill et al., 2020), and Israel (Fishelson & Rymon, 1989) are all countries that have increased crop productivity due to the promotion of digital literacy among farmers.

3. Methodology

The research based on which this policy brief is developed was conducted in sixte rural farming communities, covering over seven thousand farmers in four regions of Ghana. The research was carried out for 18 months, the first three months were used to engage the stakeholders, the majority of whom were farmers to learn from their experiences and involve them in the research's ecosystem. This phase was followed by image data collection from the farms in all four regions. Two Artificial Intelligence applications were developed; one mobile app and a web app. The mobile app can instruct the user via audio in the local language Twi or English depending on the user's choice. In November 2023, all the communities engaged in the initial stakeholder discussions were re-visited, and the farmers were trained on how to effectively use the mobile app for crop pest and disease detection. The training involved one-on-one discussions, group discussions, and question and answer series. Seven thousand, and six (7006) farmers were trained in the Bono, Ahafo, Bono East, and Savannah Regions of Ghana. Equal access, rights, and opportunities were given to males, females, and the disabled during this phase.

4. Major Findings

This policy brief brings to the fore the key findings associated with the research question (4). These findings are summarized below.

4.1 Smartphone penetration in rural farming communities in Ghana

Since 2010, smartphone penetration has increased over tenfold in Ghana. Consequently, eight in every ten farmers own a smartphone. The type and make are varied with Samsung, Techno, and Infinix Android phones being the most common. Smartphone ownership is not based on gender or disability, even though females are less likely to purchase smartphones. The study established that male farmers with smartphones are more than female farmers. Some female farmers have phones other than smartphones. Figure 1 depicts the distribution of smartphones among farmers according to gender.
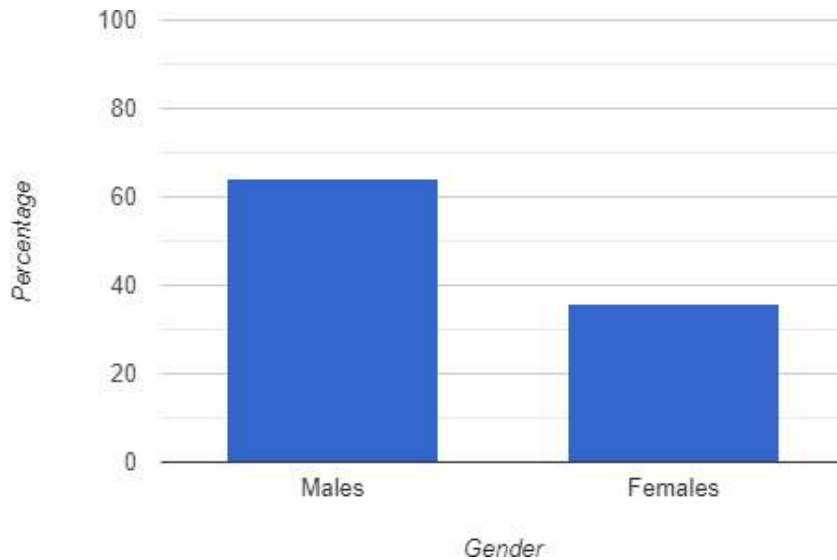
Figure 1: Distribution of smartphones according to gender

4.2 Improving Digital Literacy Levels and Policy to empower rural farmers

The majority of farmers with smartphones can only use them to receive calls. To make calls, they ask for assistance. On their own, they cannot navigate through a mobile app. Figure 2 (a) shows the percentage of farmers with and without knowledge of digital literacy. Figure 2 (b) depicts the percentage of farmers in Figure 2 (a) with knowledge of digital literacy according to gender. It is clear from the Figures that, digital literacy is low, especially among female farmers.
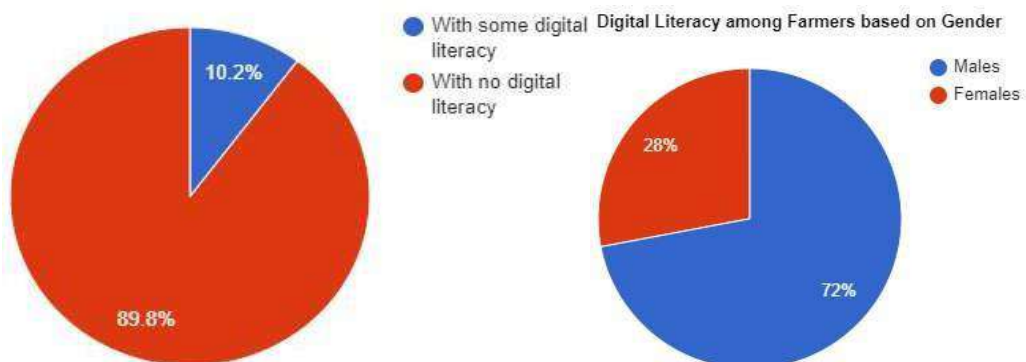
Figure 2Figure 2 (a) A pie chart showing the proportion of the farming population with and without digital literacy skills and (b) the proportion of male farmers with digital literacy skills compared to female farmers

Promoting Digital Literacy Among Farmers: Unlocking the Potential of
Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

The disparity between male, female, and disabled farmers in terms of digital literacy is due to societal norms and cultural beliefs that marginalize female and disabled farmers. Gender stereotypes and societal expectations hinder the female's access to education which is the foundation for digital literacy. This problem is deeply rooted such that women are underrepresented at several levels leading to the shortage of female role models and mentorships in agriculture. The situation becomes worse for disabled female farmers. Disabled male farmers also face similar challenges, however, they can navigate their way to circumvent the problems. On the other hand, there is difficulty in choosing an appropriate approach to train people on digital technologies since there are no guidelines as to what is legal, effective, acceptable, or applicable under given conditions. Key players in the sector have no clear-cut regulations specifically on digital literacy but must rely on general regulations governing the telecommunications and ICT sectors. There is a need to establish an institution whose primary focus will be to develop and implement a digital literacy policy instead of the current situation where the National Communications Authority (NCA) plays an oversight role even though it has its core responsibilities.

4.3 Public-private partnerships as a driver for digital literacy programs

Public-private partnerships can work together to build digital infrastructure, and low-cost digital tools for deployment in locations where they are needed most, but yet may be unaffordable. They provide mechanisms for setting up robust monitoring and evaluation regimes with the capacity to assess the impact of digital literacy programs and their effectiveness in meeting the set goals. This increases the potential for the sustainability of the programs. The NCA, and Ghana Investment Fund for Electronic Communications (GIFEC) are known institutions in Ghana that work towards bridging the digital divide. There are no public-private partnerships in this regard. Ghana needs more institutions and more public-private partnerships in the digital literacy education landscape to prepare the country for the digital revolution.

5. Conclusion and Implications

This policy brief brings to the attention of policymakers the problem of low digital literacy among farmers in Ghana. It highlights the need and importance of improving digital literacy among farmers as a means of empowering them personally and financially. Digital literacy has been prioritized by some countries, allowing them to achieve some success in meeting UN sustainable goals such as 1 and 2; "End poverty in all its forms everywhere" and "Zero hunger" respectively. A study based on which this policy is developed identified low digital literacy as being predominant among females and the disabled in the country. To tackle this issue, some recommendations are proposed in this policy brief; the government should create an enabling environment to facilitate public-private partnerships to champion the fight for improved digital literacy among farmers. The ultimate aim is for farmers to take full advantage of the benefits offered by agricultural-based technology tools.

6. Policy Recommendations

This policy brief proposes the following recommendations to take full advantage of AI tools to improve crop production:

Recommendation 1: Institute innovative programs to boost smartphone penetration among rural, female, and disabled farmers: The Ministry of Agriculture in collaboration with mobile network operators such as MTN, Telcel, and NGOs needs to provide affordable smartphones to disabled and female farmers as a means of fostering a conducive environment for smartphone adoption. To achieve this, the ministry in collaboration with MTN and Telcel should institute payment by installment schemes on heavily subsidized smartphones for farmers in this category. Discounts should be given to farmers who can afford the outright purchase of smartphones. Additionally, e-kiosks should be established in each community to offer technical support to farmers concerning problems farmers may face with smartphone usage. India has made significant strides in this direction and empowered their farmers through subsidized smartphone schemes, improving market access, and financial inclusion among others.

Recommendation 2: Develop a national digital literacy policy and establish digital literacy training centers among rural communities: The National Communications Authority should be resourced to promulgate a national digital literacy policy for consideration by Parliament. This will give a sense of direction, guidance, and coherence to parties that are interested in investing in the sector. The NCA should also set up satellite stations in each farming community to train farmers on basic smartphone usage, especially, how to access the internet and use agricultural apps effectively. To improve the levels of digital literacy among rural farmers, the NCA should organize regular workshops and training programs in the communities. Community Wi-Fi hotspots must be provided in community centers and financial incentives given to farmers who engage with agricultural applications the most. Support should also be given to local app developers to develop agricultural apps with customized content, local language, and disability support. Countries with digital literacy policies have shown high rates of digital literacy among their populace leading to an improvement in all aspects of their socio-economic activities. The local government structures should establish e-kiosks in each farming community. The Ministry of Food and Agriculture at the district level should be empowered to provide resources to e-kiosk attendants. This will enable the farmers to have a first point of contact in matters relating to their crops and AI apps they

may have challenges with. Evidence of the success in this area can be seen in India where digital kiosks are established to empower farmers to have access to market prices, weather information, and agricultural best practices, leading to high agricultural productivity.

Recommendation 3: Establish Public-Private Partnerships to promote digital literacy: The Government should create a conducive atmosphere to foster Public-Private Partnerships that can commit resources to making the training affordable to farmers. The Ministry of Finance and Economic Planning should organize and coordinate private institutions like NGOs and individuals to start digital literacy programs for rural farmers. This partnership will lead to the development of low-cost, and effective AI-powered crop pest/disease detection tools to provide access to every farmer irrespective of their income bracket. To achieve this objective, the ministry must establish clear goals, build trust through dialog and stakeholder engagements, and create a legal framework to formalize the partnerships and ensure compliance. Through the National Council for Public-Private Partnerships (NCPPP), the United States has achieved great success in different economic sectors by leveraging the partnership between the public and private sector players.

Promoting Digital Literacy Among Farmers: Unlocking the Potential of Artificial Intelligence-Enabled Crop Pests/Disease Detection Mobile App

9

References

Abdulai, A.-R., Tetteh Quarshie, P., Duncan, E., & Fraser, E. (2023). Is agricultural digitization a reality among smallholder farmers in Africa? Unpacking farmers' lived realities of engagement with digital tools and services in rural Northern Ghana. Agriculture & Food Security, 12(1), 11. DOI https://doi.org/10.1186/s40066-023-00416-6

Asiedu–Darko, E. (2014). Farmers' perception on agricultural technologies a case of some improved crop varieties in Ghana. Agriculture, Forestry and Fisheries, 3(1), 13–16. doi: 10.11648/j.aff.20140301.13

Astill, G., Perez, A., & Thornsbury, S. (2020). Developing Automation and Mechanization for Specialty Crops: A Review of US Department of Agriculture Programs. Administrative Publication No.(AP-082). https://www.ers.usda.gov/webdocs/publications/95828/ap-082.pdf?v=6263.9

Fishelson, G., & Rymon, D. (1989). Adoption of agricultural innovations: The case of drip irrigation of cotton in Israel. Technological Forecasting and Social Change, 35(4), 375–382. DOI: https://doi.org/10.1016/0040-1625(89)90073-5

Javaid, M., Haleem, A., Khan, I. H., & Suman, R. (2023). Understanding the potential applications of Artificial Intelligence in Agriculture Sector. Advanced Agrochem, 2(1), 15–30. DOI: https://doi.org/10.1016/j.aac.2022.10.001

Knierim, A., Kernecker, M., Erdle, K., Kraus, T., Borges, F., & Wurbs, A. (2019). Smart farming technology innovations–Insights and reflections from the German Smart-AKIS hub. NJAS-Wageningen Journal of Life Sciences, 90, 100314. DOI: https://doi.org/10.1016/j.njas.2019.100314

Liliane, T. N., & Charles, M. S. (2020). Factors affecting yield of crops. Agronomy-Climate Change & Food Security, 9. Webpage: https://books.google.com.gh/books?hl=en&lr=&id=Ppn8DwAAQBAJ&oi=fnd&pg=PA9&dq=Liliane,+T.+N.,+%26+Charles,+M.+S.+(2020).+Factors+affecting+yield+of+crops.+Agronomy-Climate+Change+%26+Food+Security,+9.&ots=u0-bj5qY8Y&sig=GJOAnjk54FFQOcY6nDSMEMgSA6A&redir_esc=y#v=onepage&q&f=false.

Martha, G. B., & Alves, E. (2018). The role and impact of public research and technology transfer in Brazilian agriculture. From Agriscience to Agribusiness: Theories, Policies and Practices in Technology Transfer and Commercialization, 429–444. https://link.springer.com/chapter/10.1007/978-3-319-67958-7_21.

Martin, A., & Grudziecki, J. (2006). DigEuLit: Concepts and tools for digital literacy development. Innovation in Teaching and Learning in Information and Computer Sciences, 5(4), 249–267. https://doi.org/10.11120/ital.2006.05040249:

Mukerji, M. (2020). Re-examining strategic and developmental implications of e-Choupal, India. The Electronic Journal of Information Systems in Developing Countries, 86(4), e12132. DOI: https://doi.org/10.1002/isd2.12132

Osei-Kofi, P. S., Badu, E. E., Dadzie, P. S., & Bandanaa, J. (2023). Demographic characteristics of farmers and the effectiveness of disseminating information on agriculture in Ghana. Ghana Journal of Agricultural Science, 58(2), 98–114. https://www.ajol.info/index.php/gjas/article/view/261459.

Pimpong, S., & Mojom, S. (2024). Digital Transformation in Ghana's Public Sector: An In-depth Analysis of E-Governance Strategies and Service Delivery in Contrasting Institutions. ADRRI Journal of Arts and Social Sciences, 21(3 (9), April, 2024-June, 2024), 1–16. https://journals.adrri.org/index.php/adrrijass/article/view/1130.

Van Hove, L., & Dubus, A. (2019). M-PESA and financial inclusion in Kenya: of paying comes saving? Sustainability, 11(3), 568. DOI: https://doi.org/10.3390/su11030568.

Van Keulen, R., Rumenera, P., Banjara, G., Colantuoni, M., & Muthamia-Mwenda, J. (2022). Horticulture value chain analysis " Opportunities for youth employment in Rwanda. Rome, FAO. https://doi.org/10.4060/cb8266en

ATPS TechnoPolicy Briefs Series

- Artifical Intelligent Tool Worth Scaling for Sustainable Irrigation in Malawi – A case of Chameleon Sensor Array. (ATPS TechnoPolicy Brief No. 87)
- Leveraging Artificial Intelligence for Sustainable Production and Market Access to Nsukka Yellow Pepper in Nigeria. (ATPS TechnoPolicy Brief No. 86)
- Decentralised Community – Powered Weather Networks for Hyper-localised Weather and Climate Information Services in Kenya. (ATPS TechnoPolicy Brief No. 85)
- Participation Des Parties Prenantes À La Mise En Œuvre Des Contributions Déterminées Au Niveau National (Cdn) En (ATPS TechnoPolicy Brief No. 84)
- Enhancing Climate Action In Zimbabwe: Implementing Nationally Determined Contributions (Ndcs) (ATPS TechnoPolicy Brief No. 83)
- Unlocking Zambia's Climate Potential: Enhancing Stakeholder Roles in the Implementation of Nationally Determined Contributions (NDCs) (ATPS TechnoPolicy Brief No. 82)
- Empowering Local Communities and Enhancing Public Awareness for Sustainable NDCs Implementation in Namibia (ATPS TechnoPolicy Brief No. 81)
- Empowering Stakeholders for Inclusive and Sustainable Nationally Determined Contributions (NDCs) Implementation in Botswana (ATPS TechnoPolicy Brief No. 80)
- Uniting for a Sustainable Future: Boosting Stakeholder Engagement in Sierra Leone's Climate Goals (ATPS TechnoPolicy Brief No. 79)
- Stakeholder Participation in the Implementation of Nigeria's Nationally Determined Contributions (NDCs): Best practices, challenges and opportunities (ATPS TechnoPolicy Brief No. 78)
- Stakeholder Participation in Ghana's Nationally Determined Contributions (NDCs) Implementation: Challenging issues and opportunities (ATPS TechnoPolicy Brief No. 77)
- Stakeholder Participation in the Implementation of Nationally Determined Contributions (NDCs) in Côte d'Ivoire (ATPS TechnoPolicy Brief No. 76)
- Collaborative Climate Action for Sustainable Development: The case of NDCs Implementation in Uganda (ATPS TechnoPolicy Brief No. 75)
- Advancing Tanzania's Nationally Determined Contribution (NDCs) Goals Through Inclusive Stakeholder Engagement (ATPS TechnoPolicy Brief No. 74)
- Enhancing Stakeholder Participation in the Implementation of the Nationally Determined Contributions (NDCs) in Ethiopia (ATPS TechnoPolicy Brief No. 73)
- Paving the Way for Climate Action: Kenya's Journey towards Implementing the Nationally Determined Contributions (NDCs) (ATPS TechnoPolicy Brief No. 72)
- Quelle Est La Place De La Science, De La Technologie Et De L'innovation Dans L'emploi Des Jeunes Au Sénégal ? (ATPS TechnoPolicy Brief No. 71)
- Using Science, Technology, and Innovation to Enhance Skills Development, Job

(ATPS TechnoPolicy Brief No. 51)

- New Approaches for Funding Research and Innovation in Africa (ATPS TechnoPolicy Brief No. 50)
- Towards Effective Public−Private Partnerships in Research and Innovation: A Perspective for African Science Granting Councils (ATPS TechnoPolicy Brief No. 49)
- Innovative Practices and Policies for Promoting Biodiversity Informatics in Sub−Saharan Africa (ATPS TechnoPolicy Brief No. 48)
- Improving the Relevance of University Training to Labour Market Demands in Africa (ATPS TechnoPolicy Brief No. 47)
- Developing Policies for Biodiversity Informatics in sub−Saharan Africa (ATPS TechnoPolicy Brief No. 46)
- ICTs role in Agricultural Development: Prospects of Land Potential Knowledge System (LandPKS) (ATPS TechnoPolicy Brief No. 45)
- Mainstreaming Gender in the National Science, Technology and Innovation (STI) Policy of Kenya (ATPS TechnoPolicy Brief No. 44)
- Social Innovation: An Untapped Resource for Inclusive Green Growth (ATPS TechnoPolicy Brief No. 43)
- Policy Axes that Can Uphold Agricultural Innovations for Climate Change Adaptation and Food Security in Central Africa: Case of Cameroon, Equatorial Guinea and Central African Republic (ATPS TechnoPolicy Brief No. 42)
- Frameworks for Intellectual Property Protection of Traditional Knowledge in Tanzania (ATPS TechnoPolicy Brief No. 41)
- Assessment of Possible Intellectual Property Protection Options of Traditional Knowledge System in Ethiopia (ATPS TechnoPolicy Brief No. 40)
- Towards influencing National Legislation, Policies, Strategies and Programmes for appropriate Protection and Benefit−Sharing of Traditional Knowledge (TK) with and by Traditional Herbalists in Uganda. (ATPS TechnoPolicy Brief No. 39)
- Traditional Healers and their Provision of Mental Health Services in Cosmopolitan Informal Settlements in Nairobi, Kenya. (ATPS TechnoPolicy Brief No. 38)
- Policy Implications for Intellectual Property Systems for Traditional Healers in Lesotho. (ATPS TechnoPolicy Brief No. 37)
- Incidence of Indigenous and Innovative Climate Change Adaptation Practices for Smallholder Framers' Livelihood Security in Chikhwawa District, Southern Malawi. (ATPS TechnoPolicy Brief No. 36)
- Machobane Farming System and its Relevance to Climate Change Policy in Lesotho. (ATPS TechnoPolicy Brief No.3

The African Technology Policy Studies Network (ATPS) is a transdisciplinary network of researchers, policymakers, private sector actors and the civil society promoting the generation, dissemination, use and mastery of Science, Technology and Innovations (STI) for African development, environmental sustainability and global inclusion. In collaboration with like–minded institutions, ATPS provides platforms for regional and international research and knowledge sharing in order to build Africa's capabilities in STI policy research, policymaking and implementation for sustainable development.

Science, Technology and Innovation for African Development