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## Policy Innovation for Transforming Africa's Food System with Digital Technologies



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The Government of Côte d'Ivoire has been ambitious in developing policies and regulations to promote greater ICT penetration and the provision of ICT services to different sectors of the economy, including the agriculture sector. The country's EBA ICT score[i] of 5.5 out of 9 indicates a strong enabling digital environment with regard to laws, regulations and policies, while its score of 45.7 in the GSMA Mobile Connectivity Index (MCI)[ii] highlights wide adoption and use of mobile internet. Compared to other African countries, stakeholders in the agriculture sector are in a position to seize the opportunities presented by ICTs to improve outcomes at all stages of the agricultural value chain. This achievement is largely due to the government's commitment at institutional and programmatic levels to create an enabling environment for agricultural digitalization.

### Institutional innovation

Five institutions lead on the uptake and expansion of digital services within the different sectors of the economy. The

Ministry of Communication and Digital Economy and Post (MICENUP) oversees the development and promotion of ICTs and the creation of a conducive business environment.[1] MICENUP has undertaken several legislative reforms, including an update of the telecommunication legislation dating back to 1995. The legislation was aligned with the regional recommendations of the West African Economic and Monetary Union in 2012 and covered major areas such as licenses and authorizations, identification of relevant markets and market power, and consumer protection.

The National Society of Computer Development (SNDI), a state-owned company operating since 1999 under the supervision of the Prime Minister's office, oversees the Information Technology and Information System projects run by the government. In 2006, the government approved and supported the creation of a free zone dedicated to the development of biotechnology and ICT in the city of Grand Bassam. *Village des Technologies de l'Information et de la*

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i    The EBA ICT indicator measures laws, regulations and policies that promote an enabling environment for the provision and use of ICT services, particularly in rural areas. The index ranges from 0-9 (9 indicating high performance). An index equal or higher than 4.5 is identified as 'developing' and 'prospering' in the regulatory framework performance and therefore considered as high performers in our cluster

ii    The GSMA Mobile Connectivity Index measures the performance of 163 countries (44 African countries), against the four key enablers of mobile internet adoption – infrastructure, affordability, consumer readiness and content and services. The index ranges from 0-100 with 100 indicating high national capacity to support the adoption of mobile internet.

*Biotechnolgie de Côte d'Ivoire* (VITIB SA), a public limited company created in cooperation with national and international partners, oversees the management, operation and promotion of biotechnology, information and communication technologies in the free zone. Companies in the free zone enjoy significant advantages, including zero percent customs duty for the first five years and one percent from year six, with the possibility of a tax rebate, exoneration from value added taxes (VAT), and no limit on foreign and local investments.[2]

Furthermore, in 2012, the government established the Ivorian Agency for Radio Frequency Management (AIGF), which focuses on radio frequency management, important for the dissemination of information.[3] The Universal Service National Agency (ANSUT), also created in 2012, ensures universal access to ICTs and drives digital development, making Côte d'Ivoire a model for ICT usage and contributing to the development of the eAdministration (the use of ICTs in public services). To achieve universal access to ICTs, ANSUT seeks to make ICT available and accessible to all, strengthen ICT skills and literacy, promote the development of local content, and build a powerful and secure digital economy.[4]

Finally, the Telecommunications Regulatory Authority of Côte d'Ivoire (ARTCI) was created in 2013 as a public institution with legal status and fiscal autonomy. ARTCI is responsible for enforcing the laws and regulations governing the telecommunications and ICT sector, including monitoring obligations of operators and service providers; protecting consumer, operator and service provider interests; and creating an environment conducive to the sustainable development and diffusion of ICTs.[5,6] Furthermore, several laws have been passed to create an enabling environment for ICT uptake. For instance, in 2015 the government exonerated the ICT sector from VAT and reduced custom duties for ICT and electronic equipment through 2018.[7]

In addition, the government has started to equip public agencies in charge of agricultural development with ICTs for high quality and timely service provision. The National Agency for Support to Rural Development (ANADER), created in 1993, is responsible for improving the living conditions for people in rural areas through the professionalization of farmers and agricultural organizations. ANADER designs and implements appropriate tools and approaches and adapts programs to ensure the sustainable growth and development of the agriculture sector. To reach as many farmers as possible, even in the most remote areas, ANADER created the e-extension system in 2017, which serves as an interactive response voice-server and call center through which farmers can pose technical questions and seek advice on farming practices.[8]

## Policy and programmatic innovation

The first mobile license was introduced in 1996 after the liberalization of the telecommunications sector in 1995. Since the 2000s, the ICT sector in Côte d'Ivoire has experienced a real uptake with the Plan for the Development of the National Infrastructure of Information and Communication 2000–2005. Under this plan, the government promoted the use of ICTs and set out plans to develop the necessary infrastructure for their adoption, including in the most remote areas. Using ICTs, both policy-makers and farmers received information on best practices for agriculture and natural resources management.[9] Between 1997 and 2005, the number of mobile-phone services subscribers increased from 178,349 to 2,607,954.[10] Over the next 10 years, 2005–2015, the share of mobile services subscribers in the population increased from 11 percent to 53 percent. Moreover, through increased collaboration between the private and public sector, the uptake of digital financial services has risen sharply, to almost 10 million mobile money accounts in 2015.[11]

Recognizing the importance of ICTs in achieving widespread connectivity to global markets and networks, the government developed a comprehensive national e-agriculture strategy in 2012 and updated it in 2014.[12] The e-agriculture strategy was designed jointly by the Ministry of Agriculture and MICENUP. It aims to modernize the country's agriculture sector and to enhance its productivity, specifically with an increase in exports of cocoa, coffee and other crops, while reducing food imports. The strategy sets out plans to build an ICT infrastructure for the agriculture sector and develop a legal and institutional framework for the adoption of ICTs to facilitate the use of comprehensive, real-time, multipurpose agricultural information services. The strategy also aims to ensure that farmers, people living and working in rural areas, and government officials working in the agriculture sector have adequate access to the information services and receive training to improve their digital literacy.[13]

In its pursuit of increasing the uptake of digitalization, the government initiated the One Citizen, One Computer, One Internet Connection program in 2015 through MICENUP and implemented by ANSUT. The program aims to improve the access to high-quality ICT services for more than 500,000 households by 2020. It was implemented under a public-private partnership involving the country's mobile operators and can be accessed by everyone, including those working in the agriculture sector. Under the program, a computer costs around US$110, compared to US$330 to $440 when bought at a shop.[14,15]

Between 2013 and 2016, the Côte d'Ivoire Coast Coffee-Cocoa Council and ANADER, with the support of World

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Education Inc., implemented the CocoaLink program, which uses voice messages and SMS to deliver agricultural and other useful practical information to cocoa farmers in remote areas. It offers advice on good farming practices, farm safety, laws on child labor, health, pest and disease prevention, postharvest handling, and crop marketing. Through CocoaLink, famers even in the most remote farming communities with limited agricultural extension services received and shared information. The use of ICTs has also improved the monitoring and evaluation system of the program. Data collected allowed partners to evaluate the project's performance based on selected indicators and to make improvements where needed. CocoaLink was expected to reach more than 100,000 cocoa farmers by 2016.[16]

A web-based software has also been used to improve the postharvest handling of cocoa to improve quality preservation. In 2012–2013, as part of the implementation of the reform of the coffee-cocoa sector, the Directorate of Technical Operations of the Côte d'Ivoire Coffee-Cocoa Council introduced a new ICT-based input management system to guarantee the efficiency and transparency of government support to producers. The Information and Control System for the Distribution Operations of Phytosanitary Products, Seeds and Bagging (SICOPS)

was developed to improve the process of packaging and bagging, ensure the traceability and improve the provision of storage bags to farmers, significantly lowering postharvest losses across the country. SICOPS was progressively adapted to the distribution and management of other inputs, including improved seeds and phytosanitary products.[17]

In addition, since 2012, the government has been implementing a stabilization mechanism for the sale of coffee and cocoa using a web platform. The objective is to optimize international sales, to ensure that the benefits accrue to smallholders, rather than being captured by intermediaries. To do this, a system for email auctions, the Integrated System of Sales by Auctions of Coffee and Cocoa, was set up. Sellers and buyers can negotiate and agree on sales prices through the platform. Farmers now sell most of their coffee and cocoa through these electronic auctions and the government uses the average selling price to set a minimum sale price. In 2016, 70 to 80 percent of Côte d'Ivoire's anticipated harvest of cocoa was sold through an electronic auction system.[18,19]

Côte d'Ivoire's strong enabling digital environment has allowed the private sector to take an active role in the

digitalization of the agriculture sector. Few cocoa farmers have a savings system. As a result, they are not able to deal with unexpected events or build a credit score to borrow from banks. While few cocoa farmers have a bank account, over half now have access to a mobile money account. Through a partnership with the microfinance institution Advans Côte d'Ivoire and the mobile operator MTN, farmers can now access a digital savings account using their mobile phones. In 2016, more than 7,000 cocoa farmers from 58 cooperatives had subscribed to the service and were able to open a savings account with a formal financial institution.[20] Furthermore, since 2014, Orange Côte d'Ivoire has been operating m-Agri, a platform providing farmers with information on product prices, cultivation techniques and national and international price trends.[21] More recently, Palmafrique developed a digital technology application for the geolocation of plants or the payment of bonuses and salaries for staff in remote areas.[22]

The Government of Côte d'Ivoire has shown a strong commitment to increasing the uptake of digitalization in the economy through institutional and program-matic innovations. The government has recognized the importance of access to ICTs and the creation of a conducive business environment to sustainably increase ICT-based services relevant for the development of efficient food value chains. However, more specific institutional and program-matic innovations targeting the agriculture sector are required to fully benefit smallholder farmers and the food systems within which they operate. Furthermore, public-private partnerships need to be actively facilitated and promoted to scale up interventions that have been shown to be effective, for instance, in the coffee and cocoa sector.

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