

HEALTH SYSTEMS STRENGTHENING PRACTICE SPOTLIGHT

ETHIOPIA'S INFORMATION REVOLUTION

Using digitalization to improve the health system

DIGITAL HEALTH SERIES

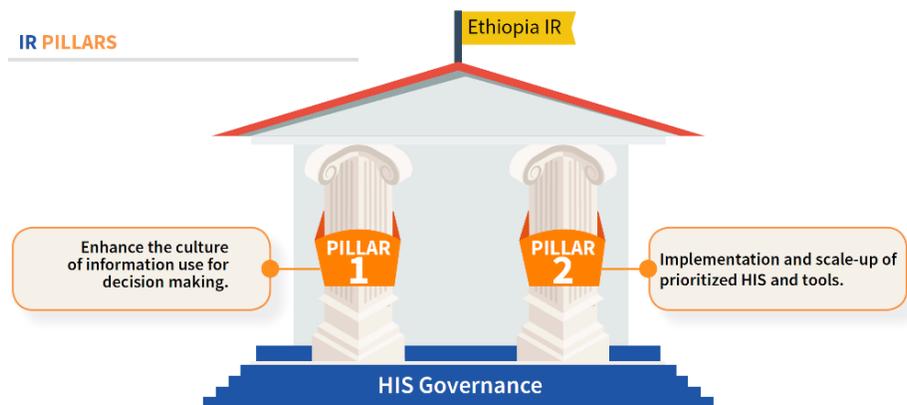
Public health systems increasingly use digital technologies to improve decision-making, planning, implementation, and evaluation of health services. The rapid pace of digital innovation provides ongoing opportunities for governments and their partners to advance the accountability, affordability, accessibility, and reliability of high-quality health services. The Practice Spotlights Digital Health series supports USAID's Vision for Health System Strengthening 2030 and Vision for Action in Digital Health by exploring the ways in which digital transformation can contribute to countries' health system strengthening efforts.

BACKGROUND

In 2015, Ethiopia's Ministry of Health (MoH) introduced the Information Revolution in the country's [Health Sector Transformation Plan](#). The Information Revolution prioritizes two pillars of actionable and measurable interventions (Figure 1) to develop better, more accessible health services, strengthen health systems, and improve health outcomes.

The initiative focuses on digital transformation of the country's health system in service of the goal to "ensure high quality, equitable, sustainable, adaptive, and efficient health services to meet the health needs of a changing population" (IR Roadmap).

FIGURE 1. COMPONENTS OF THE INFORMATION REVOLUTION, AS SHARED IN THE [FIVE YEAR PROGRESS REPORT](#)



Source: JSI (2021)

"[The Information Revolution] entails a radical shift from traditional ways of data utilization to a systematic information management approach powered by corresponding levels of technology... it is also about bringing fundamental cultural and attitudinal change regarding perceived value and practical use of information." (Health Sector Transformation Plan, 2015)

Through the Information Revolution, Ethiopia's MoH, donors, and other stakeholders aimed to improve health services by facilitating better availability, quality, and use of health data. At all levels of the country's health system, there was demand for actionable data, and improvements in available technologies made it possible to meet this demand.

The country had also experienced the challenges presented by fragmented, unscaled digital health pilots and information systems. Multiple, siloed systems would

capture data independently, with no way to share data across these systems. This limited the usefulness of data and created an administrative burden for health workers and health system managers.

When designing the Information Revolution, the MoH and its partners focused on a whole-system approach that would improve data systems and increase knowledge and skills to support data-led action. The [Information Revolution Roadmap](#) (2016) outlines specific activities, objectives, pillars, and focus areas. Notably, the two main pillars span both the digitalization of priority health information systems (HIS) and the cultural transformation needed to instill data use across the health system.

While the initial five-year period of the Information Revolution concluded in 2020, the work remains a priority under the second [Health Sector Transformation Plan \(HSTP-2\)](#). The MoH and its partners have identified additional focus areas for the country and have begun work on the next five years of activities.

KEY DEFINITIONS

Digital Health is the intersection of digital technologies with health, health care, and society to enhance the efficiency and quality of health care delivery and make medicine more personalized and precise. Digital health is the systematic application of information and communications technologies, computer science, and the data they generate, to support informed decision-making and engagement by individuals, the health workforce, and health systems to strengthen resilience to disease and improve health and wellness for all.

Digital Transformation or Digitalization refers to the use of digital technologies at scale designed to modify or create new organizational processes, culture, and client experiences, creating new value-producing opportunities. Digitalization therefore encompasses a technical process (i.e., digitization) but goes further by requiring an organizational and cultural evolution to be effectively implemented.

Health System Strengthening (HSS) comprises the strategies, responses, and activities that ensure the resilience of health systems and advance preventative, promotive, and curative care. USAID's Vision for Health System Strengthening 2030 defines three intermediate outcomes of HSS efforts: equity, quality, and resource optimization.

INTERVENTIONS

Information Revolution Pillar I: Cultural Transformation for Health Data Use

Activities under Pillar I focused on building a strong, country-wide culture of data use—the bridge between health data and health service improvement. The availability of high-quality, timely data does not in itself improve health outcomes. Rather, health impact and health system strengthening occur when data are used to inform decisions and identify opportunities for improvement. The translation of data into insights and actions relies on individual health system managers, health workers, and other stakeholders applying data in their daily work and strategic planning activities.

The Information Revolution approaches this cultural transformation with an eye towards the long-term needs of the health system—recognizing that one-time efforts to increase capacity or improve data use cannot provide sufficient or sustainable improvements. The design of cultural transformation activities focused on addressing several factors:

- Individuals working at each level of the health system require skill sets related to data collection, analysis, and use. Capacity development activities should consider how the target groups will interact with data on a daily basis.
- Training and skill building must be continually reinforced. Capacity strengthening activities should consider issues of health worker turnover and ongoing training needs to ensure adequate capacity in the health system.
- Data use should be integrated into both daily activities (including frontline care) and strategic planning. When health workers and health system managers interact with data regularly, they become more comfortable with its use and increase the demand for timely, high-quality data.

Pillar I: Promising practices

Activities under Pillar I were designed to facilitate a cultural shift toward greater data use. The promising

“The decision-making and problem-solving behavior of information users can heavily influence the ultimate use of data for service delivery improvements.” (Information Revolution booklet)

practices described below are drawn from the activities from the Information Revolution and were highlighted during stakeholder interviews. The activities were implemented concurrently.

Strengthen performance monitoring teams. The Information Revolution prioritized establishing and increasing the functionality of performance monitoring teams at the health facilities and woreda (district) health offices. A [2019 assessment](#) of 129 select health facilities showed that 91 percent of the surveyed health facilities had established performance monitoring teams in accordance with national standards. Capacity-building efforts by the MoH and its partners have focused on the skills and tools the team members need to monitor their programs' performance using quality data.

Harmonize health informatics training programs. In partnership with local universities, the MoH developed a national bachelor's-level curriculum on health informatics. “This effort ensures graduates are equipped with the knowledge and skills that correspond to the demand in the health sector... and responds to the gap of trained HIS professionals in the country.” (Information Revolution booklet)

Once approved by the Ministry of Education, the curriculum was provided to all universities in the country, eight of which have begun offering pre-service health informatics programs. More universities are expected to begin offering similar courses to meet Ethiopia's goal of helping 2,000 health information technicians gain a bachelor's degree in health informatics.

In addition, the MoH supported the standardization of in-service training materials for health workers, which were disseminated to all woredas and health facilities.

Provide training in mentorship and supportive supervision. The MoH established a capacity-building and mentorship program as part of the *Connected Woreda Initiative*. Six local universities were chosen to support pre- and in-service training, onsite coaching, supportive supervision, and other capacity strengthening activities for health workers and health system managers at the woreda and health facility levels. As of December 2020, the program is active in 181 health centers, 36 hospitals, and 38 woreda health offices.

Support implementation research and learning centers. The Information Revolution also emphasized using data and evidence to support ongoing performance improvement of the health system. The use of implementation research was prioritized as one way to document and assess data use activities. For example, [this publication](#) evaluates the implementation status of a Health Management Information System.

To create implementation research teams, the MoH brought together 30 individuals from local universities, regional health bureaus, and selected woredas for an implementation research capacity-building workshop. Research teams then identified study topics, including data use incentives, performance monitoring, effective mentorship models, and HIS governance. The research findings will be used to identify best practices to scale and inform health system policies and standard operating procedures.

The MoH also established a national digital health innovation and learning center at St. Peter's Comprehensive Hospital. The center encourages "collaborative problem solving, innovation, experiment/testing, and learning space related to different digital health systems" (Information Revolution booklet). It also provides technical support for digital health practitioners working to address longstanding barriers to implementation. Three other topical academies were also established: a DHIS2 academy at Gondar University, an Electronic Community Health Information System (eCHIS) Center of Excellence at Jimma University, and an eHealth architecture and interoperability academy at Mekelle University.

Plan for long-term health system capacity needs. To ensure long-term capacity strengthening for health informatics, the MoH developed a 10-year HIS human resource development roadmap (2020–2030). The roadmap identifies current and future human resourcing needs to support Information Revolution activities.

Information Revolution Pillar 2: Digitalization and Scale-up of Priority HIS

Ethiopia's Information Revolution was, in part, a response to fragmentation in the country's digital health ecosystem. At the national level, two independent data systems created challenges for widespread data integration and use. Data often remained at the subnational level, so standardization of data capture and data sharing was needed.

Demand for national health data has increased both internally (to plan and monitor health services), and externally (to measure progress against the Sustainable Development Goals and other global health goals). To meet these demands, health information systems must be able to reliably report data that are high-quality, timely, and complete. The Information Revolution's digitalization pillar was designed to improve the digital infrastructure needed for data collection, processing, and reporting—to make data more reliable and available.

"The national health information system [was] lagging behind in generating information needed to measure and respond to health inequities and their key determinants." (Information Revolution Roadmap)

Strengthening both individual information systems and the overarching digital health ecosystem directly contributes to other health system strengthening efforts. Together, these measures support the provision of data needed for decision-making and the identification of opportunities for improvements or efficiencies.

Pillar 2: Promising practices

Activities under the Information Revolution's second pillar focused on the technological implementation of HIS as well as the enabling environment required for scale and sustainability. As noted under Pillar 1 above, the promising practices described below are drawn from the Information Revolution activities and were highlighted during stakeholder interviews.

Create a unified national health information system.

One of the most significant shifts under the Information Revolution was the implementation of DHIS2 as a national health management information system platform, replacing the two legacy systems that had covered separate regions of the country.

"DHIS2 is now accepted as a primary source of information for planning and decision making at all levels in the health system, partners and donors are utilizing the data for planning interventions and support, and increased use of DHIS2 data [has been used] for health service quality improvements." (Information Revolution booklet)

In addition, the activities under the Information Revolution strengthened other complementary health information and reference systems, including the Electronic Community Health Information System, the Public Health Emergency Management System, the Master Facility Registry, the Human Resource Information System, the Logistics Management information System, and the Regulatory Information System.

Create a national eHealth architecture. Under the Information Revolution, the government of Ethiopia instituted a national eHealth architecture (eHA) (Figure 2), which serves as a blueprint for the information, software, and hardware needs of the health system. The eHa can be used to "coordinate IT choices, ensuring appropriate resource utilization, and facilitating access and integration of data." (Information Revolution booklet)

Ethiopia's eHA also ensures that Information Revolution improvements to coordination and efficiency will extend to new systems and technologies, and that investments in digital health contribute to the overall strengthening of health data use. By following eHA and other national standards, future digitalization efforts will align with the national vision of digital health, while protecting flexibility and responsiveness to future health system needs.

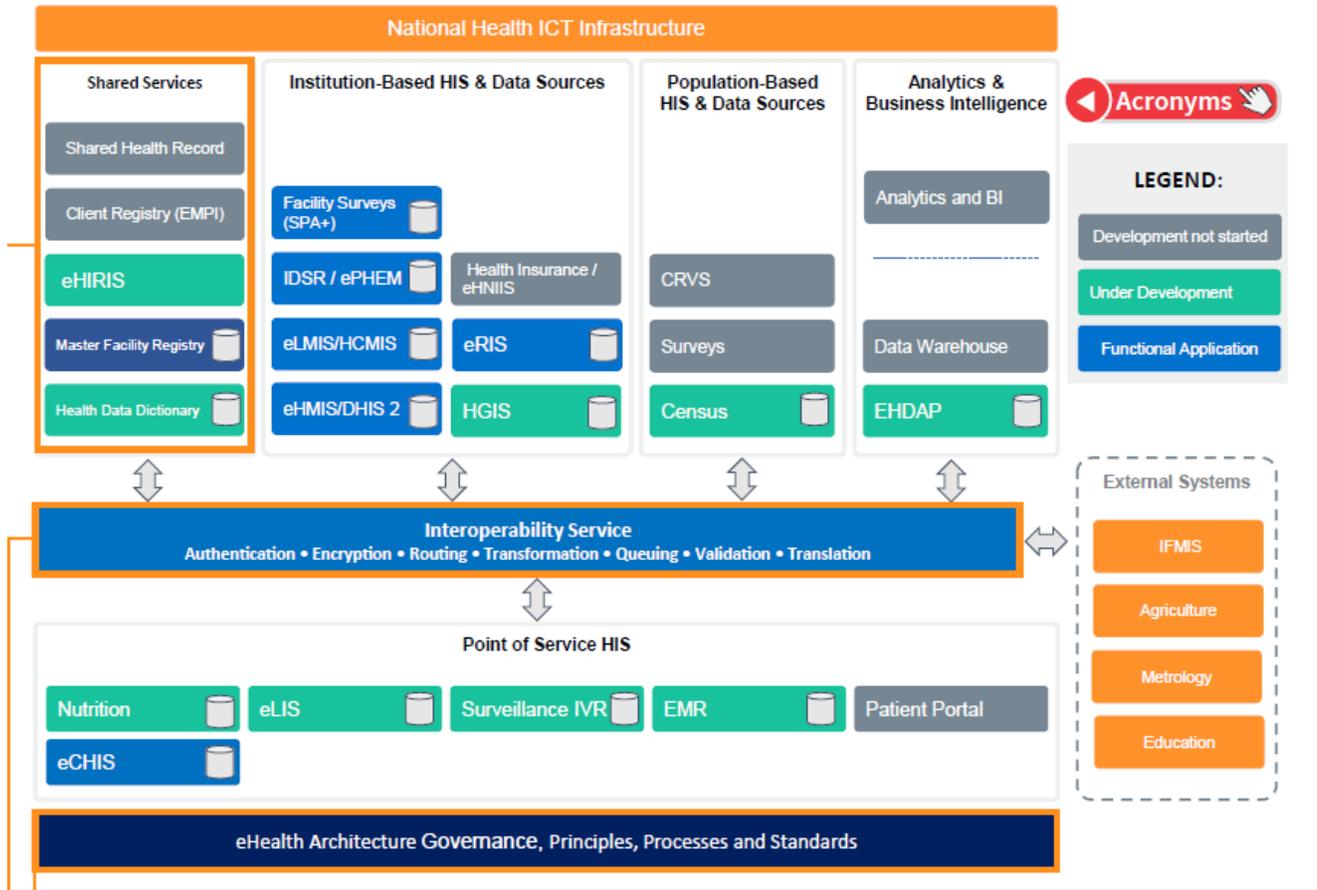
Establish supportive policies and governance structures. Under the Information Revolution, the MoH focused on four key areas of HIS governance: accountability and transparency; policy and strategy; legislation and regulation; and coordination and partnerships.

A national HIS governance framework was developed and endorsed in 2018. A guide to how the HIS governing bodies function in the country, the framework defines the roles of different committees and technical working groups, the cadences of meetings, and other operational processes. The national framework was used to develop a generic regional governance framework that can be customized for subnational use.

Ensure interoperability and set standards. The Information Revolution instituted several mechanisms that ensured digital systems worked together. A national health data dictionary has been developed as a data standard. It identifies and clearly defines 131 priority indicators and the national classification of diseases from ICD-10. These indicators help standardize which information is collected by Ethiopia's health information systems and mapped to global standards, such as Snomed and ICD-10.

An interoperability layer is included in the eHealth architecture, providing technical guidance and reference information needed to promote data sharing between systems and reduce duplicative data entry. This work also includes the development of shared services like a terminology reference service and a master facility registry.

FIGURE 2: DIAGRAM OF ETHIOPIA'S EHEALTH ARCHITECTURE (EHA) AS SHARED IN THE [FIVE YEAR PROGRESS REPORT](#)



Source: JSI (2021)

Acronyms in the figure: Business intelligence (BI); civil registration and vital statistics system (CRVS); District Health Information Software 2 (DHIS2); electronic community health information system (eCHIS); electronic health management information system (eHMIS); Ethiopia Health Data Analytics Platform (EHDAP); electronic human resources information system (eHRIS); electronic logistic management information system (eLMIS); enterprise master patient index (EMPI); electronic medical records (EMR); electronic public health emergency management system (ePHEM); electronic regulatory information system (eRIS); geographical information system (GIS); health commodity management information system (HCMIS); health information system (HIS); integrated disease surveillance and response system (IDSR); integrated financial management information system (IFMIS); interactive voice response system (IVR); electronic laboratory information system (eLIS); Service Provision Assessment plus (SPA+)

IMPLEMENTATION CONSIDERATIONS

Ethiopia's Information Revolution is an example of a national, system-wide digital health transformation. It addresses multiple building blocks of sustainable, impactful digital health systems, and demonstrates how a holistic, systematic approach to digital health can strengthen a health system.

Key lessons from the first five years of work under the Information Revolution include the following.

Government-led partnerships are critical

It is widely acknowledged that government ownership over digital transformation is critical for sustainability and long-term success ([Conclusions of the digital health hub of the Transform Africa Summit, 2018](#)). By centering the digitalization process on government priorities, donors and supporting partners have greater clarity and accountability. This approach also increases buy-in from government stakeholders and promotes engagement from stakeholders of all types.

Digital transformation requires a network of partners who can contribute resources and expertise ([How to govern the digital transformation of health services](#)). In Ethiopia, the Information Revolution was supported by significant investments from USAID, technical guidance from John Snow, Inc., and contributions by other international global health organizations. By creating and participating in governance mechanisms, the government and its partners were able to collectively clarify roles and responsibilities, as well as gain insight into the digital transformation efforts across all partners.

Recommendations

- **Co-create with government officials to ensure investments align with national priorities and digital health strategies.** Investments should align with national digital health strategies, policies, or roadmaps. When prioritized, co-creation also deepens the country ownership of digital health programs. ([Coordinating Digital Transformation: Ethiopia; USAID Vision for Action in Digital Health, Priority 2](#))

- **Support the creation and sustainment of strong governance frameworks** to monitor implementation and ensure activities are technically strong and aligned with the national digital health roadmap. ([Coordinating Digital Transformation: Ethiopia; USAID Vision for Action in Digital Health, Priority 1](#))

Connect a strategic vision to core priorities

The Information Revolution Roadmap is a strong example of how digital transformation can support broad health system goals while also defining near-term digital priorities. Both are necessary for success, but the importance of near-term priorities is less often recognized. Digital transformation is a significant undertaking that requires years of large-scale effort and change. To make this feasible, governments and their partners should establish shorter-term strategies or work plans with prioritized activities. The Information Revolution Roadmap continues to guide Ethiopia's digital transformation, ensuring that all efforts to digitize health systems contribute to the country's long-term vision.

“Donors and implementing partners now are better coordinated in their efforts because they have aligned with one another and monitor their activities against a common action plan and monitoring and evaluation framework.”

(Coordinating Digital Transformation: Ethiopia)

Recommendations

Support the creation and evolution of a national digital health strategy that clearly connects digital transformation priorities to other health system priorities. Ideally, the strategy should include the creation of a costed roadmap and a national digital health architecture. ([USAID Vision for Action in Digital Health, Priority 2 and 3](#))

- **Support the creation and evolution of supportive policies and frameworks** beyond the national digital health strategy. Government policies can

incentivize or require the use of specific digital systems by health system managers or health workers. These policies can play a critical role in addressing issues of data privacy, security, and sharing. Implementation or investment roadmaps and other frameworks support the operationalization of a national strategy and can provide more granularity on priorities and activities for the MoH and its partners. ([USAID Vision for Action in Digital Health, Priority I](#))

Balance digital health champions with sustained capacity development

Ethiopia's Information Revolution benefited from many digital health champions who prioritized digital transformation. Such champions are essential for building buy-in and momentum for significant system changes. They are often the early instigators of transformation and enable the process to move forward more quickly ([Digital Health: A Call for Government Leadership and Cooperation between ICT and Health](#)).

However, the long-term success of digital transformation cannot rely on a small number of individuals. As noted in key stakeholder interviews, the

Information Revolution has succeeded in part because of its focus on embedding a culture of data use at all levels and within all departments of the MoH. This has transformed health system workers themselves into champions, improving both the demand for and supply of data insights.

Recommendations

- **Support country capacity activities**, including expanded capacity for digital health governance, implementation, oversight, and coordination. This includes both short-term training needs and continued learning. Working directly with academic institutions, centers of excellence, and other training organizations can contribute to stronger capacity strengthening and ensure human resource needs are met. ([USAID Vision for Action in Digital Health, Priority I](#))
- **Encourage information sharing and peer learning** to capture best practices, enable collective problem-solving, cultivate a cadre of digital health leaders, and bolster digital health capacity across countries. ([Principles of Donor Alignment for Digital Health](#))

FURTHER READING

A Vision for Action in Digital Health 2020–2024 | USAID

https://www.usaid.gov/sites/default/files/documents/USAID-A-Digital-Health-Vision-for-Action-v10.28_FINAL_508.pdf

Classification of Digital Health Interventions v1.0 | WHO

<https://apps.who.int/iris/bitstream/handle/10665/260480/WHO-RHR-18.06-eng.pdf>

Coordinating Digital Transformation: Ethiopia | Digital Square

https://static1.squarespace.com/static/59bc3457ccc5c5890fe7cacd/t/5d07a359fb33ed00011e21e1/1560781660177/Donor-Coord-Case-Studies_ETHIOPIA.pdf

Ethiopia Health Sector Transformation Plan 2015/16–2019/20 | Ethiopia MoH

https://www.globalfinancingfacility.org/sites/gff_new/files/Ethiopia-health-system-transformation-plan.pdf

Ethiopia Information Revolution Roadmap | Ethiopia MoH

<http://repository.iifphc.org/bitstream/handle/123456789/316/Information%20Revolution%20Roadmap.pdf>

Ethiopia's Information Revolution: Five Year Progress Report | JSI

<https://www.jsi.com/resource/ethiopias-information-revolution-five-year-progress-report/>

Information Revolution booklet | Ethiopia MoH

<https://www.moh.gov.et/ejcc/sites/default/files/2020-10/Information%20Revolution%20Booklet-.pdf>

Recommendations on Digital Interventions for Health System Strengthening | WHO

<https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf>

USAID Vision for Health System Strengthening 2030 | USAID

[Vision for Health System Strengthening 2030 | U.S. Agency for International Development \(usaid.gov\)](https://www.usaid.gov/our-work/health-system-strengthening/vision-for-health-system-strengthening-2030)



About the Health Systems Strengthening Practice Spotlight Series

The Health Systems Strengthening Practice Spotlight series is an initiative of USAID's Office of Health Systems. Practice Spotlight briefs contribute to the global knowledge base in health system strengthening and support implementation of USAID's Vision for Health System Strengthening 2030 and the accompanying Health System Strengthening Learning Agenda. Learn more:

[Vision for Health System Strengthening 2030 | U.S. Agency for International Development \(usaid.gov\)](#)
[Health System Strengthening Learning Agenda | U.S. Agency for International Development \(usaid.gov\)](#)

Acknowledgements

This document benefitted from key informant interviews with individuals involved in the design and implementation of Ethiopia's Information Revolution. The individuals interviewed included:

- **Natsant Animut**, Technical Director, Data Use Partnership, Digital Health Activity, John Snow Inc.
- **Tewodrow Berihun**, Senior Health Information Systems Advisor, Health System and Resilience Team, United States Agency for International Development
- **Eyob Kebede**, Director, Health Information Technology Directorate, Ministry of Health, Ethiopia
- **Al Shiferaw**, Deputy Director, Digital Health Activity, John Snow Inc.
- **Solomon Zewdu**, Deputy Director, Africa, Bill & Melinda Gates Foundation

Recommended citation

Health Systems Strengthening Practice Spotlight. October 2021. *Ethiopia's Information Revolution: Using Digitalization to Improve the Health System*. Washington, DC: USAID. Available at: www.lhssproject.org

The Local Health System Sustainability Project (LHSS) under the USAID Integrated Health Systems IDIQ contributed to the development of this brief. The Health Systems Strengthening Practice Spotlight briefs are made possible by the support of the American people through the United States Agency for International Development (USAID). The contents are the sole responsibility of the authors and do not necessarily reflect the views of USAID or the United States government.

October 2021