



# USAID GEOSPATIAL STRATEGY



**USAID**  
FROM THE AMERICAN PEOPLE

# ACRONYMS

<b>ADS</b>	Automated Directives System
<b>AI</b>	Artificial Intelligence
<b>BHA</b>	Bureau for Humanitarian Assistance
<b>CDCS</b>	Country Development Cooperation Strategy
<b>CoD</b>	Common Operational Datasets
<b>CoP</b>	Community of Practice
<b>DDL</b>	Development Data Library
<b>DHS</b>	Demographic and Health Surveys Program
<b>DPGs</b>	Digital Public Goods
<b>FEWS NET</b>	Famine Early Warning Systems Network
<b>GEO</b>	Group on Earth Observations
<b>GIS</b>	Geographic Information System
<b>GPS</b>	Global Positioning System
<b>IATI</b>	International Aid Transparency Initiative
<b>IR</b>	Intermediate Result
<b>IT</b>	Information Technology
<b>M/CIO</b>	Office of the Chief Information Officer
<b>MDM</b>	Misinformation, Disinformation, Malinformation
<b>MEL</b>	Monitoring, Evaluation, and Learning
<b>NASA</b>	National Aeronautics and Space Administration
<b>NSDI</b>	National Spatial Data Infrastructure
<b>OTI</b>	Office of Transition Initiatives
<b>PLR</b>	Bureau for Policy, Learning, and Resource Management
<b>REFS</b>	Bureau for Resilience, Environment, and Food Security
<b>SO</b>	Strategic Objective
<b>UN-OCHA</b>	United Nations Office for the Coordination of Humanitarian Affairs

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# MESSAGE FROM THE CHIEF GEOGRAPHER

**A**s the daughter of a rocket scientist, I watched many launches while growing up and was amazed by the images of our earth. It struck me that despite the great diversity of people and countries, we all share the same planet. My globe had boundaries delineating nations, but from space, you cannot see borders. I would stare at it for hours, putting my face up close in hopes of seeing more specific details of the countries and neighborhoods of people in faraway places.

Since that time in the 1960s when my father was working to put a man on the moon and USAID was getting its start, technology has dramatically changed. Back then, maps were made of paper and data wasn't a "thing." Today, data is a valuable commodity, and most maps are digital. Using a common smartphone, we have access to an unprecedented amount of real-time location information and can navigate our world better than ever before. Adults and kids alike can now easily zoom in to a high-resolution satellite image of their own neighborhood, or any place in the world they choose to explore.

In addition to the benefits of technology, the 21st century has also brought challenges that threaten the livelihoods of people in the places where USAID works. To meet these complex challenges, we must use every tool available. Geospatial data and technology are critical components in our toolbox.

This first-ever Geospatial Strategy will institutionalize USAID's commitment to leveraging geospatial capabilities in the modern era. Taking a *geographic approach* to development enables us to analyze the complex, interconnected factors that influence the communities in places we seek to support. Combining geographic, economic, and demographic information with satellite data, mapping technology, and local knowledge, the geographic approach makes visible what would otherwise be hard to see. It brings together critical data and expertise to better understand where needs are concentrated, how those needs are connected, where development programs are implemented, and the effectiveness of our programs by geographic location.

Where we work shapes how we work. This Strategy builds on existing geospatial expertise in the Agency and has several objectives. It will help us expand workforce access to geospatial data and tools; strengthen our capacity to use geospatial insights for decision-making; integrate geographic information into our policies and practices; and provide global leadership in applying geospatial solutions for development and humanitarian assistance.

Ultimately, this Strategy will enhance USAID's ability to provide geospatial leadership across the international development community and thereby enable us to serve as a stronger partner to the people who can benefit most from these technologies. It will deepen the impact of the geographic approach across our vast international development community. I invite you to explore the following pages, discover the power of geospatial tools, and learn to map a better world.

Carrie Stokes  
USAID Chief Geographer and GeoCenter Director  
2023

# EXECUTIVE SUMMARY

**G**eospatial technology is essential for providing evidence to shape development progress and deliver lifesaving humanitarian assistance. Since the U.S. Agency for International Development (USAID) was founded in 1961, geospatial (location-based) data and tools have evolved dramatically. When the Global Positioning System (GPS) was created in the 1970s, it was almost exclusively used by the U.S. military. Today, satellites in space capture a near-constant stream of images of the entire Earth that are made available to the public. Most mobile devices come embedded with default mapping applications. These geospatial data and technologies offer people the ability to participate in the development of their communities and countries more actively and inclusively. Geospatial information is a critical component of digital ecosystems and can be used to enrich data landscapes, improve digital service delivery, upskill the digital workforce, elevate the voice of underserved communities, and more. In an increasingly interconnected world, the relevance of geospatial information will only continue to grow.

Recognizing these critical opportunities, USAID is releasing its first-ever Geospatial Strategy. It envisions a future in which a geographic approach to development empowers USAID and its partners to apply all forms of data more effectively to advance international development and humanitarian assistance outcomes. The geographic approach is a process that brings together data and analytical expertise to better understand where development and disaster risk reduction needs are concentrated, where programs are implemented, and the effectiveness of those programs by geographic location. It is a systems-based approach which facilitates development at the local level through an improved understanding of the complex and interconnected realities of a specific place. The geographic approach demonstrates a shift for USAID,

and the international development community more broadly, from a traditionally sector-based model to one that is more holistic, interconnected, and grounded in local context.

The Geospatial Strategy will guide USAID's efforts over a five-year period to realize this shift by institutionalizing the Agency's use of geospatial technologies and capabilities to achieve greater efficiency in programs, operations, and development outcomes. It will be supported by the following strategic objectives:

1. Expand access to geospatial data and tools to strengthen the planning and implementation of USAID programs.
2. Strengthen USAID's capacity to use geospatial data, technology, and expertise for decision-making.
3. Advance USAID policies and practices by applying geospatial information.
4. Provide global leadership in applying geospatial solutions for development and humanitarian assistance.

As the world's premier development agency, USAID has a unique role to play in the growing field of geospatial visualization and analysis—as a thought leader and convener, as an enabler of locally led development, and as a champion for innovative development solutions. This Strategy will help USAID fully embody this role and serve as a stronger partner to the people who can benefit most from these technologies. Working together with the geospatial and international development and humanitarian communities, by leveraging the best of our respective assets and strengths, we can help societies become more resilient and capable of leading their own development journeys.

# INTRODUCTION



## INTERNATIONAL DEVELOPMENT IS INHERENTLY GEOGRAPHIC

**S**ince the first maps were etched onto clay tablets and cave walls, humans have been creating visual representations of their environments. As computers and other digital tools become more powerful and ubiquitous, people are using geospatial data and technology to understand their world and improve life in their own communities. From university students using satellite imagery to document the effects of climate change, to ministries of health using mobile location data to track disease outbreaks, to humanitarian organizations using open, online mapping platforms to inform disaster response, the implications of geospatial data and technology are vast and growing. Yet, too often, these initiatives are uncoordinated, technologies are custom made, and data are not standardized or shared.

This Geospatial Strategy presents an opportunity to help USAID and the broader development community move from individual sector-based investments to a more holistic use of geospatial information to understand and support local priorities. It will require not only innovative technologies and partnerships, but also a reimagining of the Agency's own internal processes. The geographic approach is well positioned to operationalize this because it reflects how multiple factors intersect and interrelate in a specific place. Success will require a whole-of-Agency approach, leveraging the resources and talents of the U.S. government and international development community.

*Photo credit: NASA*

## ALIGNMENT WITH U.S. GOVERNMENT AND AGENCY PRIORITIES

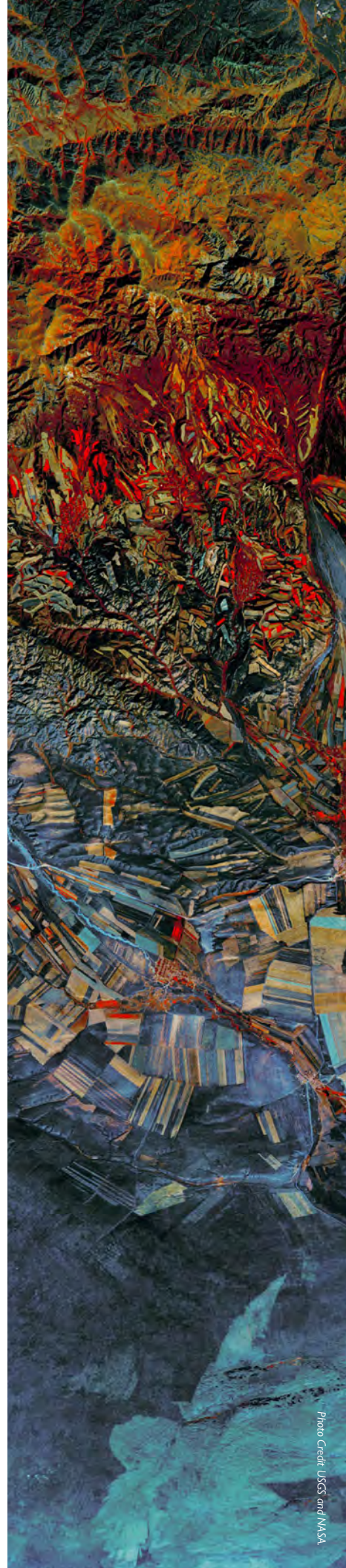
The Geospatial Data Act of 2018 acknowledges the critical importance of geospatial data and services for the United States. It was signed into law to make the government's geospatial investments more efficient and accessible. The USAID Geospatial Strategy serves as a roadmap for the Agency and its partners to act in alignment with the objectives of Geospatial Data Act. The Strategy's objectives also align with the following U.S. government priorities:

- National Spatial Data Infrastructure (NSDI) Strategic Plan, 2021-2024
- Open, Public, Electronic, and Necessary (OPEN) Government Data Act of 2018
- Foundations for Evidence-Based Policymaking Act of 2018
- Federal Data Strategy
- Office of Management and Budget Circular A-16
- U.S. Department of State and USAID Joint Strategic Plan, FY 2022-2026
- National Security Strategy (2022)

This Geospatial Strategy advances an integrated, cross-sectoral vision for locally led, inclusive development.<sup>1</sup> All development programs, regardless of sector, can benefit from the improved collection, management, and analysis of more granular geospatial data. The Geospatial Strategy has also been designed to support and reinforce other Agency policy documents and respective ongoing implementation efforts, including the USAID Policy Framework, the Climate Strategy, Digital Strategy, Gender Equality and Women's Empowerment Policy, and Youth in Development Policy (see Annex III for additional examples and explanation of these policy, strategy, and sectoral applications).

### GEOSPATIAL INFORMATION SUPPORTS EVERY PART OF USAID'S WORK

For every sector and development or humanitarian assistance priority, geospatial information offers the opportunity to better understand local challenges and opportunities. USAID has used geospatial data and technology to **advance food security and resilient livelihoods**, track **COVID-19** cases within countries and inform delivery of vaccines, understand patterns and **drivers of migration and forced displacement**, manage **shelter and services** in settlements, promote **women's participation** in local elections, and increase investments in infrastructure to spur **economic growth**. USAID has also used satellite imagery and mapping to help respond to **disasters**, secure customary land rights to **mitigate conflict**, monitor deforestation (a driver of **climate change**), and promote **sustainable water resource management**.



# USAID APPLIES A GEOGRAPHIC APPROACH TO ADVANCE ITS MISSION ACROSS FIVE REGIONS

Here are examples from each region of how USAID leverages geospatial data and services to save lives, reduce poverty, strengthen democratic governance, and help people emerge from humanitarian crises and progress beyond assistance.



## **AFRICA ▶ USAID/South Africa Strengthens HIV/AIDS Program with Geospatial Analysis**

The USAID/South Africa Health Office manages one of the largest President's Emergency Plan for AIDS Relief (PEPFAR) programs in the world. The Health Office sought to integrate gender-based violence prevention into all PEPFAR programs, given that gender-based violence is a major barrier to accessing life-saving antiretroviral treatment, specifically for women. After mapping treatment facilities, the Mission's GIS Specialist found that the majority of facilities with treatment retention issues are located in gender-based violence hotspots. The results of this analysis informed the Health Office in its design of programs to prevent gender-based violence.



## **ASIA ▶ USAID/Bangladesh Maps Monsoon Flooding to Inform Humanitarian Assistance**

The GIS team in USAID/Bangladesh used geospatial analysis to identify areas of the country that were most severely impacted by monsoon floods during a ten year period. Combining this information with an aerial investigation of the selected districts helped the Mission determine which settlements were most in need of critical humanitarian assistance.



## EUROPE AND EURASIA ► USAID/Armenia and the GeoCenter Create a Water and Energy Web Atlas

Water and energy conservation are high priorities in Armenia. The country is heavily reliant on imported energy and faces increasing pressures on essential water resources. The USAID GeoCenter and USAID/Armenia partnered to create The Armenia Water and Energy Web Atlas. This interactive atlas compares existing power resources with potential locations for generating renewable energy sources of power in the country. It also identifies threats to the nation's water resources. The atlas served as a key information resource for USAID, partner organizations, and the Government of Armenia. By using web-based mapping technology, the GeoCenter made otherwise static data accessible and easy to understand, ultimately improving the ability to make smarter development investments.



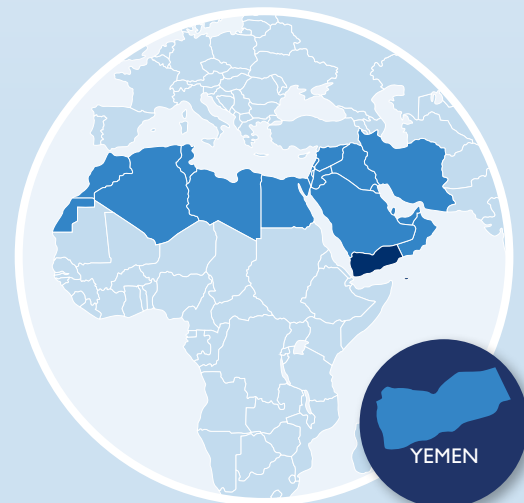
## LATIN AMERICA AND CARIBBEAN ► USAID/Eastern and Southern Caribbean Regional Mission and the GeoCenter Map Impact of Resilience Program

The USAID GeoCenter, in partnership with the Eastern and Southern Caribbean Regional Mission, created a StoryMap to highlight the Mission's Community Family and Youth Resilience program. From 2018 to 2020, the program worked with youth, families, community residents and partners to reduce youth involvement in crime and violence in target communities across three countries in the region. The multimedia StoryMap showcases the successes and scope of this consequential program to the general public.



## MIDDLE EAST ► USAID/Bureau for Humanitarian Assistance Uses Geospatial Insights in Yemen Crisis Response

USAID's Bureau for Humanitarian Assistance (USAID/BHA) provides humanitarian assistance in response to disasters, conflicts, and other crises around the world. The Humanitarian Information Team (HIT) equips the Bureau with the geospatial information needed to provide timely support during sudden-onset emergencies and prolonged crises. Since 2015, Yemen has experienced climatic shocks, economic decline, and ongoing political instability that have intensified humanitarian needs. HIT mapped the locations of humanitarian response programs, household displacement, and projected food insecurity in the country. This work helped the Agency target where to deliver lifesaving support, including emergency food assistance, safe drinking water, and health services to affected populations.



# THE GEOGRAPHIC APPROACH AT USAID

**T**HE GEOGRAPHIC APPROACH brings together data and expertise to analyze where needs are concentrated, where programs are implemented, and the effectiveness of our programs by geographic location. It is more than a map or tool; it is a process that defines a geographic area of interest and analyzes the factors that influence that location, as a whole system. This process makes visible what would otherwise be hard or impossible to see and is well-suited for informing locally led development. USAID has made considerable progress in applying the geographic approach, demonstrated by the mobilization of geospatial capacity across numerous USAID Operating Units and the widespread application of geographic data to advance USAID's mission. This section summarizes how far USAID has come in these endeavors and the challenges and opportunities that exist today.

## USAID'S GEOSPATIAL WORKFORCE

USAID has made considerable progress in applying geographic data and technology to advance the Agency's mission. Starting in the 1990s, innovative leaders in USAID's Office of Foreign Disaster Assistance and then the Office of Transition Initiatives (OTI) created their own dedicated geospatial teams. In 2011, USAID established the position of the Chief Geographer and the GeoCenter, a team of geographers and data analysts, to serve the Agency's geospatial needs. Since then, the GeoCenter has established the Agency's Geospatial Community of Practice (CoP) and supported 75 USAID field Missions and every Bureau in Washington, D.C. Across the Agency, there are now more than 30 dedicated Geographic Information System (GIS) Specialists embedded directly in USAID Missions. Complementing this internal expertise, the implementing partner community acts as an extension to the Agency's workforce.

Today, geospatial data and technology can be applied to nearly every major USAID program. For example, the Resilience, Environment, and Food Security (REFS) relies on spatial data to select the areas where each Feed the Future (FTF) country portfolio aims to have the greatest impact. It also makes use of remote sensing to help farmers in Sub-Saharan Africa optimize local fertilizer use. Together, the dedicated geospatial units, Mission specialists, and partner community provide the basis for implementing this Strategy.



Maps are an essential part of how BHA tells its story. Working with the BHA Maps team, we are able to show the public where our aid is going (in many cases we work in countries that are unfamiliar to the American public), why it's challenging to get aid there (this could be because of the challenging landscapes/geography or vast distances between different locations), and why some communities face greater threats from disasters and require more assistance.

PUBLIC OUTREACH OFFICER

## HOW USAID USES GEOGRAPHIC DATA

The Agency and its Geospatial CoP rely on three categories of geographic data layers to make programmatic and operational decisions:

- **Activity location data**, which illuminate the locations where USAID-funded activities are implemented and the places that are intended to benefit.
- **Geographically disaggregated indicator data**, which illuminate the geographic distribution of USAID activity performance indicators.
- **Thematic data**, which illuminate the geographic distribution of specific foundational layers such as road and river networks, as well as descriptive layers such as population density and poverty rates.

### INTEGRATING MULTIPLE TYPES OF DATA TO TARGET HUMANITARIAN ASSISTANCE

Since 1985, USAID's Famine Early Warning Systems Network (FEWS NET) has continuously refined its predictive geospatial analyses to provide the Agency with the food-security and climate-related decision support it needs to deliver timely humanitarian assistance. By integrating satellite imagery with other critical context indicators (such as nutrition trends, market prices, conflict dynamics, and climate events) and local expert insights, FEWS NET can forecast food security needs for more than 28 priority countries up to eight months in advance.

These data can be used throughout all phases of the Program Cycle. Thematic data are especially useful during regional or country strategic planning and activity design, whereas activity location data and geographically disaggregated indicator data are typically collected and analyzed throughout the implementation, monitoring, and evaluation phases. Together, each of these categories of data help USAID and its partners better understand the environments within which they are operating, along with how they can adapt and improve programming based on those insights.

### APPLYING A GEOGRAPHIC APPROACH TO STRATEGIC PLANNING: THE KENYA MISSION'S COUNTRY DEVELOPMENT COOPERATION STRATEGY (CDCS)

In 2018, USAID/Kenya requested the GeoCenter's support in developing a new, data-driven CDCS. Together with the Mission's GIS Specialists, the GeoCenter team compiled multiple diverse datasets, including the Kenyan government's own budget data, to create a series of maps about poverty, demographics, health, shocks, humanitarian cases, and budgets for every county in the country. For every county in the country, the maps enabled data-rich discussions with stakeholders across the country, helped the Mission prioritize future areas of intervention, and strengthened the Mission's capacity to use a geographic approach in its planning.

Effective data use requires a lifecycle approach. USAID has established several geospatial-specific policies and guidance to enhance this data lifecycle, from collection to analysis to sharing results:

- ADS 201/579 Mandatory Reference: Activity Location Data, which requires Operating Units to collect the location of their activities and the people affected by those activities.
- ADS 201 Additional Help: Data Disaggregation by Geographic Location, which provides guidance on collecting and analyzing performance indicators.
- ADS 579 Additional Help: Geographic Data Collection and Submission Standards, which provides guidance and standards on how to collect geographic data, in support of the ADS 579 data lifecycle requirements to collect and make accessible development data.

Through these policies and guidance, USAID has established the foundation for using geographic data throughout the Program Cycle. Simultaneously, the Office of the Chief Information Officer (M/CIO) is leading the deployment of information technology (IT) systems, such as the Development Information Solution (DIS), that will support collecting and visualizing the locations of USAID activities for all Agency Operating Units. Integrating activity location data stored in the DIS with thematic data such as the Demographic and Health Surveys datasets will enhance understanding about the Agency's activities in the context of local economic and social conditions.

## WHY USAID NEEDS A GEOSPATIAL STRATEGY

Despite this progress, a thorough analysis of the strengths, weaknesses, opportunities, and threats (SWOT) in the use of geospatial information at USAID identified several interrelated barriers to the wider adoption of a geographic approach across the Agency. These include a lack of awareness about how to apply geospatial information and technology, uneven capacity across the Agency, fragmented systems for collecting and using geospatial data, and insufficient resources. The identification of these challenges informed this Strategy's strategic framework. (Additional information about the SWOT analysis and other factors that influenced the design of and justification for this Strategy is available in Annex II.)

For USAID to advance international development outcomes and fully embody its leadership role in promoting geospatial solutions through partnerships and innovation, it must strengthen its own internal IT systems and capacity. Many within the Agency remain unaware of the extent to which a location and its surrounding geography can influence development outcomes. Even those familiar with the benefits of mapping or other geospatial applications require additional support to integrate geospatial data and technology fully into their own decision-making, strategic planning, and adaptive programming.

As a result, resourcing and investment have not kept pace with the growing demand for geospatial services or the speed of new geospatial technology and innovation. There is uneven geospatial capacity across the Agency, and hiring more geospatial professionals alone is not enough to fully realize the benefits of an Agency-wide geographic approach. Siloed systems of data collection, storage, and analysis, along with the inconsistent application of location names and levels of disaggregation, make the geospatial data landscape at USAID disorganized and inefficient.

### LEVERAGING GLOBAL HEALTH INVESTMENTS FOR THE BENEFIT OF ALL USAID SECTORS

The USAID-funded Demographic and Health Surveys Program provides a robust repository of nationally representative, geographically referenced household survey data for more than 90 countries. By geospatially enabling its data, the Demographic and Health Surveys Program can be easily integrated with other geographic features such as infrastructure, roads, and school locations, expanding its application well beyond the health sector. With these data, development organizations can better understand geographic and temporal trends that are vital for effective planning and implementation.



“The better we understand where we work, the deeper we can drill into how our programs are impacting actual change for Tanzanians, at an individual, community, district, or regional level. The data helps us focus our own review of our progress and ensures that we are measuring our impact appropriately. The more our teams get involved with requesting and using geospatial data, the better they get at telling USAID’s story of delivering transformative change to the people of Tanzania.”

USAID/TANZANIA PROGRAM  
OFFICER

# GUIDING PRINCIPLES

**S**even guiding principles underpin the Geospatial Strategy. These principles are informed by USAID's key principle of Do No Harm and the Principles for Digital Development, which were co-created and endorsed by several donors and multilateral organizations, including USAID.

- 1. Support evidence-based decision-making.** Enriching other forms of data and information with analyses of the geographic distribution of social, economic, and environmental phenomena offers novel insights and strengthens the Agency's culture of data use.
- 2. Expand availability, accessibility, and awareness of geospatial data, tools, and training.** Connecting people to geospatial data and information that is FAIR (findable, accessible, interoperable, and reusable) and providing opportunities to develop the skills to use them and reflect critically on their appropriate use allows the Agency to incorporate more rigorous analytic approaches and methodologies in its programs.
- 3. Advance equity.** Leveraging geospatial insights to better understand patterns of inequality and the systems that perpetuate them enables decision makers to design development programming that addresses and mitigates inequity.
- 4. Co-create with key stakeholders.** Engaging stakeholders directly in the creation and governance of context-appropriate geospatial products enables USAID to design and implement development programs that are inclusive and responsive.
- 5. Design for sustainability and scale.** Orienting the Agency's geographic approach around open standards-based interoperable and adaptable products, services, and digital public goods (commonly referred to as DPGs) that can be maintained by end users enhances sustainability, promotes ownership, and prevents duplication of effort.
- 6. Fuel innovation through partnership, collaboration, and learning.** Providing opportunities for diverse partners and stakeholders to collaborate and learn together builds relationships and accelerates the creation of innovative geospatial approaches that improve development programming.
- 7. Protect privacy, integrity, and security of data.** Applying standards to minimize unauthorized access to and manipulation of geospatial data to ensure that USAID's programs respect data protection practices for all people, including historically marginalized groups or people in vulnerable situations.



## USAID/NEPAL MAPS HISTORICALLY MARGINALIZED COMMUNITIES TO ADVANCE INCLUSIVE DEVELOPMENT

The GIS Specialist in USAID/Nepal conducted a geographic analysis to identify areas with the highest concentration of historically marginalized communities in Nepal. Indicators of marginalization included caste, ethnicity, gender identity, sexual orientation, language, and religious affiliation. The analysis provided a visual snapshot of the geographic distribution of social vulnerabilities, multi-hazard exposure, and COVID-19 risks. This analysis has become a valuable resource to inform how new programming can be targeted to deliver on the Mission's commitment to inclusive development and improve results.

## ETHICAL CONSIDERATIONS OF COLLECTING AND USING GEOSPATIAL INFORMATION

Despite its many advantages, the use of geospatial data and technology is not without its risks. USAID's Digital Strategy succinctly outlines some of the risks inherent in adopting any digital technology, including:

- **privacy and security concerns** (for example, the collection and manipulation of mobile location data for surveillance or digital repression without customers' awareness or full understanding of what is being tracked, how it is being shared, and why).
- **exclusion of historically marginalized populations<sup>2</sup>** (disparate access to digital geospatial tools affects which geographic areas and features are mapped, which populations participate in the mapping process, and which populations are able to leverage the resulting datasets and analytical products for decision-making).
- **perpetuation of systemic biases** (which is reflected in common assumptions shown in modern maps such as the distortions of different cartographic projections, as well as in advanced mapping applications that rely on artificial intelligence [AI] and machine learning derived from incomplete or skewed data).
- **spread of misinformation, disinformation, and malinformation (MDM) or violent hate speech** (for example, similar to any open or public platform that relies on users to generate and auto-regulate content, there are both benefits and risks of open mapping).

As digital geospatial data and tools become more common, there is a growing awareness in the broader geospatial community of the importance of using them in a responsible manner. For example, EthicalGEO is an initiative of the American Geographical Society that has sparked global dialogue about the ethical challenges and opportunities posed by the many geospatial technologies and data sources that are reshaping society.<sup>3</sup> USAID and its partners also authored a report, *Considerations for Using Data Responsibly at USAID*, that provides guidelines for improving the management and use of any form of data, including geospatial data, at USAID. Similarly, USAID is working with partners on due diligence in technology investment planning to ensure the protection of human rights. Guided by the Strategy's principles outlined above, USAID will use geospatial information to protect and elevate local perspectives and expertise in ways that are ethical and responsible.

# STRATEGIC FRAMEWORK



An “**enterprise geospatial infrastructure**” is a system of tools and applications that securely store, manage, share, analyze, and visualize geospatial data.

## VISION

The Geospatial Strategy envisions a future in which a **geographic approach to development empowers USAID and its partners to apply all forms of data more effectively to advance development and humanitarian assistance outcomes.** The promise of a fully realized geographic approach is that communities will be better equipped with the essential data, technology, and capacity needed to thrive in their own modern and resilient societies.

## GOAL

As a step toward achieving this vision, over a five-year period **the Strategy will institutionalize the Agency’s use of geospatial technologies and capabilities to achieve greater efficiency in programs, operations, and development outcomes.**

This vision and goal will be supported by the following four strategic objectives:

### STRATEGIC OBJECTIVE 1

**EXPAND ACCESS TO GEOSPATIAL DATA AND TOOLS TO STRENGTHEN THE PLANNING AND IMPLEMENTATION OF USAID PROGRAMS**

Geospatial data and tools are essential for providing evidence to inform USAID’s programming. Long-established USAID investments that create and use geospatial and remote sensing data, such as the Demographic and Health Surveys program and FEWS NET, are invaluable resources for understanding societal conditions across sectors. Only through such investments can USAID generate and coordinate the geospatial information and tools necessary to support its operations, strategic planning, activity design, program evaluation, and learning. Yet, despite individual office and program investments, the Agency does not currently have the necessary data and technology environment to enable all Operating Units to use geospatial information systematically and coherently throughout their operations.

USAID aims to put in place an **enterprise geospatial infrastructure** that will include both virtual and desktop-based tools for spatial data management, storage, visualization, and analysis. This spatial data infrastructure will enable access to a standard set of geospatial data and software applications for the USAID workforce, from viewing basic maps to advanced data processing and visualization. It will include foundational geospatial data layers such as administrative boundaries, place names, and physical features, as well as standardized thematic data such as disease incidence, temperature variations, and literacy rates.

As the industry drives technological advances, the demand for geospatial data and analysis at USAID will only expand. To expand access to geospatial data and tools and thereby increase the efficiency of operations and programs, USAID will continually invest in and modernize its systems architecture, applications, and data services.

**IR 1.1: Enable USAID workforce access to an enterprise geospatial infrastructure as an integrated component of the Agency’s IT architecture.**

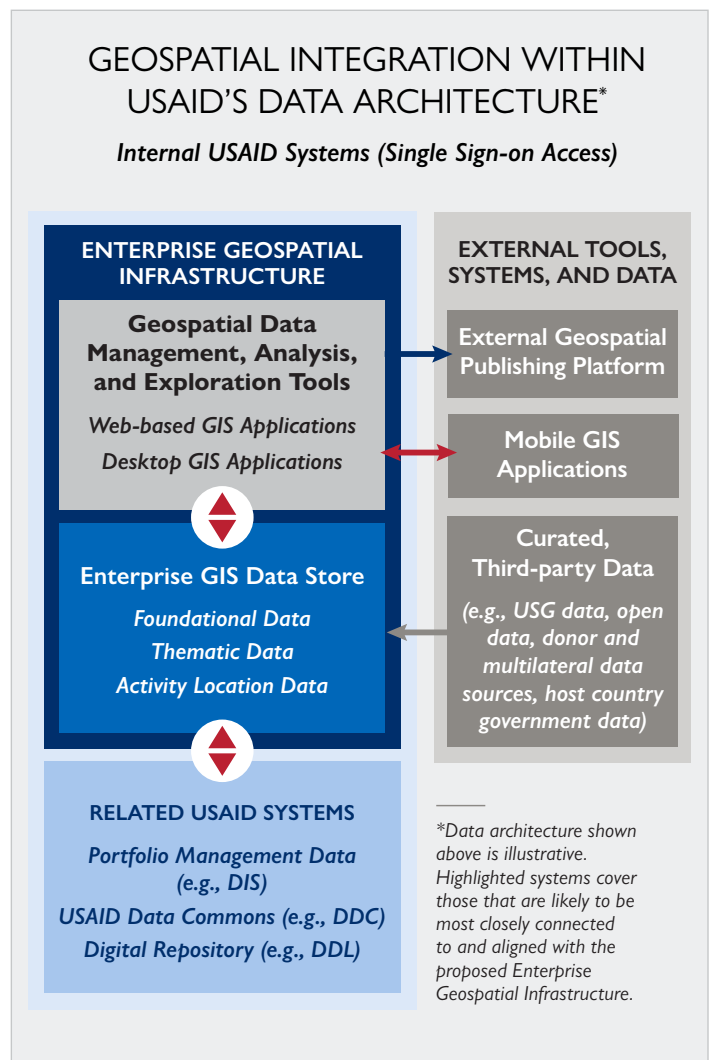
**TARGETS:**

- ⊙ **By 2027, the full USAID workforce has access to geospatial technology.**
- ⊙ **By 2027, at least 75 USAID Operating Units are using geospatial technology.**

Adoption of an enterprise geospatial infrastructure will be integral to the Agency’s IT architecture and modernization plans. The GeoCenter, USAID’s Geospatial CoP, PLR, and M/CIO will collaborate to design, develop, and deploy policy guidance and tools for the USAID workforce to view, capture, store, access, analyze, visualize, and publish geospatial data. This effort will include an investment and maintenance plan to ensure that the infrastructure and data management can be sustained and meet U.S. government cybersecurity requirements.

An enterprise geospatial infrastructure will provide the Agency with options for spatial data exploration, visualization, and analytics that encompass both web-based technologies and desktop solutions. It will provide capabilities to store geospatial data in native GIS file formats and capture data using mobile devices. It will also allow access to other USAID data repositories, such as the Development Information Solution and the Development Data Library. To facilitate access, the enterprise geospatial infrastructure will aim to provide single sign-on access to virtual geospatial databases and tools.

The GeoCenter and USAID’s Geospatial CoP will coordinate with the Data Administration and Technical Advisory (DATA) Board, the Digital Sector Council, M/CIO, PLR, and other key Agency stakeholders to ensure that any technology and data acquired for the enterprise geospatial infrastructure meets the needs of the broader Agency without duplicating efforts, including support for USAID’s Policy Framework, Agency Learning Agenda, Program Cycle Operational Policy (ADS 201), and efforts to advance Knowledge Management and Organizational Learning at USAID. USAID will rely on the enterprise infrastructure to disseminate geospatial data, analyses, and knowledge products both internally and externally. Sharing these products will help USAID promote knowledge exchange to improve development and humanitarian assistance outcomes.





## MORE TREES, LESS DISEASE: COMBINING GEOSPATIAL DATA FROM DIFFERENT SECTORS TO UNDERSTAND HEALTH OUTCOMES

In 2018, USAID/India worked with the GeoCenter to combine satellite data with Demographic and Health Surveys' data to investigate whether a relationship existed between forest cover and health outcomes. After accounting for attributes such as wealth, education, age, improved water supply, and runoff, the analysis found that in areas with at least 10 percent forest canopy cover, there was a lower prevalence of diarrheal disease. This insight created an opportunity for the Mission to engage in strategic discussions across the environment and health sectors. Developing the Agency's enterprise geospatial infrastructure and increasing access to standardized data sets will allow USAID to perform innovative, cross-sectoral analyses like this one more efficiently and effectively.

## IR 1.2: Collect, curate, manage, and store standard geospatial data.

### TARGET:

- ◎ **By 2027, at least 75 USAID Operating Units are collecting standardized location-based data about USAID activities.**
- ◎ **By 2027, 100 percent of USAID Operating Units will have access to standard foundational and thematic geospatial datasets.**

With access to standardized foundational and thematic geospatial data that can be integrated with activity location and indicator data, the USAID workforce will be able to gain new and locally tailored insights to support its programs. Standardizing the collection, acquisition, and maintenance of all USAID geospatial data enables interoperability and data sharing within USAID's enterprise geospatial infrastructure. It also creates a common framework for the Agency to understand the context of its work. Collecting and using the same foundational geospatial datasets consistently across all of USAID's systems creates opportunities for cross-sectoral collaboration, continuous learning, and enhanced operational and programmatic decision-making.

### USING AGENCY TOOLS TO SUPPORT A GEOGRAPHIC APPROACH TO DEVELOPMENT

The Development Information Solution is an Agency-wide portfolio management platform that includes a functionality to map activity locations. The Development Information Solution, when coupled with geographic data collected according to ADS 201 and ADS 579, will enable USAID to better visualize where it is working and assess programmatic gaps.



### STRATEGIC OBJECTIVE 1 IMPLEMENTATION FOCUS AREAS

- ▶ **Develop an enterprise geospatial infrastructure that is integrated with other USAID technology applications and data environments.**
- ▶ **Improve access for the USAID workforce to geospatial tools, including commercial and open-source software options, and single sign-on capability.**
- ▶ **Provide tools and applications that enable USAID to externally publish knowledge products.**
- ▶ **Establish processes for advising new Agency-wide investments in mapping software, geospatial tools, and foundational and thematic geospatial datasets.**
- ▶ **Make available standard foundational and thematic datasets to maximize their use by the USAID workforce.**
- ▶ **Promote geospatial data stewardship to augment Agency capacity for managing enterprise geospatial data.**



Photo credit: USAID

## STRATEGIC OBJECTIVE 2

### STRENGTHEN USAID'S CAPACITY TO USE GEOSPATIAL DATA, TECHNOLOGY, AND EXPERTISE FOR DECISION-MAKING

The last ten years have seen a proliferation of geospatial technology and data that are available for both expert and public use. Geospatial experts leverage a range of robust software applications for analysis and visualization. Increasingly, non-technical users are also gaining access to web-based geospatial tools, including open platforms spanning every major development sector. Data sources such as satellite imagery and real-time location data that were once restricted to a limited audience are now digital public goods. This rapid evolution in geospatial technology and data availability reinforces the importance of ensuring that USAID's staff can benefit from these advancements to address the growing landscape of development and humanitarian challenges.

#### IR 2.1: Expand geospatial literacy and skill sets to advance an Agency culture of data-driven decision-making.

##### TARGET

- ⊙ Each year, the Geospatial CoP provides at least 15 geospatial capacity building events for the USAID workforce.

To improve geospatial literacy and incorporate geographic insights into Agency decision-making, USAID will conduct outreach to build awareness of the geographic approach to development and of opportunities to leverage the expertise of geospatial professionals. USAID will deliver training and workshops to staff across the Agency. The course content will be customized to align with the participants' roles in the Agency, familiarity with geospatial data and tools, and training needs. The GeoCenter and USAID's Geospatial CoP will leverage its capacity

#### Trainings promote geospatial literacy

Since 2011, the GeoCenter has trained over 2,000 USAID staff on geographic concepts, analytical processes to improve evidence-based decision-making, and GIS tools. This has led to a better understanding of how to use data analysis throughout the Program Cycle and increased engagement with geospatial professionals.

building efforts to monitor and promote the ongoing implementation of the Geospatial Strategy, advancing the Agency's understanding of policies, technologies, and partnerships that will shape the Agency's geospatial landscape.

### A GEOGRAPHIC APPROACH HELPS FOSTER A CULTURE OF COLLABORATION AND DATA USE

The USAID/Colombia Mission uses geospatial data to track security incidents and armed conflict, illicit coca crop production, deforestation, and issues related to Venezuelan migration. Mission staff recognize that a geographic approach to development strengthens USAID's adaptive management and impact by equipping the Mission to reach the right people, with the right interventions, at the right time. The geographic approach has become so important that it is now a key part of the Mission's culture of collaboration, learning, and data use.

USAID will further strengthen its network of Mission-based GIS Specialists in the Geospatial CoP, already an invaluable human capacity asset for enhancing Agency programming. As digital technologies continue to influence international development, the Geospatial CoP is uniquely positioned to help integrate these tools into USAID's work, further advancing the Agency's efforts to become more data-driven.

These efforts will expand the geospatial capacity of USAID's current workforce. As the demand for geospatial solutions grows, the Agency's Chief Geographer, the GeoCenter, and the Geospatial CoP will continue to advocate for increased geospatial expertise, employing more GIS Specialists and other staff with experience using geospatial and data analysis more generally for international development and humanitarian assistance.

### STRATEGIC OBJECTIVE 2 IMPLEMENTATION FOCUS AREAS

- ▶ Deliver customized training and workshops to improve USAID's geographic literacy and ability to use, store, and share data across sectors and major Agency and Presidential initiatives.
- ▶ Promote workforce participation in geospatial learning opportunities.
- ▶ Increase workforce awareness of the capabilities offered by geospatial professionals to address Agency priorities.
- ▶ Support USAID's Geospatial CoP in creating a culture of data use by engaging USAID communities (e.g., Program Officers and Youth, MEL, and Digital Development Advisors) and sharing best practices.
- ▶ Advocate for hiring at least one GIS Specialist in each Regional Bureau, and additional Mission-based GIS Specialists where needed.



### An active geospatial community helps build capacity throughout the Agency

The Agency has an active geospatial community that includes more than 70 GIS Specialists from nearly 35 Missions and six Washington, DC-based bureaus. The GeoCenter fosters this community by hosting monthly events and an annual workshop in Washington, DC for USAID's dedicated GIS Specialists.

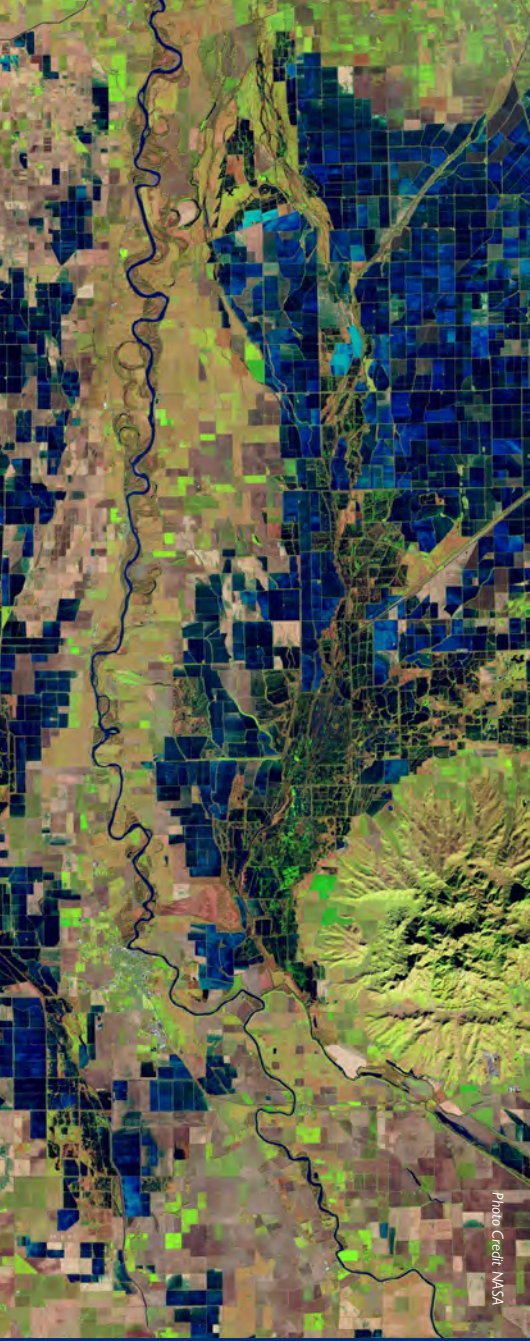


Photo Credit: NASA

## STRATEGIC OBJECTIVE 3

### ADVANCE USAID POLICIES AND PRACTICES BY APPLYING GEOSPATIAL INFORMATION

Activating a geographic approach throughout the Agency in support of USAID’s priorities requires clearly articulating the role of geographic information in USAID’s policies and providing guidance to implement their respective requirements. Among development and humanitarian policy documents (such as the Agency’s Climate Strategy 2022-2030, Gender Equality and Women’s Empowerment Policy, and Youth in Development Policy), geography is a cross-cutting dimension that creates a common link to leverage opportunities across sectors. Operational policies such as ADS 201 and ADS 579 establish which geospatial data should be collected and how they can be used throughout the Program Cycle. They also define common standards and methods to manage USAID’s geospatial data assets throughout the data lifecycle, promoting interoperability and data reuse<sup>4</sup>

#### USAID/GEORGIA APPLIES A GEOGRAPHIC APPROACH TO DEVELOPMENT THROUGHOUT THE PROGRAM CYCLE

With the help of the Mission’s GIS Specialist, USAID/Georgia has integrated geospatial analysis and visualization into the Program Cycle. The Mission uses these tools to inform the geographic footprint of new activity designs and monitor operations across the country during implementation. Site-level location information collected via mobile phones enables the Mission to track progress toward the CDCS objectives. Development of an interactive dashboard displaying investments by region and municipality further integrates location-based information into Mission processes. Geographic visualizations allow the Mission to better communicate its work.

#### VISUALIZING COUNTRY DIGITAL ECOSYSTEMS

Mapping in support of USAID’s Digital Ecosystem Country Assessments provides critical context for implementing the Digital Strategy. The maps produced show digital infrastructure alongside USAID activities and population density, highlighting each country’s unique operating environment.

#### IR 3.1: Integrate geospatial data and analysis into the formulation and implementation of relevant USAID operational, development, and humanitarian policies.

##### TARGET:

- ⊙ Each year, OUs leading the formulation and implementation of USAID operational, development, and humanitarian policies consider and, as relevant, integrate geospatial data and analysis into policy documents and/or implementation plans to support sustainable outcomes.

The GeoCenter will advise Bureaus and Independent Offices that are formulating or revising policy documents and Regional or Country Development Cooperation Strategies (R/CDCSs) on the role of geospatial information. The GeoCenter will also provide relevant guidance and technical assistance for integrating a geographic approach into policy implementation across USAID.



**IR 3.2: Adopt standards for geospatial data collection, management, and sharing that optimize interoperability and fulfill USAID data policy requirements.**

**TARGET:**

- ⦿ **By 2027, governance procedures and standards for collecting, managing, and sharing USAID’s geographic data assets are established.**

ADS 579 established data as a strategic asset. Dedicated geospatial data governance procedures and standards ensure that geospatial data can be effectively curated and managed for optimal use and availability. Adopting procedures and standards, under the auspices of the Data Administration and Technical Advisory Board (DATA Board), will align with USAID’s data lifecycle approach.<sup>5</sup> This effort includes defining different types of geospatial assets and machine readable file formats that promote reuse, establishing standard geographic names that are interoperable with other internationally recognized standards for use across all relevant USAID IT systems, and developing approaches to mitigate risk and protect privacy. These data standards, operating procedures, and resources will also align with the U.S. NSDI framework and uphold the values articulated in USAID’s Digital Strategy.

To implement USAID’s geospatial data standards, the Agency will reinforce incorporation of standard procurement award language that clearly communicates the digital data governance requirements that are expected of implementing partners. USAID will also work with the interagency, partners, and foreign governments

to encourage the sharing of relevant data, as appropriate, and in alignment with the Agency’s policies. These efforts will help increase access to valuable geospatial data and improve reporting to the International Aid Transparency Initiative (IATI).

**STRATEGIC OBJECTIVE 3  
IMPLEMENTATION FOCUS AREAS**

- ▶ **Integrate geospatial data and analysis into the formulation and implementation of relevant USAID operational, development, and humanitarian policies.**
- ▶ **Develop and distribute guidance to strengthen the integration of geospatial data and analyses throughout the Program Cycle.**
- ▶ **Develop standard solicitation and award language to ensure geospatial data are collected and submitted by implementing partners.**
- ▶ **Promote guidance for data sharing with relevant partners.**
- ▶ **Establish standards for collecting, managing, and sharing geospatial data that are sensitive to mitigating data risk and are integrated into relevant USAID enterprise systems.**

## STRATEGIC OBJECTIVE 4

### PROVIDE GLOBAL LEADERSHIP IN APPLYING GEOSPATIAL SOLUTIONS FOR DEVELOPMENT AND HUMANITARIAN ASSISTANCE

The international development and humanitarian response communities benefit from the global organizations and pioneering leaders that established critical standards and precedents that make volumes of geospatial data available and accessible to the public. The U.S. government has also been at the forefront of funding, creating, and sharing innovative data and geospatial technologies, such as Landsat imagery and the Global Positioning System (GPS). These initiatives have expanded how people understand their relationship to the world. Opening GPS for public and commercial use helped catalyze a revolution in location-based mobile technologies that are now taken for granted. U.S. government investments in these digital public goods have benefitted the global economy and significantly advanced the potential for geospatial programming. According to the United Nations Committee of Experts on Global Geospatial Information Management, “the next five to ten years will see significant developments in the maturity and application of already well-established technologies across the geospatial industry.”<sup>6</sup> Given its vast programmatic footprint, USAID is well-positioned to serve as a global leader in harnessing the power of these transformative geospatial technologies for international development and humanitarian assistance.

#### IR 4.1: Advance partnerships and innovative geospatial solutions that respond to local and global priorities.

##### TARGET:

- ⊙ **Through 2027, USAID will engage at least 75 external actors<sup>7</sup> to promote the use of geospatial data and analysis for international development and humanitarian assistance.**

Strategically engaging partner countries and other local actors is critical to the success of this Strategy. Geospatial information can enrich the digital ecosystems of low- and middle-income countries, strengthen their digital workforce, and create competitive economic opportunities. By intentionally engaging with partners on the application of geospatial tools to reach out to historically marginalized populations, we can elevate local voices, perspectives, leadership, and entrepreneurship; foster transparency; and advance inclusive development. Customized analyses can also be used to further engage citizens as consumers and stewards of locally relevant geospatial information. USAID will invest in partnerships and innovative geospatial solutions to support the Agency’s programming and sustainable development in the countries it serves. Consistent with USAID’s commitment to locally led development, these partnerships and



Photo credit: NASA

#### GROUP ON EARTH OBSERVATIONS: PIONEERS IN GLOBAL GEOSPATIAL COLLABORATION

The Group on Earth Observations (GEO) is an intergovernmental partnership that brings together governments, academic and research institutions, data providers, businesses, engineers, scientists, and other experts to use Earth observation data to address global challenges that transcend national and disciplinary boundaries. These partners represent more than 100 countries and approximately 140 participating organizations. USAID contributes to GEO as a leader in applying Earth observations to international development and humanitarian assistance and by strengthening partner countries’ capacities to access and use geospatial technologies.

solutions will be responsive to the capacities and priorities of local stakeholders. USAID will work with partner countries to identify issues and areas where the implementation of the Strategy can complement local systems.

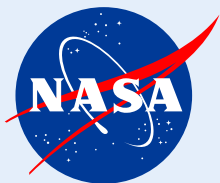
### LEVERAGING PARTNERSHIPS TO ADVANCE AND PROMOTE EMERGING GEOSPATIAL INNOVATIONS

USAID’s Bureau for Resilience, Environment, and Food Security (REFS) partners with academic and interagency researchers to assess agricultural productivity and human well-being. Satellite imagery provides an opportunity to collect and analyze data more frequently, at a lower cost, with greater geographic coverage than household surveys. These partnerships have led to the development of new datasets and peer-reviewed articles, including “Using Satellite Imagery to Understand and Promote Sustainable Development”<sup>18</sup> and “Multivariate Random Forest Prediction of Poverty and Malnutrition Prevalence.”<sup>19</sup> REFS plans to continue to invest in maturing these innovations to enhance development and humanitarian outcomes.

In addition to local actors, USAID partners with a wide range of institutions in the geospatial community through both formal, funded relationships and informal, unfunded collaborations. USAID will draw on its years of experience to encourage others within the broader international community to apply geospatial solutions to their

own development and humanitarian programming. The Agency will prioritize partnerships that promote digital public goods, international standards, and geospatial solutions that address local and global challenges. Strong partnerships can enable more responsible use, management, and sharing of open data and technology; strengthen capacity through knowledge sharing and learning; and uncover innovative solutions to emergent challenges.

Through its global leadership, USAID will promote the types of policies, funding mechanisms, and programs that enable the innovative use of geospatial data and technology to advance development outcomes and humanitarian response. In coordination with the internal Data Administration and Technical Advisory (DATA) Board and Digital Sector Council, the Agency’s Chief Geographer will advocate among senior-level leadership to elevate innovative and responsible applications of geospatial technology, such as remote sensing, machine learning, and geospatial artificial intelligence (GeoAI). In addition to promoting digital public goods and international standards, USAID will explore how other geospatial innovations and enabling technologies, such as those summarized in Annex IV, can advance development objectives. These technologies are rapidly evolving. A geospatial for development research agenda that helps identify new opportunities and how to expand previous successes will bolster the implementation of this strategic objective. It will also leverage the Agency’s ongoing work regarding the responsible use of AI and machine learning.<sup>10,11,12</sup>



### ADVANCING GEOSPATIAL TOOLS THROUGH PARTNERSHIPS

SERVIR—a collaboration between USAID, the National Aeronautics and Space Administration (NASA), partner organizations, and governments around the world—harnesses free and open satellite Earth observation data to address critical challenges in food security, water resources, weather and climate, land use, and disasters. SERVIR helps support programs such as micro-insurance products for women farmers, improved drought and flood early-warning systems, and air-quality monitoring and alerts. With multiple hubs around the world, SERVIR’s collaborative approach helps organizations and governments develop solutions for improved resilience to climate change and sustainable resource management at local, national, and regional scales.



## YOUTHMAPPERS EMPOWERS UNIVERSITY STUDENTS WITH DIGITAL MAPPING AND LEADERSHIP SKILLS

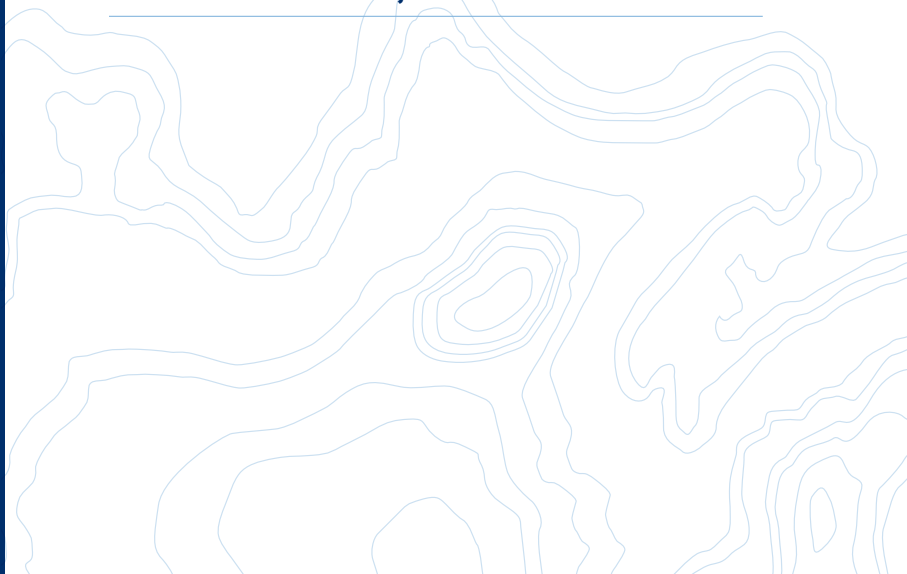
The YouthMappers program is a pioneering example of USAID's commitment to addressing digital divides through inclusive engagement and co-creation with local stakeholders. YouthMappers is a network of thousands of students in more than 380 universities across more than 72 countries. Together, the students have contributed more than 20 million edits to the OpenStreetMap platform, a digital public good with more than eight million registered users,<sup>13</sup> and provided valuable information for local communities to harness for decision-making. In response to gender divides in geospatial data, the open mapping community, and the broader geospatial industry,<sup>14,15</sup> the YouthMappers program introduced the Everywhere She Maps initiative in 2020. The program aims to increase opportunities for women and improve the quality and availability of geographic data that support women's security, health, livelihoods, and overall well-being.

## PARTNERSHIPS ENABLE DATA SHARING IN COUNTRIES AFFECTED BY DISASTERS AND COMPLEX EMERGENCIES

USAID has partnered with the United Nations Office for the Coordination of Humanitarian Affairs (UN-OCHA) and the broader humanitarian community to adopt Common Operational Datasets (CODs). Standardizing identifiers for populated places facilitates data sharing with partners involved in a disaster response, regardless of location and language. Additionally, these standards allow for existing and new data to be used for response, planning, and preparedness by local and international organizations.

## STRATEGIC OBJECTIVE 4 IMPLEMENTATION FOCUS AREAS

- ▶ **Formalize partnerships that make geospatial data and technology available in support of host-country capacity and as digital public goods.**
- ▶ **Partner with the interagency, international bodies, donors, the private sector, and academic communities to advance geospatial solutions for international development.**
- ▶ **Establish a research agenda to identify and invest in innovative, responsible, and inclusive geospatial technologies that catalyze development and humanitarian assistance outcomes.**
- ▶ **Support Mission GIS champions to engage in-country stakeholders to promote geospatial innovations that advance Mission development and humanitarian objectives.**





# VISION

*A geographic approach to development empowers USAID and its partners to more effectively apply all forms of data to advance development and humanitarian assistance outcomes*

# GOAL

*Institutionalize the Agency's use of geospatial technologies and capabilities to achieve greater efficiency in programs, operations, and development outcomes*

**SO1:** Expand access to geospatial data and tools to strengthen the planning and implementation of USAID programs

**IR 1.1:** Enable USAID workforce access to an enterprise geospatial infrastructure as an integrated component of the Agency's IT

→ Invest in and adopt new commercial and open source geospatial software and tools across Agency Operating Units using collaborative planning processes and USAID forums

→ Create and maintain a shared digital repository to store and disseminate relevant USAID and thematic geographic data assets for Agency and, when possible, public use

**IR 1.2:** Collect, curate, manage, and store standard geospatial data

→ Increase collaboration and investment in the collection and acquisition of sectoral and foundational geospatial data

→ Provide the USAID workforce with standardized thematic and foundational geospatial datasets

**SO2:** Strengthen USAID's capacity to use geospatial data, technology, and expertise for decision-making

**IR 2.1:** Expand geospatial literacy and skill sets to advance an Agency culture of data-driven decision-making

→ Create and maintain geospatial trainings, workshops, and resources appropriate for both GIS professionals and general Agency staff, and integrate geospatial topics into other USAID data literacy initiatives

→ Increase awareness of the geographic approach and related policies, technologies, and partnerships to support Agency decision-making

→ Strengthen the role of USAID's Geospatial Community of Practice in creating a culture of geospatial data use

→ Advocate for the employment of Agency field and Washington-based staff with geospatial and data science skills and experience

**SO3:** Advance USAID policies and practices by applying geospatial information

**IR 3.1:** Integrate geospatial data and analysis into the formulation and implementation of relevant USAID operational, development, and humanitarian policies

→ Advance the use of geospatial data and technology to inform USAID policy formulation and implementation

→ Develop and distribute guidance to USAID OUs and implementing partners on integrating geospatial data and analysis into the formulation and implementation of relevant policies

**IR 3.2:** Adopt standards for geospatial data collection, management, and sharing that optimize interoperability and fulfill USAID data policy requirements

→ Develop standard solicitation and award language to implement geospatial data collection and reporting requirements pursuant to ADS 579

→ Establish a USAID geographic location and name standard that is implemented across all USAID systems and governed by a master data management plan

→ Support the development of guidance and templates for data sharing agreements with foreign governments, multilateral partners, USG, and other institutions

**SO4:** Provide global leadership in applying geospatial solutions for development and humanitarian assistance

**IR 4.1:** Advance partnerships and innovative geospatial solutions that respond to local and global priorities

→ Collaborate with other donors and private sector partners to invest in and promote digital public goods

→ Elevate geospatial innovations as essential enablers of improving development and humanitarian assistance outcomes

→ Support partner country digital development through the integration of geospatial data and technology

**SO** denotes Strategic Objective, **IR** denotes Immediate Result

# IMPLEMENTATION APPROACH

**T**his Strategy's implementation takes into consideration the existing resources, coordination structures, and partnerships available to achieve its objectives. Each of the implementation focus areas has been formulated to be actionable, as detailed in the Strategy's internal implementation plan. The Strategy's implementation will be monitored and, as necessary, adapted to integrate lessons learned and good practices and to respond to evidence and trends that emerge during the Strategy's five-year lifespan. Additional guidance documents and tools will be developed and made available, as necessary, to support implementation of the Strategy.

## RESOURCES AND FUNDING

The majority of the costs associated with implementing the Geospatial Strategy are being borne by Operating Units through existing activities and are essential for maintaining the momentum built by the Agency over the last several decades. The GeoCenter will be responsible for monitoring the Strategy's implementation, in coordination with M/CIO, to include supporting the integration of implementation focus areas in Operating Unit budget planning. The Geospatial Strategy will help USAID be more efficient and coordinated in leveraging those resources and activities. The priorities for implementation include:

- Investing in the USAID GeoCenter as the Agency's central hub for geospatial analysis and coordinator of this Strategy's implementation.
- Acquiring public, commercial, and academic sources of geospatial data and making those data accessible to USAID staff for their programs.
- Strengthening the linkages of existing investments—such as FEWS NET, SERVIR, and DHS—to other current and future programs.
- Establishing within ADS 101 the role of USAID Chief Geographer and designating it as the Senior Agency Official for Geospatial Information, as defined by the Federal Geographic Data Committee.
- Developing an enterprise geospatial infrastructure solution that minimizes inefficiencies of individual Operating Unit GIS software purchases.
- Investing in geospatial data stewardship to raise Agency capacity for managing enterprise geospatial data and advancing standards to promote interoperability and usability.
- Investing in M/CIO's capacity to integrate geospatial technology and data as part of broader responsibilities for maintaining USAID's IT architecture.
- Continuing to develop and update training programs to build geospatial capacity, customized according to the range of needs and applications of geospatial analysis across the Agency.
- Implementing Agency geospatial standards, such as USAID location and place names, and requirements articulated in ADS 579 and ADS 201, such as collecting activity location data.
- Establishing a geospatial research agenda, in alignment with the Agency's Learning Agenda, and guide implementation of the priorities identified by the research agenda.
- Expanding collaboration with key partners, including other U.S. government agencies.

## COORDINATION

All USAID programs, regardless of sector, can benefit from improved collection, management, and analysis of granular geospatial data. While the GeoCenter and M/CIO are the principal implementers of the Geospatial Strategy, effective coordination across all Agency Operating Units is essential to its success. The following stakeholders play especially critical roles in achieving the Geospatial Strategy's vision, goal, and objectives:

- The **Agency Chief Geographer**, who directs the **GeoCenter**, will lead the implementation of the Geospatial Strategy, in collaboration with M/CIO and other stakeholders across the Agency.
- The **Chief Digital Development Officer**, who directs the Technology Division, will ensure synergies across USAID's digital development Investments. This includes implementation of USAID's Digital Strategy, which complements the Geospatial Strategy through its holistic focus on technology and development.
- The **Chief Data Officer** and **Chief Technology Officer**, leaders within **M/CIO**, will support the geospatial technology component of the Strategy and oversee its integration with USAID's broader internal technology and data environment.
- **Bureaus, Independent Offices, and Missions** will operationalize the Geospatial Strategy at the country level to enhance their programs. In consultation with the GeoCenter and PLR, they will integrate the Strategy in their program planning, implementation, and oversight as determined appropriate.
- The **Geospatial CoP**, a working-level forum for GIS Specialists and other Agency geospatial champions, will share knowledge and best practices for using geospatial data and information. Members of the CoP have been essential to the development of the Geospatial Strategy and will continue to serve as key advocates for and participants in its implementation.
- **USAID coordinating entities** such as the Data Administration and Technical Advisory Board (**DATA Board**) and Digital Sector Council will support integration of the Geospatial Strategy within other key digital development and Agency initiatives.



## MONITORING AND EVALUATION

The Geospatial Strategy will complement existing USAID monitoring, evaluation, and learning (MEL) processes by promoting data standards and interoperability, contributing to the Agency's Learning Agenda, and enriching the development data landscape. To ensure that the goals and objectives of the Geospatial Strategy are being met, a system for continuously monitoring implementation will be developed in a MEL plan included in the internal implementation plan. The MEL plan will identify a set of indicators and associated, time-bound targets that are reasonable, meaningful, and actionable (including the high-level targets proposed for each Intermediate Result and summarized in Annex I). With input from stakeholders, the GeoCenter will be responsible for reporting these indicators and will leverage existing reporting requirements and processes to the greatest extent possible.

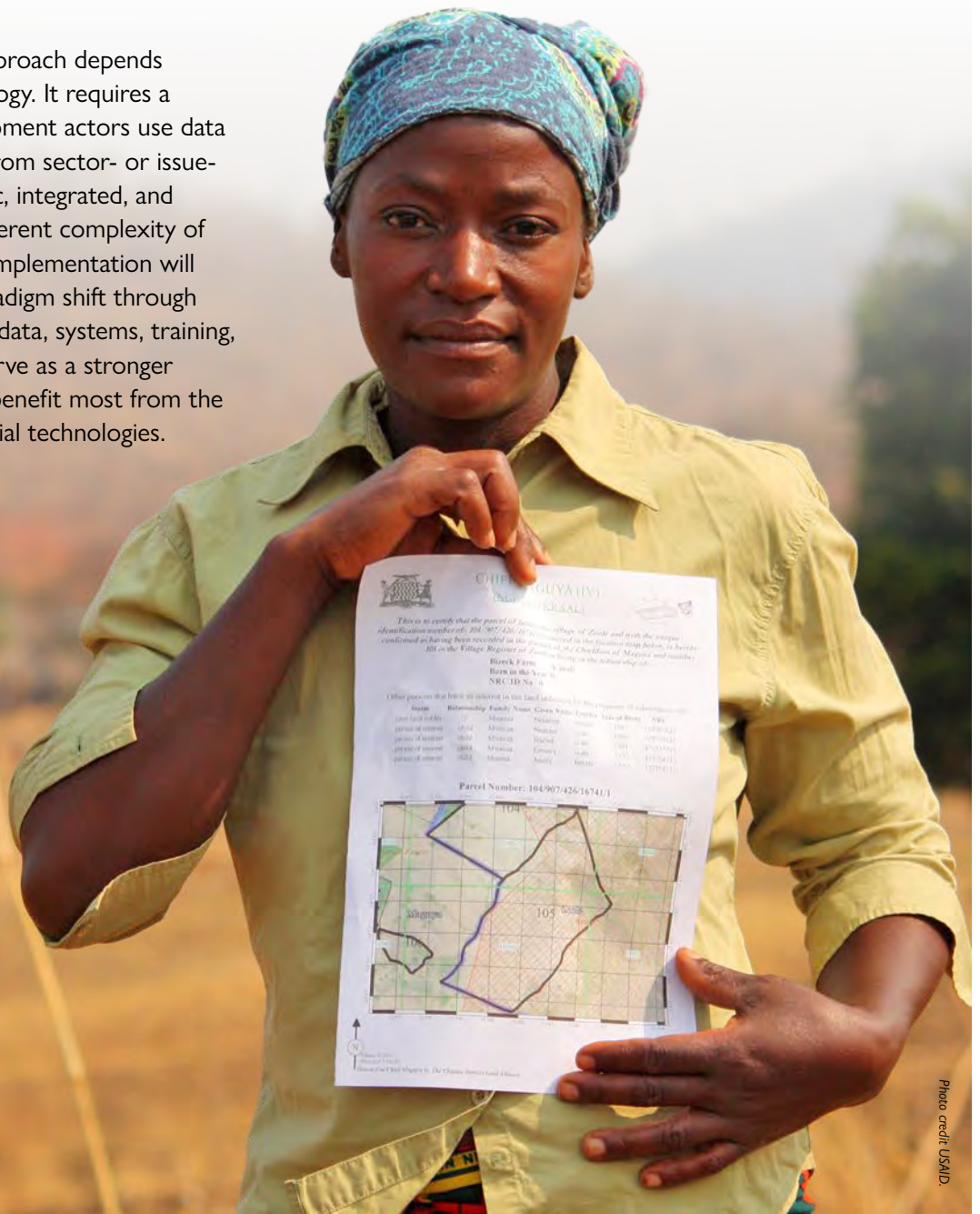
## LEARNING AND ADAPTIVE MANAGEMENT

Throughout the implementation of the Geospatial Strategy, the GeoCenter will organize "pause and reflect" sessions that will bring together a variety of key stakeholders to discuss achievements, challenges, and lessons learned. This process will leverage the Geospatial Strategy's monitoring data and other key indicators, as well as qualitative inputs and feedback from Missions and partners. In addition, the GeoCenter will monitor key global and local trends and shocks to adapt the Geospatial Strategy's implementation to the emerging needs and opportunities.

# CONCLUSION

This Strategy is a call to action for USAID and the broader international community to adapt to and use the rapidly accelerating geospatial technology and data in service of development and humanitarian missions. This Strategy presents an opportunity to plan, align, and coordinate USAID's geospatial investments more effectively and efficiently to maximize their impact and position the Agency to leverage the most promising geospatial technologies as they emerge.

Institutionalizing a geographic approach depends on more than geospatial technology. It requires a fundamental shift in how development actors use data to inform their programming—from sector- or issue-driven analyses to a more holistic, integrated, and efficient model rooted in the inherent complexity of a given location. This Strategy's implementation will enable USAID to realize this paradigm shift through critical investments in geospatial data, systems, training, policies, and partnerships and serve as a stronger partner to the people who can benefit most from the transformative power of geospatial technologies.



## IR-LEVEL TARGETS

INTERMEDIATE RESULT (IR)	TARGET(S)
<b>SO1: Expand access to geospatial data and tools to strengthen the planning and implementation of USAID programs.</b>	
<b>IR 1.1:</b> Enable USAID workforce access to an enterprise geospatial infrastructure as an integrated component of the Agency's IT architecture.	By 2027, the full USAID workforce has access to enterprise geospatial technology.  By 2027, at least 75 USAID Operating Units are using geospatial technology.
<b>IR 1.2:</b> Collect, curate, manage, and store standard geospatial data.	By 2027, at least 75 USAID Operating Units are collecting standardized location-based data about USAID activities.  By 2027, 100 percent of USAID Operating Units have access to standard foundational and thematic geospatial datasets.
<b>SO2: Strengthen USAID's capacity to use geospatial data, technology, and expertise for decision-making.</b>	
<b>IR 2.1:</b> Expand geospatial literacy and skill sets to advance an Agency culture of data-driven decision-making.	Each year, the Geospatial CoP provides at least 15 geospatial capacity building events for the USAID workforce.
<b>SO3: Advance USAID policies and practices by applying geospatial information.</b>	
<b>IR 3.1:</b> Integrate geospatial data and analysis into the formulation and implementation of relevant USAID operational, development, and humanitarian policies.	Each year, OUs leading the formulation and implementation of USAID operational, development, and humanitarian policies consider and, as relevant, integrate geospatial data and analysis into policy documents and/or implementation plans to support sustainable outcomes.
<b>IR 3.2:</b> Adopt standards for geospatial data collection, management, and sharing that optimize interoperability and fulfill USAID data policy requirements.	By 2027, governance procedures and standards for collecting, managing, and sharing USAID's geographic data assets are established.
<b>SO4: Provide global leadership in applying geospatial solutions for development and humanitarian assistance.</b>	
<b>IR 4.1:</b> Advance partnerships and innovative geospatial solutions that respond to local and global priorities.	Through 2027, USAID will engage at least 75 external actors to promote the use of geospatial data and analysis for international development and humanitarian assistance.

## SUMMARY OF RESEARCH AND EVIDENCE

In alignment with ADS Chapter 200, this Strategy has been developed based on the latest research and state of knowledge in the field of geospatial analysis and technology. Led by the GeoCenter and M/CIO, it is the product of several rounds of consultations with key stakeholders; a review of existing geospatial policies and strategies from other agencies and development actors; as well as a thorough analysis of the strengths, weaknesses, opportunities, and threats (SWOT) in the Agency's use of geospatial information.

### THE IMPORTANCE OF A GEOGRAPHIC APPROACH TO DEVELOPMENT

Since the first maps were etched onto clay tablets and cave walls, humans have been creating visual representations of their environments. In the 15th and 16th centuries, maps began to proliferate due to the invention of the printing press, the popularization of the pursuit of knowledge and information, and European colonialism. Advances in mathematics enabled cartographers to refine and standardize Ptolemy's centuries-old system of longitude and latitude and develop methods of projecting the earth's spherical shape onto flat surfaces. These early maps served the economic, legal, and political needs of their time. Unfortunately, they also facilitated military conquest and the seizure of indigenous lands.<sup>16,17</sup> More recently, geographers and cartographers have been reckoning with this history<sup>18</sup> and acknowledging the many examples of how maps were used for good throughout history. For example, John Snow's map of cholera cases in London in 1854 is perhaps one of the earliest and best known examples of how geospatially visualizing data can have a tremendous impact on social welfare. His maps illustrating that cholera deaths were concentrated around specific water pumps were instrumental in advocating for the closure of those pumps, which were eventually found to be contaminated by sewage.<sup>19</sup>

More than 100 years later, geospatial information systems flourished in the 1960s as computers became more powerful and affordable, enabling more sophisticated layering and interaction of different types of geospatial and statistical data. In 1972, the first Landsat satellite was launched, and has since provided a continuous stream of Earth observation data with countless applications.<sup>20</sup> For example, Earth observation data can specifically help monitor several of the Sustainable Development Goals, such as those related to conservation and environmental protection, sustainable resource management, access to electricity, waste management, air pollution, food security, access to clean water, and more.<sup>21</sup> In 2008, in accordance with the Group on Earth Observation (GEO)'s Data Sharing Principles, select Landsat data products were made available to the public, online at no charge.<sup>22</sup> Following this critical decision to make the data cost-free, the average daily downloads of Landsat images increased more than 100-fold—from 53 to 5,700 scenes a day.<sup>23</sup> This uptake reflects not only the strong interest in and demand for satellite data, but also its economic benefits. It is estimated that Landsat data generated \$3.45 billion dollars in economic benefits globally in 2017, based on users' willingness to pay for the satellite imagery. Nearly 60 percent (\$2.06 billion) of that economic value was concentrated in the United States.<sup>24</sup>

The exponential adoption of the internet in high income countries in the 1990s<sup>25</sup> represents another critical phase for the role of geospatial technologies. When Google Earth and Google Maps were launched in 2005, suddenly anyone with internet access could visualize their daily lives geographically and interact with geospatial

platforms. Many new use cases for geospatial technology began to unfold with this increase in producers and consumers of location information. Thus, the importance of carefully managing the use of geospatial data has never been more salient.<sup>26,27</sup>

As technology has become increasingly geo-enabled, and awareness of the effects of geography on daily phenomena has grown, a “geographic approach” to inquiry and problem solving has emerged.<sup>28</sup> The geographic approach “integrates geographic information into how we understand and manage our planet.”<sup>29</sup> It acknowledges the importance of context and complexity in addressing any problem or question, and can enrich any stage of a process—from planning to design to implementation.<sup>30</sup> Integrating a geographic approach into development and humanitarian programs can help solve increasingly complex problems more efficiently and sustainably.<sup>31</sup> While the causes of poverty may be as geographically heterogeneous as the distribution of income itself, what is clear is that a deeper understanding of the geospatial distributions of poverty and prosperity can help development agencies design better targeted, more effective, and more inclusive programs.<sup>32</sup>

## OTHER KEY GEOSPATIAL STRATEGIES

Covered agencies listed in the Geospatial Data Act of 2018 are required to prepare, maintain, publish, and implement a strategy for advancing geographic information and related geospatial data and activities appropriate to the agency’s mission. The USAID drafting team reviewed the strategies prepared by the Department of State, Department of Justice, Department of Energy, Department of Transportation, Department of Agriculture, and NASA. Those U. S. government strategies are typically focused on filling the requirements of the Geospatial Data Act, expanding access to and sharing of key thematic data sets for which they are responsible, enabling collaborative partnerships to leverage geospatial data in support of their respective missions, and strengthening the engagement of leadership and communities of practice in promoting the value of geospatial data, information, and technology.

Beyond the U.S. government, other organizations have published strategies related to geospatial technology. In 2018, the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) of the UN Statistics Division released its Integrated Geospatial Information Framework (IGIF). The IGIF focuses on geospatial data and capacity as critical components of a country’s infrastructure and its ability to make evidence-based decisions. It provides a consistent framework that countries around the world can use to develop and enhance their own geospatial information management. In 2021, the UN Office of Information and Communications Technology published a Geospatial Strategy for the United Nations which informs how the UN as an organization can better leverage geospatial information in all of its work, by focusing on access, use, workforce capacity, and partnerships. Finally, GEO is in the midst of implementing its 2016-2025 Strategic Plan. GEO promotes openly accessible earth observation data and convenes stakeholders across the earth observation community. It also supports initiatives related to sustainable ecosystems, agriculture, urban development, water resources management, public health, and disaster resilience.

Each of these strategies emphasize the importance of creating and maintaining systems that ensure easy access to interoperable geospatial data, building the capacity to use those systems, applying the geospatial information and systems to key decisions and priorities, and maximizing efficiency and innovation through partnerships. The consensus on the importance of these pillars and features forms the empirical basis for the strategic objectives outlined in this USAID Geospatial Strategy.

## STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS

A geospatial data infrastructure is a framework of technologies, people, policies, and institutional arrangements that together facilitate the creation, exchange, and use of geospatial data and related information resources.<sup>33</sup> In the USAID context, these elements were translated into the following five themes to form the basis of a SWOT analysis: IT/systems; people/capacity; policy; data; and vision/organization.

### STRENGTHS

IT/SYSTEMS	PEOPLE/CAPACITY	POLICY	DATA	VISION/ ORGANIZATION
The USAID geospatial workforce leverages a variety of technologies to address different mapping needs (ArcGIS suite, QGIS, AGOL, Tableau, R, Google tools), with some options for securely sharing products internally (Tableau for interactive dashboards, Google Drive for static maps).	USAID has an active GIS CoP with robust technical expertise; the GeoCenter has a very good reputation in the Agency, especially at Missions, and excels at relationship management. Many senior leaders understand the value of place-based analysis and programming.	USAID already has policies for collecting and utilizing spatial data (e.g., ADS 201, ADS 579, and Mission Orders in some field offices). GeoCenter has assisted with previous policy updates. Programming is increasingly focused at the sub-national level.	USAID has access to a range of quality datasets through internal and external partnerships with programs such as YouthMappers, PEPFAR, PMI, FEWS NET, the Demographic and Health Surveys Program, and SERVIR.	Geospatial teams (like those in BHA and OTI) have had individual successes incorporating geospatial information into their Bureau's decision-making. The GeoCenter enables an Agency-wide audience to access "geospatial technology, data analytics, and visualization techniques to improve... Agency programs." <sup>34</sup>

### WEAKNESSES

IT/SYSTEMS	PEOPLE/CAPACITY	POLICY	DATA	VISION/ ORGANIZATION
USAID does not have an overarching enterprise geospatial technology solution. It is increasingly difficult to procure software (and there is a lack of clarity about why some software is approved, and some is not).	Not all Operating Units have the capacity, time, or expertise to conduct geospatial analyses (i.e., there are not enough GIS Specialists). Non-geospatial workforce may struggle with identifying how GIS can enhance program outcomes and MEL (lack of geographic literacy).	The Agency does not yet have a strategy that provides coherent guidance for integrating geospatial information, technology, and solutions into USAID's development and humanitarian assistance programs.	Data are siloed and there is a lack of master data management on place names and boundaries.	USAID has multiple offices across different bureaus with geospatial expertise. The offices do not consistently coordinate with each other on strategic planning for geospatial investments. Knowledge exchange between these offices is weak.



## OPPORTUNITIES

IT/SYSTEMS	PEOPLE/CAPACITY	POLICY	DATA	VISION/ ORGANIZATION
<p>Opportunity to develop a shared vision for an enterprise approach to geospatial and establish an internal geospatial environment. A shared vision will increase efficiency in software and data acquisition, reducing fractured investments, and enabling more sustainable procedures for the future.</p>	<p>Opportunity to leverage a repository of GIS examples to inspire Missions to incorporate geospatial in their programming; opportunity to establish and convene regular geospatial meetings for Agency staff focused on policy updates and GIS use cases.</p>	<p>The Geospatial Strategy can align with and build on other USAID policies and strategies. It can assist with consistent integration of geospatial into Country Development Cooperation Strategies and the Program Cycle.</p>	<p>Opportunity to introduce guidelines that ensure clearer and more consistent metadata (following FGDC guidance); opportunity to break down data silos and foster data sharing; opportunity to further connect with the global open mapping ecosystem and strengthen data systems of partner country governments.</p>	<p>Geospatial Strategy can help advance U.S. national security and foreign policy objectives and improve coordination with other agencies to increase efficiency and reduce duplication of effort.</p>

## THREATS

IT/SYSTEMS	PEOPLE/CAPACITY	POLICY	DATA	VISION/ ORGANIZATION
<p>Conflicting forces between open data and data privacy make it challenging to create a geospatial environment to fully leverage location data; possibility that we will continue to lack access to enterprise geospatial environment and rely on third-party technology sources, given history of difficulties in pooling funding for enterprise system; challenge of integrating with the Development Information Solution.</p>	<p>Operating Units may lack the human and financial resources, the technical expertise and capacity, and the political capital to implement the Strategy. GIS champions are unequally distributed across the Agency, meaning that achieving geospatial progress across all Operating Units may present challenges.</p>	<p>Time lag between enacting the Strategy and socializing it widely; difficulty of enforcing policy; potential difficulty of rolling out ADS 579; policies and mandates could make GIS seem less inviting and accessible; Strategy could become too prescriptive, making adherence difficult or too time intensive.</p>	<p>Weak geospatial infrastructure in countries where USAID works, meaning that foundational geospatial data can be limited; data can become outdated if not routinely used, invested in, or updated.</p>	<p>Risk that geospatial is usurped into broader category of data visualization (i.e., data dashboards are prioritized over geospatial thinking or a geographic approach to development); risk that the Strategy isn't funded and implemented; risk that Agency shifts priorities and pivots away from geospatial.</p>

## ALIGNMENT WITH OTHER USAID POLICIES AND STRATEGIES

All USAID programs, regardless of sector, can benefit from improved collection, management, and analysis of more granular geospatial data. These data allow USAID to understand where it is working, whether those are the areas and populations with the greatest need, and whether the Agency’s interventions are effectively addressing that need. Below, several illustrative examples reiterate how the Geospatial Strategy reinforces the implementation of select USAID policy documents. The full catalog of current USAID policies and strategies is available in USAID’s Policy Registry.

USAID POLICY	ALIGNMENT WITH THE GEOSPATIAL STRATEGY
<p><b>Climate Strategy</b></p>	<p>From rising sea levels to severe droughts, satellite imagery and other geospatial tools are essential for understanding and responding to climate change. Beyond this direct application of geospatial information, the geographic approach is especially appropriate for tackling complex challenges in all their manifestations. Building capacity to use, manage, and report geospatial information is an essential component of achieving USAID’s vision for a resilient, prosperous, and equitable world with net-zero emissions.</p>
<p><b>Countering Trafficking in Persons Policy</b></p>	<p>Geospatial data and technology are important for tracking the movement of people, both within and between countries. When migration is forced, as in the case of human trafficking, it becomes even more imperative to carefully track patterns of movement to prevent trafficking, protect victims and survivors, and prosecute perpetrators. The Geospatial Strategy will enable USAID to share data and analyses in a more timely and efficient manner to respond in the places of greatest need.</p>
<p><b>Digital Strategy</b></p>	<p>The Geospatial Strategy’s focus on increasing access to and effective use of data is a direct complement to the Digital Strategy (and the bureau-specific Digital Action Plans that have followed). The geospatial community has been at the forefront of shaping the standards and policies necessary to enable the digital infrastructure of modern economies. Leveraging geospatial innovations is an integral part of fulfilling USAID’s shift to “digital by default.”</p>
<p><b>Gender Equality and Women’s Empowerment Policy</b></p>	<p>Geographic analysis can reveal correlations between geography and gender equality and highlight areas where more attention is needed to increase women’s economic opportunities. For example, Everywhere She Maps is a USAID Gender Equity and Equality Action Fund activity which expands three core, interrelated YouthMappers initiatives: mapping and geospatial data activities that invest in women and girls’ security, livelihoods, access, prosperity, and economic participation; leadership development programs for women in technology; and a peer support network that builds local capacity of the female mapping community. Everywhere She Maps uses geospatial data and technology to empower women and girls to develop gender-sensitive solutions to development challenges.</p>
<p><b>Knowledge Management and Organizational Learning Policy (forthcoming)</b></p>	<p>Geospatial analysis yields an important type of knowledge that is essential to informing Agency programs. Combined with local sociocultural knowledge, geospatial analysis can offer a deeper contextual understanding to inform USAID programs. It is a knowledge asset that USAID can share strategically to inform and influence the work of other development actors; and it is an element of local knowledge systems that USAID can support to advance locally led development.</p>

USAID POLICY	ALIGNMENT WITH THE GEOSPATIAL STRATEGY
<p><b>Local Capacity Strengthening Policy</b></p>	<p>At the core of USAID's local capacity strengthening approach is a commitment to understanding local actors and systems and responding to dynamic country and regional contexts. Applying a geographic approach to development will enable the Agency to deepen its awareness of local systems and enhance its ability to design programming that reflects current conditions.</p>
<p><b>Local Systems: A Framework for Supporting Sustained Development</b></p>	<p>The geographic approach is inherently a systems approach; it is about understanding how economic, political, environmental, and cultural factors interact and influence a given place. USAID's Geospatial CoP includes GIS Specialists from more than 30 countries around the world who can incorporate their knowledge of local culture with geospatial analytical skills. This is invaluable to informing the Agency's work. In addition to identifying a country's hotspots of vulnerability at the local level, these Specialists are well positioned to help Missions engage with local stakeholders. The data visualizations and custom maps they can make with localized data help facilitate dialogue with people in communities who have not historically been consulted about their own livelihood priorities.</p>
<p><b>USAID Resilience Policy (update forthcoming)</b></p>	<p>The USAID Resilience Policy can be strengthened by the geographic approach to development. Geospatial analysis illuminates where shocks and stresses affect a given location, allowing the Agency to properly target zones within countries that require resilience strengthening, particularly in areas subject to recurrent and protracted crises. Mapping can highlight both current and historic shocks, such as severe weather, and stresses, such as environmental degradation, providing a more in-depth understanding of both risks and resilience in target areas.</p>
<p><b>USAID Vision for Health Systems Strengthening 2030</b></p>	<p>Achieving USAID's Vision for Health Systems Strengthening depends on a strong understanding of current health system capacities. The USAID-funded Demographic and Health Surveys (DHS) Program has been integrating location information into its survey process for nearly 40 years, which has created a robust repository of geographically referenced, nationally representative household survey data for more than 90 countries. Complementing this kind of rich survey data with real-time, open platforms like Healthsites.io, which maps health facilities and their services, helps USAID better align its health interventions with local health systems.</p>
<p><b>Youth in Development Policy</b></p>	<p>The GeoCenter's YouthMappers program is a one-of-its-kind illustration of a positive youth development approach that harnesses the power of digital technology to help youth lead change in their own communities. YouthMappers is an international network of more than 380 university-student-led chapters in 72 countries. Its members create and use open geospatial data and information to respond to emergent development and humanitarian needs around the globe. Since 2016, YouthMappers have made more than 20 million edits to the OpenStreetMap platform, a digital public good which is leveraged by NGOs, humanitarian responders, and multi-billion-dollar technology companies alike. These highly granular mapping data have also been used to inform USAID-funded projects, such as mapping water points in Uganda, improving soybean production in Ghana, and optimizing indoor residual spraying for malaria prevention in Rwanda.</p>

## GEOSPATIAL ENABLING TECHNOLOGIES AND INNOVATIONS



### AI AND MACHINE LEARNING

Artificial Intelligence (AI) and Machine Learning use advanced computation to detect patterns in data and use those patterns to automate processes. Combined, these two technologies have the power to dramatically expand how geospatial data are used for development and humanitarian assistance. For example, AI algorithms can use the patterns identified in satellite imagery by machine learning to quickly and accurately identify geographic features on the ground in areas that have been damaged by a disaster or that are otherwise hard to reach.



### PREDICTIVE ANALYTICS

Predictive analytics use large quantities of data to identify the likelihood of future outcomes and behavior. Machine learning, combined with new sources of data, will improve the predictive quality of data analysis, resulting in improved planning and increased decision space for leaders and communities.



### BIG DATA

Big data are extremely large sources of dynamic and disaggregated data from sources such as social media, driving telemetry, and internet metadata. Geolocating this information offers insights into behavior that differs from normal patterns and can drive future innovations such as smart cities and intelligent transportation systems.



### REMOTE SENSING

High resolution imagery from satellites and other earth observations captures information about the earth at a greater frequency (i.e., daily) and with more detail, to include information not detectable by human eyes. Continuous earth monitoring with more advanced sensors offers near real-time insights into fragile environments and changes to local conditions because of conflict, disasters, and human activity.



### DIGITAL INFRASTRUCTURE

Digital infrastructure is made up of equipment, tools, and infrastructure that enable location data to drive the modern digital economy. Advanced digital infrastructure such as 5G, low-cost sensors, and cloud computing will increasingly serve as the backbone for digital connectivity, data capture, and interoperability.



### CROWDSOURCING

Platforms such as OpenStreetMap use data that have been crowdsourced from a dispersed group of people to maintain the most accurate and current global map possible. In addition to capturing a broader range of data and opinions, crowdsourced data platforms can lead to massive participation because users are empowered to contribute and have a vested interest in maintaining them.

## GLOSSARY OF KEY TERMS

**Activity location data:** Data that indicate the location where an activity is implemented and the location of the intended beneficiaries. Activity location data supports the Agency's objectives to improve the effectiveness and efficiency of development programming and fulfill accountability and transparency objectives (ADS 201 and ADS 579).

**ADS 200:** Chapter 200 of the Automated Directives System (ADS) describes the roles, responsibilities, and processes involved in formulating and implementing USAID's development and humanitarian policies (ADS 200).

**ADS 201:** Chapter 201 of the Automated Directives System (ADS) is the Agency's operational policy for the Program Cycle (ADS 201).

**ADS 579:** Chapter 579 of the Automated Directives System (ADS) provides guidance for managing data at USAID, including the submission of datasets to the DDL (ADS 579).

**Artificial Intelligence (AI):** The science and technology of creating intelligent systems. Machine learning (ML) often enables AI systems, which apply data-derived predictions to automate decisions. While ML focuses on learning and prediction, AI applications often create, plan, or do something in the real world (Reflecting the Past, Shaping the Future: Making AI Work for International Development).

**Co-creation:** Co-creation is a design approach that brings people together to collectively produce a mutually valued outcome, by using a participatory process that assumes some degree of shared power and decision-making (ADS 201).

**Data assets:** A collection of data elements or datasets that make sense to group together. Each community of interest identifies the data assets specific to supporting the needs of their respective mission or

business functions. Notably, a data asset is a deliberately abstract concept. A given data asset may represent an entire database consisting of multiple distinct entity classes, or may represent a single entity class (Supplemental Guidance on the Implementation of M-13-13).

**Data landscape:** The universe or possible set of datasets and data sources that can be used to inform a decision or process. For a specific organization, it may refer to the representation of an organization's data assets, storage options, systems for creating, analyzing, processing and storing data, and other applications for data use.

**Data lifecycle:** The stages through which data or information passes, characterized by USAID as: planning, collection or acquisition, processing or integration, analyzing, curating, and publishing or sharing (ADS 579).

**Data repository:** A storage space for data assets.

**Data sharing agreement:** A formal contract that details what data are being shared and the appropriate use for those data (USGS).

**Development and humanitarian policy:** USAID publishes two types of policy documents: (1) policies, which outline principles to guide decisions and actions in development and humanitarian assistance; and (2) strategies, which outline a desired end-state or goal, a hierarchy of subordinate objectives, specific time bound programmatic results in a sector or cross-cutting area, measurable targets, and a logic model which connects the planned actions and the strategy's goal. (ADS 200).

**Development Data Library (DDL):** The DDL is USAID's repository of USAID-funded, machine readable data created or collected by the Agency and its implementing partners (ADS 579).

**Development Information Solution (DIS):** A web-based, Agency-wide portfolio management system

designed to capture one cohesive development story—from strategy to results. The DIS enables USAID staff and implementing partners to perform a broad range of business operations, reporting, and planning tasks in one place (USAID).

**Digital development:** The promotion of secure, open, and inclusive country-level digital ecosystems and the programmatic use of digital technology in the Agency’s development and humanitarian assistance (USAID Digital Strategy).

**Digital ecosystem:** The stakeholders, systems, and enabling environment that together empower people and communities to use digital technology to gain access to services, engage with each other, or pursue economic opportunities (USAID Digital Ecosystem Framework).

**Digital Public Goods:** Open-source software, open data, open AI models, open standards, and open content that adhere to privacy and other applicable laws and best practices, do no harm by design, and help attain the Sustainable Development Goals (Digital Public Goods Alliance).

**Earth observation data :** Data and information collected about our planet, whether atmospheric, oceanic, or terrestrial. This includes space-based or remotely sensed data, as well as ground-based or in situ data (Group on Earth Observations).

**Enterprise geospatial infrastructure:** The system of tools and applications that enable the USAID workforce to securely store, manage, share, analyze, and visualize geospatial data.

**Foundational geospatial data:** Base layer data such as administrative boundaries, place names, physical features, and cultural features that provide the basis upon which maps can be created and standardized.

**Geographic:** This Strategy uses the terms “geographic” and “geospatial” interchangeably to refer to any data, information, system, or tool that describes or examines relationships between the social, economic, and physical features of a place (location).

**Geographic Approach to Development:** A process that facilitates a systems approach for understanding the economic, political, environmental, and cultural factors that interact and influence a given place. It brings together data and expertise to better understand where development needs and opportunities are concentrated, where development programs are implemented, and the effectiveness of those programs.

**Geographic Information System (GIS):** A computer system that analyzes and displays geographically referenced information. It uses data that are attached to a unique location and allows for the spatial overlay of multiple datasets. It facilitates basic and advanced geospatial analysis to identify trends, patterns, and relationships between datasets.

**Geographically disaggregated indicator data:** Performance and context indicators that are collected and reported at multiple geographic scales (e.g., country, region, district, village). These data provide the foundational for asking and answering questions such as “Does an activity’s performance vary across the geographic area where it is implemented?” and “Does the geographic variability in an activity’s performance relate to geographic variation observed in a context indicator?” (ADS 201 Additional Help: Data Disaggregation By Geographic Location).

**Geospatial:** This Strategy uses the terms “geographic” and “geospatial” interchangeably to refer to any data, information, system, or tool that describes or examines relationships between the social, economic, and physical features of a place (location).

**Geospatial Community of Practice (CoP):** The human network of GIS Specialists, data scientists, and non-geospatial staff who champion the geographic approach to development, work together to address challenges, and share knowledge and best practices for using geospatial data and information in USAID’s programs.

**Geospatial Data Act of 2018:** A federal law that facilitates the efficient procurement of geospatial expertise, technology, services, and data from the rapidly growing geographic community. The legislation

also codifies the committees, processes, and tools used to develop, drive, and manage the National Spatial Data Infrastructure (NSDI) and recognizes responsibilities of and beyond the Federal Government for its development (FGDC).

**Implementing partner:** Any individual or organization that receives an acquisition or assistance award from USAID (a contract, grant, cooperative agreement, or similar instrument). Unless the context otherwise requires, implementing partners include subrecipients, subcontractors, and contractors under an assistance award (ADS Glossary).

**Inclusive development:** An equitable development approach built on the understanding that every individual and community, of all diverse identities and experiences, is instrumental in the transformation of their own societies. Their engagement throughout the development process leads to better outcomes.

**Interoperability:** The ability of different applications to access, exchange, integrate, and cooperatively use data and information in a coordinated manner through the use of shared application interfaces and standards (adapted from A Vision for Action in Digital Health).

**Joint Strategic Plan:** The Department of State and USAID Joint Strategic Plan sets forth the vision and direction for both organizations and presents how the Department and USAID will implement U.S. foreign policy and development assistance (Department of State).

**Machine Learning:** A set of methods that train computers to learn from data, where “learning” generally amounts to the detection of patterns or structures in data. ML approaches begin by finding patterns in a subset of existing data and use them to make predictions for new, unseen data (USAID Digital Strategy).

**Marginalization :** The process, whether in practice or in principle, in which individuals or communities with certain identities and/or experiences are typically denied access to social, economic, political, and/or cultural participation in their societies, or access to programming for historical, cultural, political, or other

contextual reasons. Groups who face marginalization often experience discrimination in the application of laws, policies, and social and cultural norms and may be subject to persecution, harassment, and/or violence.

**Marginalized Groups:** Marginalized groups may include women, youth, children in adversity and their families, older persons, persons with disabilities, LGBTQI+ people, displaced persons, migrants, Indigenous Peoples and communities, non-dominant religious groups, non-dominant racial and ethnic groups, people in lower castes, and persons with unmet mental health needs.

**Misinformation, Disinformation, and Malinformation (MDM):** Misinformation is false information, but not intended to cause harm. For example, individuals who do not know a piece of information is false may spread it on social media in an attempt to be helpful. Disinformation is false information that is deliberately created or disseminated with the express purpose to cause harm. Producers of disinformation typically have political, financial, psychological, or social motivations. Malinformation is the deliberate publication of private information for personal or private interest, as well as the deliberate manipulation of genuine content.

**Multilateral partners:** An organization or alliance formed between multiple nations and/or organizations to work on issues that relate to all members of the organization or alliance (e.g., the World Health Organization; Gavi, the Vaccine Alliance; Education Cannot Wait; World Bank) (ADS Glossary).

**National Security Strategy:** A report mandated by Section 603 of the Goldwater-Nichols Department of Defense Reorganization Act of 1986 (Public Law 99-433) that provides discussion on proposed uses of all facets of U.S. power needed to achieve the nation’s security goals. The report is obligated to include a discussion of the United States’ international interests, commitments, objectives, and policies, along with defense capabilities necessary to deter threats and implement U.S. security plans (Office of the Secretary of Defense).

**National Spatial Data Infrastructure (NSDI):**

The technology, policies, criteria, standards, and employees necessary to promote geospatial data sharing throughout the Federal Government, State, tribal, and local governments, and the private sector (including nonprofit organizations and institutions of higher education). The goal of the NSDI is to ensure that geospatial data from multiple sources are available and easily integrated to enhance the understanding of the physical and cultural world (FGDC).

**Native GIS file format:** Native Geographic Information System (GIS) file formats are a broad set of digital file types whose specifications include the ability to encode geographic information. Illustrative examples include, but are not limited to: Shapefile (.shp, .dbf, and .shx), GeoTIFF (.tif), GeoJSON (.geojson), and NetCDF (.nc).

**OMB Circular A-16:** Circular A-16 provides direction for federal agencies that produce, maintain, or use spatial data either directly or indirectly in the fulfillment of their mission and provides for improvements in the coordination and use of spatial data. The Circular also describes effective and economical use and management of spatial data assets in the digital environment for the benefit of the Federal Government and the Nation. The Circular establishes a coordinated approach to electronically develop the National Spatial Data Infrastructure and establishes the Federal Geographic Data Committee (FGDC).

**Open/open-source:** An open or open-source product (such as open data, open mapping platforms, open tools and documents, or open-source software) is one that is made freely available for possible modification and redistribution, often through decentralized models of collaboration (for more information see the Principles for Digital Development).

**Operating Unit (OU):** The organizational unit responsible for implementing a foreign assistance program for one or more elements of the Department of State's Foreign Assistance Framework. The definition includes all U.S. government agencies implementing any funding from the relevant foreign assistance accounts (the 150 accounts). For USAID, it includes field Missions and regional entities, as well as regional Bureaus, pillar

Bureaus, and Independent Offices in USAID/Washington that expend program funds to achieve development objectives identified in a Country Development Cooperation Strategy. In Chapter 201, field Operating Units are referred to as "Missions," and those in Washington are referred to as "Washington OUs" (ADS Glossary).

**Operational policy:** Program procedures, rules, and regulations affecting the management of USAID internal systems, including budget, financial management, personnel, procurement, and program operations (ADS Glossary).

**Partner country:** The country in which a USAID-funded activity takes place (ADS 201).

**People in vulnerable situations:** Those in a state of exposure to circumstances, often temporary and not structural, which are difficult or impossible to ignore, over which they have little or no control, and which can lead to serious harm to the individual.

**Policy:** A policy is a USAID-generated document which articulates the Agency's corporate position, identifies priority directions, outlines a set of principles to guide decisions and actions in development and humanitarian assistance. A policy typically focuses on a sector, major program area, or cross-cutting issue, and is consistent with U.S. government and USAID Administrator directives. A policy articulates a desired end state or goal(-s) and outlines a path for achieving them through a principles-based approach, which can include organizing units around a common development or humanitarian challenge, defining a new cross-cutting lens, or changing the way the Agency approaches programs in a key area. A policy does not set specific time bound targets but expires after ten years if not renewed (ADS 200).

**Program Cycle:** The Program Cycle is USAID's operational model for planning, delivering, assessing, and adapting development programming in a given region or country to advance U.S. foreign policy. It encompasses guidance and procedures for: 1) making strategic decisions at the regional or country level about programmatic areas of focus and associated resources; 2) designing projects and activities to implement strategic plans; and 3) learning from performance monitoring, evaluations, and other relevant sources of information



to make course corrections and inform future programming, as needed (ADS 201).

**Remote sensing:** Remote sensing is the acquisition of information from a distance, often using sensors aboard satellites and aircraft that detect and record reflected or emitted wavelengths of energy. Remote sensors, which provide a global perspective and a wealth of data about Earth systems, enable data-informed decision-making based on the current and future state of our planet (NASA).

**Single sign-on:** An authentication scheme that allows a user to log in with a single identification (such as a PIV or token, for USAID staff) to any of several related, yet independent, software systems.

**Strategy:** A strategy is a USAID-generated document which sets specific, and time bound programmatic results in a sector or cross-cutting area, and is consistent with U.S. government and USAID Administrator directives. A strategy articulates a desired end-state or goal(-s) which it aims to achieve, a hierarchy of subordinate objectives, and the planned actions which will be taken to achieve them. A strategy must include explicit targets linked to its objectives and a plan for achieving those targets within a defined time period and for assessing progress. A strategy must include a logic model. The logic model specifies a theory of change, connections between the planned actions and the strategy's goal(-s), and risks and assumptions. A strategy is appropriate for a sector or program area with existing, substantial, and dedicated resources. The process to formulate a strategy includes discussion of budget and human resources (ADS 200).

**Thematic data:** Geographic data related to thematic topics, such as demographic characteristics, environment, and infrastructure. Thematic data are commonly used by USAID Operating Units and implementing partners to improve development program planning and management (ADS 579 Additional Help).

**USAID geospatial data standards:** The guidelines and procedures for collecting and submitting geospatial data. These standards are described in the Additional

Help for ADS 579, and will be formalized under contractual requirements.

**USAID workforce:** All individuals working for or on behalf of the Agency, regardless of hiring or contracting mechanism, who have physical and/or logical access to USAID facilities and information systems. This includes but is not limited to: United States Direct-Hire employees, Personal Services Contractors, Fellows, Participating Agency Service Agreement, and contract personnel (ADS Glossary).



1 Inclusive Development is an equitable development approach built on the understanding that every individual and community, of all diverse identities and experiences, is instrumental in the transformation of their own societies. Their engagement throughout the development process leads to better outcomes.

2 Marginalized groups may include women, youth, children in adversity and their families, older persons, persons with disabilities, LGBTQI+ people, displaced persons, migrants, Indigenous Peoples and communities, nondominant religious groups, nondominant racial and ethnic groups, people in lower castes, and persons with unmet mental health needs.

3 EthicalGeo and the Benchmark Initiative of the Ordnance Survey (both funded by the Omidyar Network) collaborated to author the Locus Charter, which outlines ten principles for the ethical and responsible use of geospatial data. <https://ethicalgeo.org/locus-charter/>

4 For example, through the Digital Strategy's focus on "digital by default" and the open data collection and submission standards defined in ADS 579, USAID is making progress toward benefiting from its full investment in development and humanitarian assistance.

5 As USAID's data governance body, the DATA Board informs data-related policy, procedures, and standards for the Agency. <https://data.usaid.gov/stories/s/Data-Governance/cjcz-4uux>

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10 Artificial Intelligence Action Plan

11 *Managing Machine Learning Projects in International Development: A Practical Guide*

12 *Reflecting the Past, Shaping the Future: Making AI Work for International Development*

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