



Satellite Data's Role in Supporting Sustainable Development Goals

Empowering Organizations with Earth Observation
Geospatial Information & Big Data



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Bringing the benefits of space to humankind

The Sustainable Development Goals (SDG) are the blueprint constructed by the United Nations to achieve a better and more sustainable future for all.



Social reform, a healthy planet, equality, peace, and economic growth are just a few of the actions put forth by the United Nations. This transformational agenda is set to be achieved around the globe by 2030.

Monitoring poverty, hunger, and health; observing education and equality trends; better understanding the effects of climate change; and protecting human rights are all made possible through the power of earth observation, satellite imagery, and geospatial data.

DigitalGlobe is a leader in Earth Observation satellite imagery and geospatial technology. We are leveraging our constellation and geospatial big data platform (GBDX), alongside the power of civil, state, and national governments, NGOs, and other organizations to unlock insights that were once virtually invisible.

In addition, thousands of volunteers and analysts are collaborating on our proprietary crowd-source platform to collectively solve today's global challenges – scrutinizing imagery by tagging important objects, features, or locations. The input of this human network is validated and refined with advanced geospatial consensus algorithms.

This report shares some of the great work these partnerships have achieved and the technology solutions that made it possible.



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WHY IT MATTERS

At DigitalGlobe, we're committed to combining the collective intelligence from these and other technologies with the power of civil, state, and national governments, NGOs, and other organizations to unlock insights that were once virtually invisible. We look forward to forming partnerships with those invested in solving the challenges facing our world today.



1 NO POVERTY



SDG 1 | NO POVERTY

In the past two decades, there have been tremendous advances towards eradicating poverty. Yet a staggering 800 million people are deprived of the most basic human necessities. Today, the private sector, civil governments, academia, and philanthropists work together to identify and target areas where the greatest needs exist.

“11% of the world’s population lives in extreme poverty. More than 800 million people globally live on less than US \$1.25 per day.”

- The World Bank

Mapping the poverty line

In much of the developing world, reliable data on poverty and economic welfare is scarce and outdated, producing “less than true” poverty rates. To fill these data gaps, [The World Bank](#) is conducting a study to investigate whether high-resolution satellite imagery from DigitalGlobe can accurately and affordably estimate the economic well-being of 1,291 Sri Lankan villages from space.

Spatial features, derived from high-resolution satellite imagery, including agricultural land, cars, shadows (building height proxy), building density and vegetation, road and transportation, roof types, and textural and spectral characteristics expose great insights into economic well-being. Combined with a variety of data points, the initial results indicate that the correlation between satellite-derived indicators and economic well-being is remarkably strong. These approaches are proving to be increasingly valuable to help governments and stakeholders better understand the spatial nature of poverty.

Key solutions

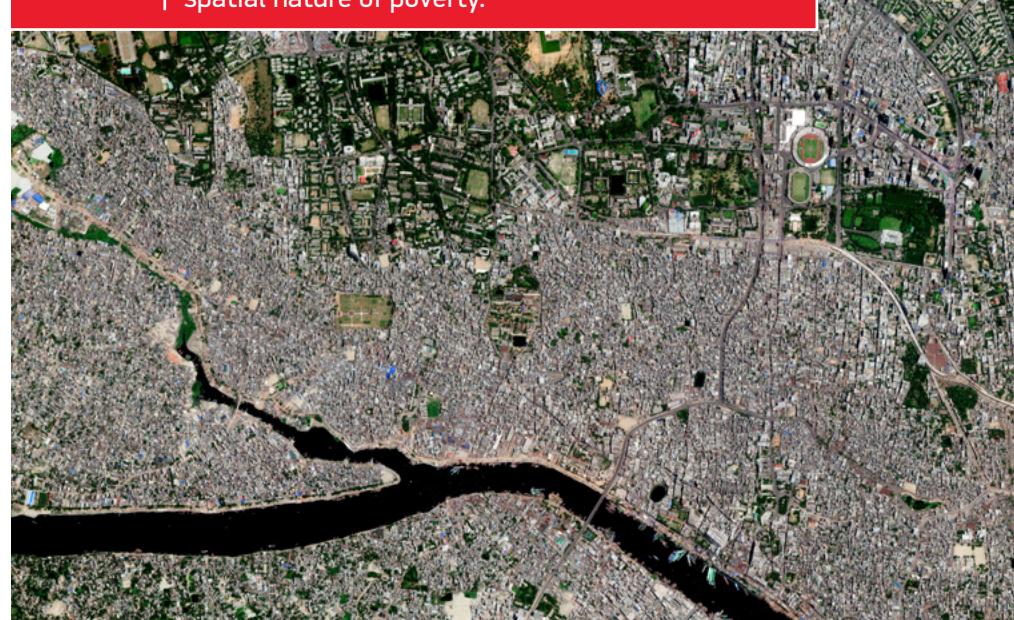
- » High detail satellite imagery provides unparalleled clarity and resolution for the best view of what's happening on the ground.
- » Machine Learning and imagery provide important proxy indicators, such as car counts, building density, green space, and more, which is utilized in models to predict the spatial variability of poverty across urban areas.



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Satellite imagery is a valuable tool to help governments and stakeholders better understand the spatial nature of poverty.



2 ZERO HUNGER



SDG 2 | ZERO HUNGER

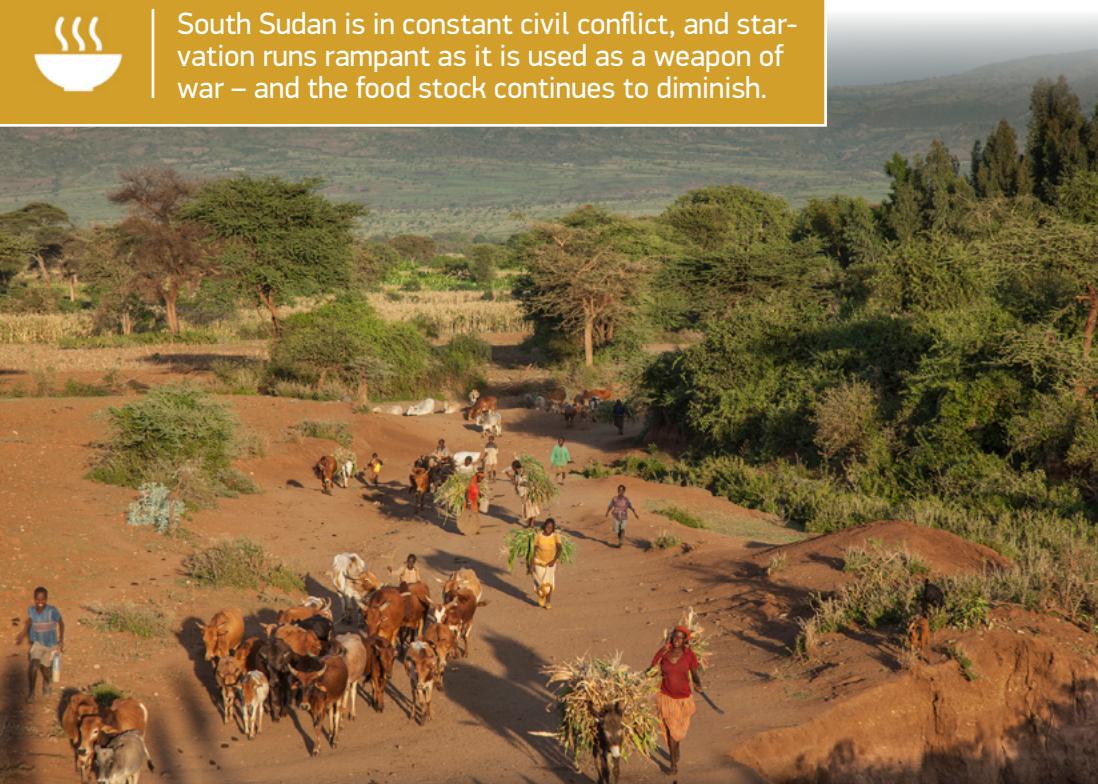
Along with water and shelter, food is a necessity of life – and a basic human right. The good news is sustainable agricultural practices, economic growth, and increased food yields have advanced our progress in solving world hunger. However, even with these tremendous strides, over three million children die from undernutrition each year.

“Some 795 million people in the world do not have enough food to lead a healthy active life. That's about one in nine people on earth.”

- Food Aid Foundation



South Sudan is in constant civil conflict, and starvation runs rampant as it is used as a weapon of war – and the food stock continues to diminish.



Cattle Migration from CES to BOR South Country - April, 2018

Ending famine & world hunger

South Sudan is in a dire humanitarian crisis with over half of the population experiencing hunger and malnutrition due to massive food and water shortages. The [Famine Early Warning System Network \(FEWS NET\)](#), a leading provider of information and analysis on food insecurity operating in more than 20 countries, partners with DigitalGlobe to better understand today's staggering hunger statistics.

Focusing on five vulnerable counties in South Sudan: Panyijiar, Leer, Guit, Koch, and Mayendit – DigitalGlobe and FEWS NET utilize satellite imagery and a crowdsourcing platform to study and react to communities in need. Volunteers tag permanent dwellings (such as tukuls or circular-shaped homes), temporary dwellings (such as tents), and herds of livestock. FEWS NET then uses this data set to accurately assess the level of food insecurity in the region – assisting humanitarians with planning optimal responses, strengthening data analysis, and helping them understand where to locate those in need.

Key solutions

- » DigitalGlobe Crowdsourcing leverages our satellite constellation – connecting volunteers with millions of square kilometers of high-resolution earth imagery.
- » The identification and tagging of features across large areas, such as temporary settlements, permanent settlements, and herds of livestock reveal insight into food insecurity and conflict through migration patterns and displacement.



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SDG 3 | GOOD HEALTH & WELL-BEING

Imagine a life where you must walk several miles just to see a doctor or reach a hospital. For many of us healthcare is a given, but the reality is millions of people around the globe do not have access to basic health services.

"In 2016, there were 216 million cases of malaria in 91 countries, 5 million more than the 211 million cases reported in 2015. This marks a return to 2012 levels."

- [World Health Organization](#)

Breaking the cycle of poverty and poor health

Health impacts education opportunities, and in developing countries, escape from poverty begins with access to quality health services. The [Bill & Melinda Gates Foundation](#) is working diligently towards breaking this vicious cycle by eliminating malaria.

Information needed to mitigate malaria risks is pretty straightforward: Where do people live? How many people live there? Are those homes at risk for malaria? But in rural Zambia, for instance, these are hard questions to answer.

By mapping areas at high risk for malaria, DigitalGlobe empowers health workers with vital demographic and environmental information, such as population density and nearby water sources. This determines the necessary quantity of life-saving mosquito nets and where to apply insecticides.

Key solutions

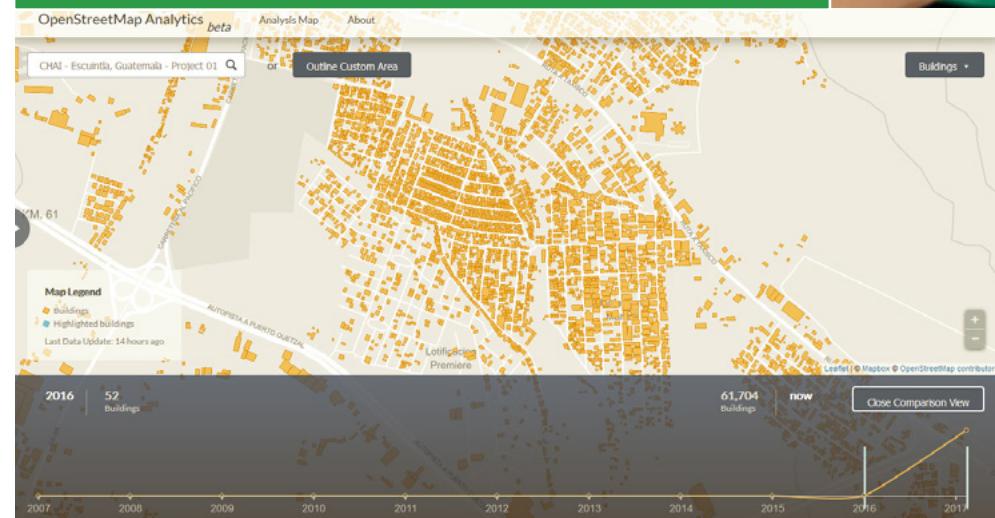
- » Ecopia Building Footprints powered by DigitalGlobe leverages advanced high-resolution satellite imagery, machine learning, and cloud compute power to map entire countries. Working together with the Gates Foundation, Tanzania, Ghana, Sierra Leone, Mozambique, Djibouti, and Somalia have been mapped with the goal of improving health.
- » Machine learning is leveraged to produce automated building footprints across many African countries – mapping 18.5 million buildings in Tanzania in only three weeks.



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 In many areas around the globe, deadly diseases such as Malaria, AIDS, and Tuberculosis are common conditions and a constant threat.



[Bill & Melinda Gates Foundation, Mapping Malaria](#)

4 QUALITY EDUCATION



SDG 4 | QUALITY EDUCATION

Inclusive and equitable quality education is the foundation of truly sustainable communities. Knowledge elevates every human by breaking the cycle of poverty while building a strong and enduring society, but sadly [Project Connect estimates](#) that over 60 million children won't have access to primary education by 2030.

"Education liberates the intellect, unlocks the imagination and is fundamental for self-respect."

- [Globalgoals.org](#)



UNISEF, Project Connect, DevelopmentSEED, BigPixel, DigitalGlobe, and other NGOs are leveraging high-resolution satellite imagery and geospatial analysis to map every school on the planet.

Region Threats

- Natural Disasters Index
- Violence Index
- Zika Risk Index

Region Vulnerabilities

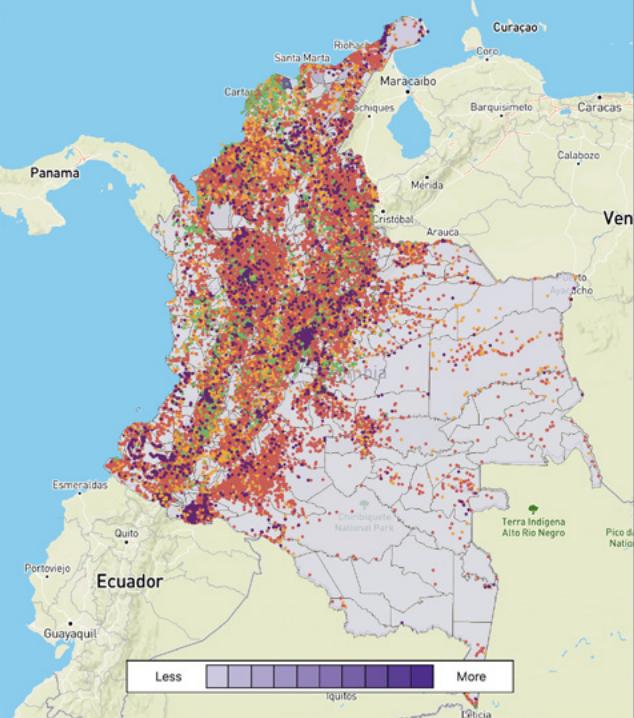
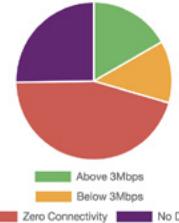
- Human Development Index (Inverted)
- HDI estimated
- Population

School Capabilities

- Connectivity
- Internet Connectivity 4G Coverage
- 3G Coverage 2G Coverage

The selected items will be considered when calculating the risk level of schools and areas.

Connectivity Details



Increasing equitable education and safety

The first step to increasing and improving educational opportunities is understanding where schools are located and what resources are available. This basic information allows organizations to address the infrastructure gaps, whether it is transportation, safety, internet access, or other barriers.

Moreover, climate change and global conflicts exacerbate problems with education accessibility by increasing the number of children who are displaced or on the move. We believe that insights from satellite imagery have the power to help us provide fair opportunities to every child — and mapping every school in the world is an important part of this effort.

Key solutions

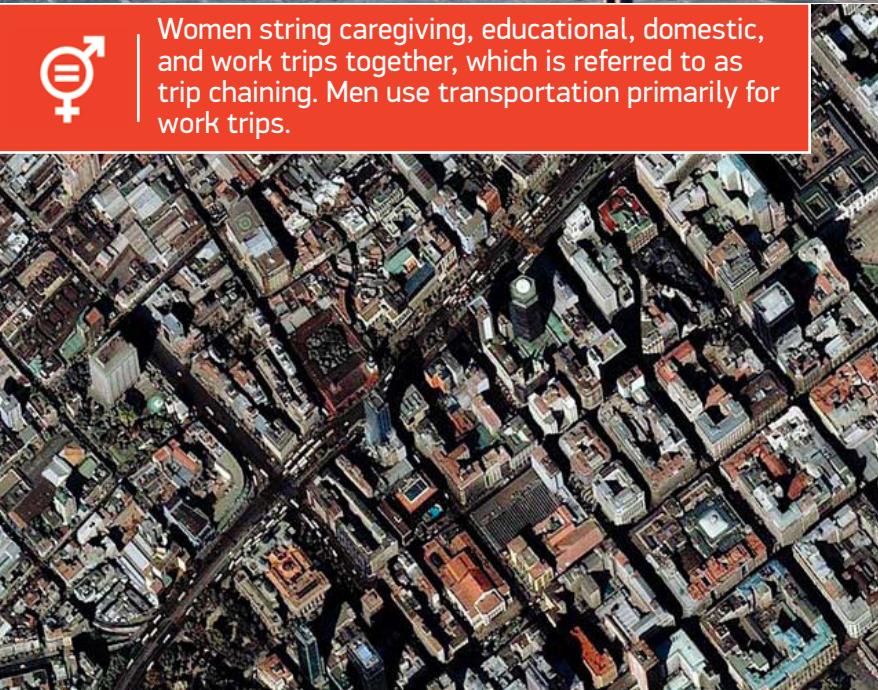
- » The [GBDX platform](#) leverages satellite imagery to make the invisible – visible – on a global scale.
- » DevelopmentSEED and BigPixel provide advanced intelligence through workflows and machine learning algorithms.
- » [UNICEF's real-time data](#) visualization utilizes the power of the above technologies to unearth every school – even in the most remote corners of the world



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Women string caregiving, educational, domestic, and work trips together, which is referred to as trip chaining. Men use transportation primarily for work trips.



1m color IKONOS high resolution satellite image of Santiago, Chile



SDG 5 | GENDER EQUALITY

Oppression against women and girls is a worldwide problem. In fact, in many countries, women cannot make crucial life choices without male permission. Eliminating all forms of this type of discrimination is an ambitious, yet momentous goal that is rapidly gaining support and strength.

["On average, women do three times as much unpaid care and domestic work as men

- United Nations Women

Decoding urban mobility and gender

To better understand the disparity in transportation use by gender, and the role it plays in inequality, DigitalGlobe, together with [GovLab](#), [UNICEF](#), [Universidad del Desarrollo](#), [Telefónica R&D Center](#), and [ISI Foundation](#) formed a data collaborative with funding from [Data2X](#) to establish the first-ever baseline study of urban mobility experiences of women and girls. The partners studied Latin America, specifically, Santiago, Chile – one of the most urbanized cities in the world. Data was collected from satellite imagery exposing roads, tourist attractions, educational institutions, and other points of interest. In combination with a wide range of datasets, such as call detail records provided by the Data Collaborative, actionable insights were collected and shared.

Initial findings show that gender inequality in transportation is relevant in our society – with safety a top concern. In Chile, 85% of women reported they were harassed on the street between 2014 and 2015. The study also concluded that decreased access to transportation affects women's socioeconomic prospects, mobility, and physical safety. Improved public transportation safety, pedestrian networks, and easier access to schools and health facilities are just a few of the neglected elements of urban planning today. Empowered with this information, city planners now understand that a non-biased urban agenda is necessary.

Key solutions

- » DigitalGlobe provides Human Landscape and Basemap + Metro imagery overlaid with mobility data from Critical Design Reviews (CDRs). Heatmap data layers are incorporated alongside public data and the CDRs. Together, this reveals insights into points of interest and mobility.
- » Government census, transport, crime report, and socioeconomic data is collected and combined with anonymized Call Detail Records from Telefonica. This, together with satellite data, forms a human landscape and mobility map of Santiago.



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SDG 6 | CLEAN WATER & SANITATION

Clean water and sanitation are vital for living a healthy life – not only do they ignite our well-being, but cleanliness often fuels our dignity and self-respect. Yet for almost 900 million people across our globe, access to clean water is a daily struggle. And in many parts of the world, millions of women and children walk for miles every day to retrieve heavy loads of water for their homes and villages.

3 in 10 people lack access to safely managed drinking water services and 6 in 10 people lack access to safely managed sanitation facilities.

- United Nations

Supporting flood resiliency and clean water

Flood waters are well-known to contain raw sewage and other hazardous contamination, posing health threats to fresh water sources in flood zones. Ramani Huria (“Open Map” in Swahili) is working to support flood resiliency efforts in high risk areas. Comprised of a broad consortium, including the Tanzania Commission for Science and Technology, the University of Dar es Salaam, Ardh University, Dar es Salaam City Council, and Buni Innovation Hub – it is supported by the Humanitarian OpenStreetMap Team (HOT), the World Bank, GFDRR, and the Red Cross.

This organization works with communities to create highly sophisticated maps of residential areas, roads, streams, floodplains, and other relevant features using DigitalGlobe satellite imagery. They combine this data with software inputs and run realistic natural disaster scenarios, which improve disaster preparedness planning and response plans. Beyond flood resiliency, these maps empower communities in other ways, such as mapping cholera to locate possible sources of contamination and creating real time transportation apps, so communities know exactly when the next “dala dala,” or bus is available.



“These people have never been mapped,

nobody has ever cared enough about them to even know where their house is. To be on the map is to be acknowledged, it is to be known, it is to be recognized, it is to be counted. It is for the world to know that you are there and that you have needs, that you have dignity, that you have rights.”

- HOT Tanzania Country Manager, Ivan Gayton

Key solutions

- » [OpenStreetMap \(OSM\)](#), a free, crowd-sourced, editable map of the world, is used to empower those in Tanzania.
- » DigitalGlobe is an essential partner and proud supplier of the imagery that the OSM crowd community utilizes to trace and label relevant information.



[\[CLICK TO LEARN\]](#)



Local participants not only learn valuable computer and mapping skills; they also have a stake in the community’s efforts to become more resilient in the face of continued seasonal flooding.

-HOT Tanzania Country Manager, Ivan Gayton.



Building footprints - Tanzania



SDG 7 | AFFORDABLE & CLEAN ENERGY

As fossil fuels continue to burn across our planet, carbon dioxide emissions rise; resulting in floods and droughts, rising sea levels, and dangerous storms. Solar energy can be one answer to this problem because of its tremendous potential to reduce hazardous CO₂ emissions.

“Transitioning the global economy towards clean and sustainable sources of energy is one of our greatest challenges in the coming decades. Sustainable energy is an opportunity – it transforms lives, economies and the planet.”

– United Nations



Together with our partners, DigitalGlobe supports clean energy research and we are focused on assessing and locating solar power generation.



Pathways to Electrification

2015

2017



Satellite imagery has proven very useful for tracking the rapid growth of solar PV over time. With increased collection capacity and revisit rates, satellites can provide regularly-updated imagery on a global scale. This enables decision makers to plan ahead – ensuring smooth integration of this variable energy source into the grid. What's more, it exposes what motivates individuals to install solar arrays.



Turning darkness into light

The path forward is clearer when decision makers have data. In much of the world, power plants and grid lines are well-documented, but that is not true for many regions facing energy access challenges. Information about renewable energy infrastructure is lacking – even in resources such as the World Resources Institute's [Global Power Plant Database](#).

To solve these problems, a team of researchers from Duke University's [Energy Initiative](#) and [Applied Machine Learning Lab](#) partner with the [World Resources Institute](#) to demonstrate how using high-resolution satellite imagery with state-of-the-art computer vision techniques can be used to identify and track changes in vital energy infrastructure.

Key solutions

- » Using DigitalGlobe high-resolution satellite imagery, the GBDX platform monitors solar development to inform pathways toward access to electricity for villages.
- » Machine learning techniques and deep learning algorithms (specifically convolutional neural networks) automatically identify solar photovoltaic (PV) arrays.
- » Data gathered from information-rich regions, like [some areas of the United States](#), train algorithms and apply them globally.



SDG 8 | DECENT WORK & ECONOMIC GROWTH

Full and decent work are vital components of productive lives. But unfortunately many people are unhappy at work, unemployed and underemployed, and at worst – forced into slavery and subjected to human trafficking. For example, slavery in the brick kilns industry in countries such as Pakistan is prolific and many of the victims are tricked into bonded labor. Laborers work for 14 hours a day, and 20% of the workforce are children – denied access to education.

“The victims of modern slavery have many faces. They are men and women, adults and children. Yet, all are denied basic human dignity and freedom. All too often suffering from horrible physical and sexual abuse, it is hard for them to imagine that there might be a place of refuge.”

[- Barack Obama](#)



Rod Waddington Follow, Brick Kiln Workers, Madagascar



In Pakistan, there are an estimated 4.5 million people, including many children, working at 20,000 brick kilns across the country.

Madhabdi, Bangladesh – Kiln smokestacks

Slavery cannot hide from satellites

University of Nottingham is leveraging DigitalGlobe satellite imagery to detect locations of human rights abuse. The project, [Slavery from Space](#), encourages volunteers to assist the university in their mission to end slavery, through mapping potential sites of brick kilns, which exposes forced labor. Volunteering is open to anyone and is accessible online.

Another initiative, the [Global Fund to End Modern Slavery](#), tracks the location and number of boats used for fishing around Lake Volta in Ghana, West Africa, which is a well-known hub of modern slavery and child trafficking. In this region, children work 19 hours a day and end up disabled, disfigured, and left for dead. This project also utilizes the power of crowdsourcing and volunteers to fight child slavery. Both of these projects contribute intelligence to those providing aid on the ground, and also empower policy and decision makers to understand the processes that enable slavery at a larger scale.

Key solutions

- » DigitalGlobe Crowdsourcing leverages our satellite constellation – connecting volunteers with millions of square kilometers of high-resolution earth imagery.
- » Crowdsourced input trains machine learning algorithms that, over time, will accelerate knowledge-share and assistance for humanitarian organizations.



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SDG 9 | INDUSTRY, INNOVATION & INFRASTRUCTURE

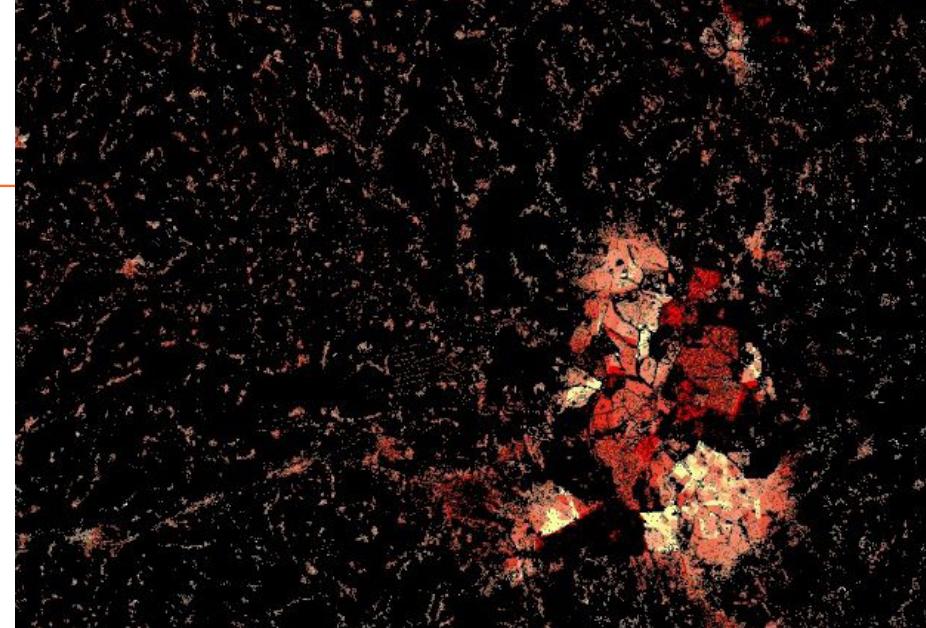
Economic growth is key to fighting poverty, improving living standards, and promoting health and opportunity. Countries with a solid GDP experience greater stability, security, and safety with resources to foster investments in infrastructure, such as water supplies, transportation, energy, and internet communication technologies.

Understanding the physical layout of rural settlements is vital for planning access to the internet, but it also plays a huge role in designing utilities, building transportation, and assessing disaster risk

- Food Aid Foundation



The Connectivity Lab at Facebook is exploring a variety of technologies to empower the world with essential communications, such as internet access, and satellite imagery is a fundamental component of this strategy. Using Facebook's image recognition engine, their Core Data Science, Infrastructure, and Artificial Intelligence teams are working with DigitalGlobe's 50-cm resolution satellite imagery to identify structures and create high-resolution population maps.



Facebook Internet Connectivity Initiative - Malawi

Accelerating affordable internet access

Population distribution maps, especially in rural areas, are crucial for achieving a variety of global goals and play an integral role in communication plans. Moreover, understanding the physical layout of rural settlements is vital for planning access to the internet, designing utilities, building transportation, and assessing disaster risk.

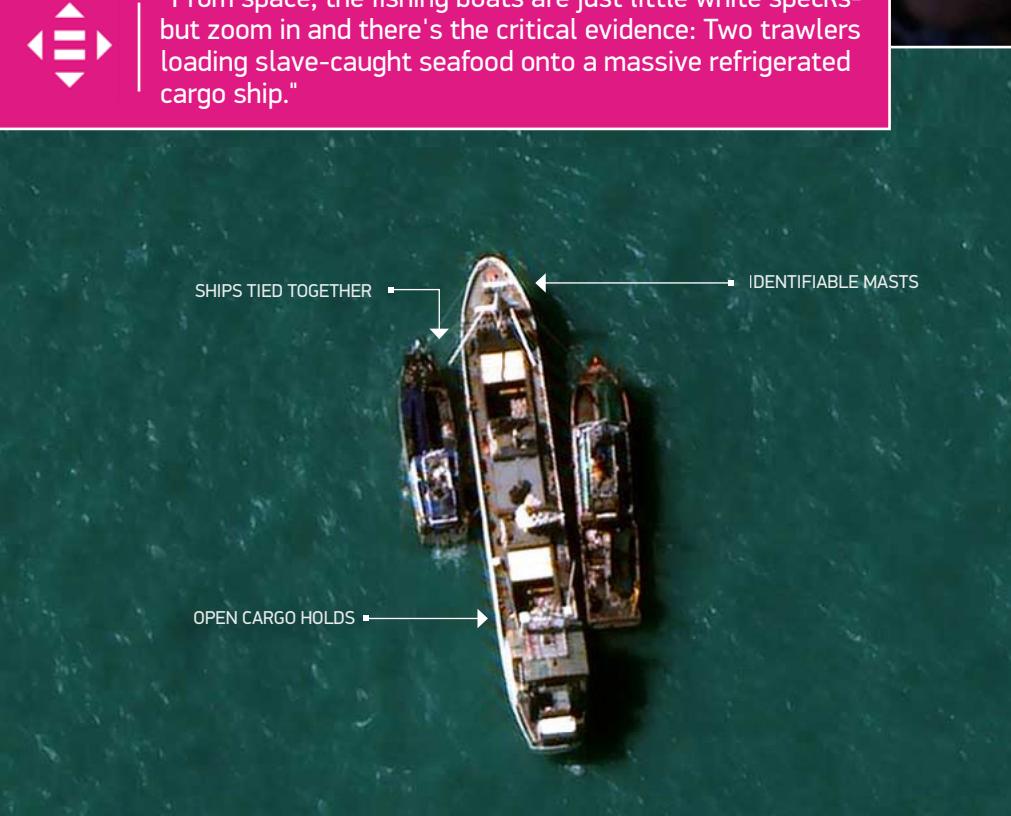
With the end goal of expanding connectivity infrastructure to rural populations throughout several developing nations, Facebook has accomplished the necessary first steps to empowering these countries with internet communications. For example, they've created human population distribution data sets at a resolution of 1 arc-second (approximately 30m) for several countries. These population estimates are based on census data and high-resolution (0.5m) satellite imagery. Facebook shares this data at the [Center for International Earth Science Information Network \(CIESIN\)](#) website.

Key solutions

- » DigitalGlobe's GBDX platform and algorithms for mosaicking and atmospheric compensation provide consistent imagery mosaics that are foundational to population density mapping.
- » Facebook's convolutional neural nets utilize DigitalGlobe's mosaics to identify populations over massive areas around the globe.



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10 REDUCED INEQUALITIES



SDG 10 | REDUCED INEQUALITIES

Despite our modern perception, there are more people enslaved today than in any other time in history. Humanitarian organizations and governments around the globe are banding together and partnering with commercial innovators to stop human exploitation.

“More than 40 million people around the world are victims of modern slavery – forced labor and forced marriage.”

— United Nations

Empowering human rights

In the summer of 2015, Martha Mendoza and her team from the Associated Press (AP) conducted an extensive investigation into the enslavement of humans in Southeast Asia's fishing industry. Men are tricked into working on fishing boats and kept captive against their will – in many cases – for decades.

After over a year of investigation and hundreds of interviews, the AP team needed solid evidence. Through the AP's intel, DigitalGlobe targeted a location in the waters off of Papua New Guinea and tasked a satellite to the proper location. The WorldView-3 Satellite located and identified the fishing vessels engaged in illegal activity and delivered indisputable evidence of human trafficking in action. This critical eye-in-the-sky proof gave the Indonesian Navy the confidence to seize the tainted cargo and succeed in freeing more than 2,000 slaves to date.

These outcomes contributed to:

- » Seizure of ships worth millions of dollars.
- » Legislation in the U.S. Congress to create greater transparency from food suppliers.
- » Reinforcement of the concept that high-resolution imaging satellites are critical to human rights protection and accountability.

Key solutions

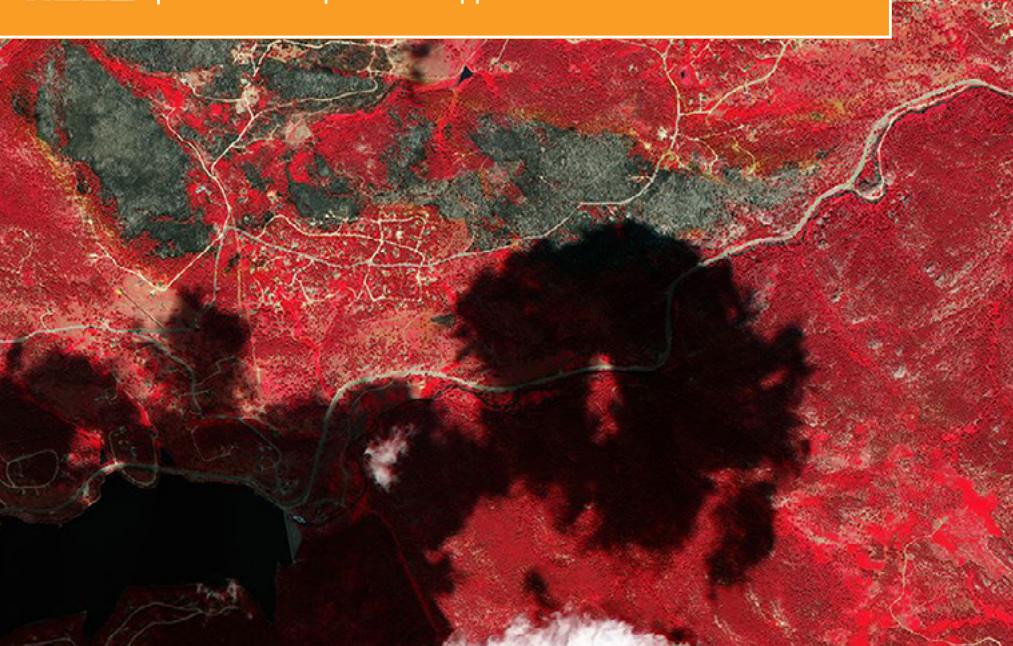
- » Highest quality satellite imagery available with resolution better than 50 cm.
- » Situational monitoring for intelligence, surveillance and reconnaissance.
- » High frequency of revisits to a location due to the size of the DigitalGlobe constellation, providing greater probability of capturing the desired high resolution imagery.
- » A network of geospatial analysts with the professional skills and training to derive key intelligence factors.



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Many nations, countries, and cities are setting standards to achieve sustainable urban development, and at DigitalGlobe we're proud to support these initiatives.



Boulder Canyon Cold Springs Fire, July 11, 2016

11 SUSTAINABLE CITIES AND COMMUNITIES



SDG 11 | SUSTAINABLE CITIES AND COMMUNITIES

Large cities open appealing opportunities – jobs, social development, and cultural attractions – to name a few. However, rapid urbanization introduces new problems – water supplies, waste removal, public health, growing emissions, and aging infrastructure are just a handful of the challenges faced by urban planners.

“Half of humanity – 3.5 billion people – lives in cities today and 5 billion people are projected to live in cities by 2030.

[– United Nations](#)

Strategies for sustainable urban development

Boulder, Colorado is a city laser-focused on reducing local greenhouse gas emissions. In fact, by 2050, this city has a lofty goal to reduce emissions by 80 percent. Through a local carbon offset fund, electric vehicles and other energy system changes, they are poised to pioneer a new way of looking at sustainable and resilient cities.

Boulder has discovered one of its most important untapped resources – trees. Scientists now have evidence that urban tree canopies (UTCs) offer benefits such as increased oxygen production, less pollutants, improved respiratory health, reduced smog, and more. In fact, satellite imagery demonstrates that cities with more trees have cooler climates.

To help the city of Boulder achieve its aggressive resiliency goals, DigitalGlobe works with [Trimble](#) to accurately classify, map, and measure the green UTC. Armed with knowledge through satellite imagery, urban planners can easily assess and reinforce their resiliency and sustainability objectives and efforts.

Key solutions

- » Trimble's eCognition software leverages DigitalGlobe high-resolution satellite imagery to paint an accurate picture of city-wide tree coverage



[\[CLICK TO LEARN\]](#)

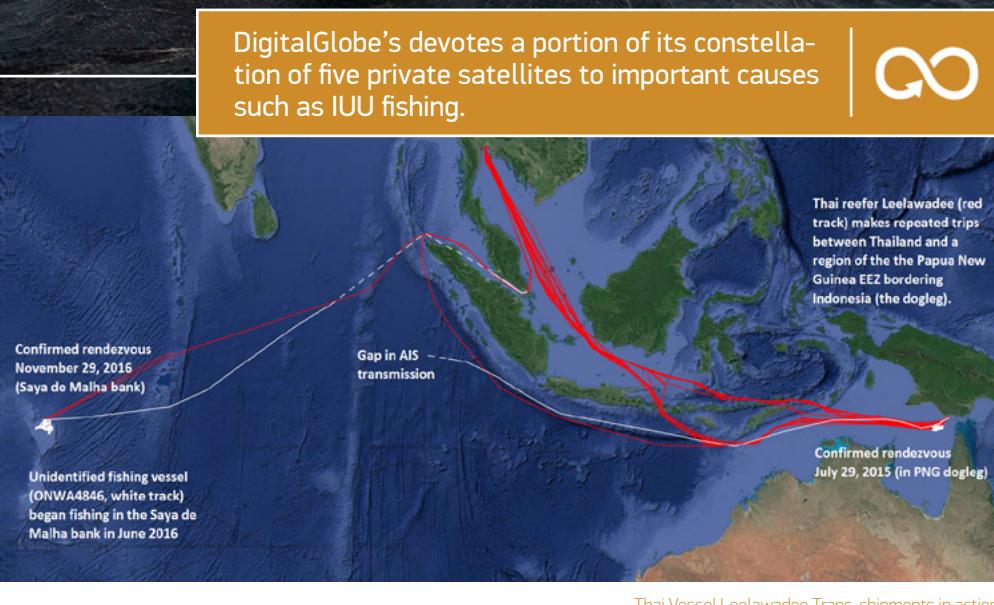


SDG 12 | RESPONSIBLE CONSUMPTION & PRODUCTION

Do you know where your food comes from? Many of us don't think twice about it. The sad truth is much of the food that is sold is harvested illegally or a result of unsustainable practices. This is why governments, businesses, and activists are taking action as a result.

"Land degradation, declining soil fertility, unsustainable water use, over-fishing, and marine environment degradation are all lessening the ability of the natural resource base to supply food."

— United Nations



Governments and organizations around the globe partner with DigitalGlobe to help identify trans-shipments and other types of illegal fishing activity. In conjunction with complementary technologies, illegal fishers simply cannot hide.

A bird's-eye view of illegal fishing

The UN Food and Agricultural Organization (FAO) sees illegal, unreported, and unregulated (IUU) fishing as a massive problem and a huge threat to fish stocks. It is so harmful, addressing it is critical to achieving the 2030 SDG 14 agenda. Because of this, DigitalGlobe has pledged to help identify illicit fishing activities around the globe.

Illegal fishers utilize two key strategies to hide their activities: "going dark" and "trans-shipments." In a "going dark" scenario, illegal fishers turn off their universally-required Automatic Identification System (AIS) beacons, which track a ship's position and route. What's more, "Trans-shipments" are a common practice where illegal catches are transferred to a cargo ship and combined with a legal catch – making the illegal goods nearly impossible to track.

The [Global Fishing Watch \(GFW\)](#) monitors global fishing fleets by mapping all AIS signals, and they publish this data on a [public map](#). When these suspicious activities are discovered, such as gaps in AIS transmission, DigitalGlobe's highest-resolution satellites are tasked to sweep for a bird's-eye view. This visual evidence exposes proof of trans-shipments to authorities, such as ship-to-ship mooring lines and open cargo holds.

Key solutions

» SkyTruth analyzes AIS data to identify anomalies in ship movement, thus narrowing down "dark targets" or vessels that have turned off their AIS. With this analysis, "tipping" and "cue-ing" is used to task the constellation and to capture evidence of nefarious trans-shipments.



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SDG 13 | CLIMATE ACTION

It is undeniable that the planet is undergoing global warming and weather patterns are shifting. Warmer temperatures are a concern and threaten to impact our lives in catastrophic ways. Hotter conditions jeopardize food production – but also increase the chances of natural disasters, such as fire, flooding, strong hurricanes, and drought.

Large wildfires in the United States burn more than twice the area they did in 1970, and the average wildfire season is 78 days longer.

– Center for Climate and Energy Control

Strategies for major disaster relief

Since the 2010 Haiti earthquake, DigitalGlobe has supported major disaster relief efforts by releasing free and open imagery of affected areas. Over the years, our high-resolution imagery has provided critical, timely insights in the aftermath of Typhoon Haiyan, the Nepal earthquake, Hurricane Patricia, and the Ecuador earthquake, among others. More recently, Haiti again suffered horrendous damage from Hurricane Matthew, leaving 1.4 million people in need of humanitarian aid. Our Open Data Program has served as a critical data source for first responders and recovery efforts.

Alongside government partners, DigitalGlobe works with the [Humanitarian OpenStreetMap Team \(HOT\)](#), [Amazon Web Services \(AWS\)](#), [The World Bank](#), [NetHope](#), [MapBox](#), [Team Rubicon](#), [IMMAP](#), and the [United Nations](#) to support major disaster relief efforts around the globe. Through these partnerships and satellite imagery, dozens of humanitarian and relief agencies are empowered with data and insights to guide operational efforts on the ground. From damage assessments to flood mapping to evacuation planning, high resolution imagery provides valuable information during these crises.



"Without FirstLook imagery, we would have wasted precious hours driving around looking for access routes. With so many people trapped without electricity, food or water, we didn't have time to lose."

- Team Rubicon

Key solutions

- » [DigitalGlobe's Open Data Program](#) provides accurate high-resolution satellite imagery to support disaster recovery in the wake of large-scale natural disasters.
- » Open imagery is released for select sudden onset major crisis events, including pre-event imagery post-event imagery, and a crowdsourced damage assessment.

Note: The Open Data Program supports non-commercial use only. For businesses operating in affected areas, our StormWatch data bundle offers satellite imagery, flood models, and building footprints for commercial use.



Ventura Fire

Satellite imagery is a vital tool enabling scientists to collect information about climate change and reveal the tell-tale signs of global warming. It provides actionable information before, during, and after natural disasters.

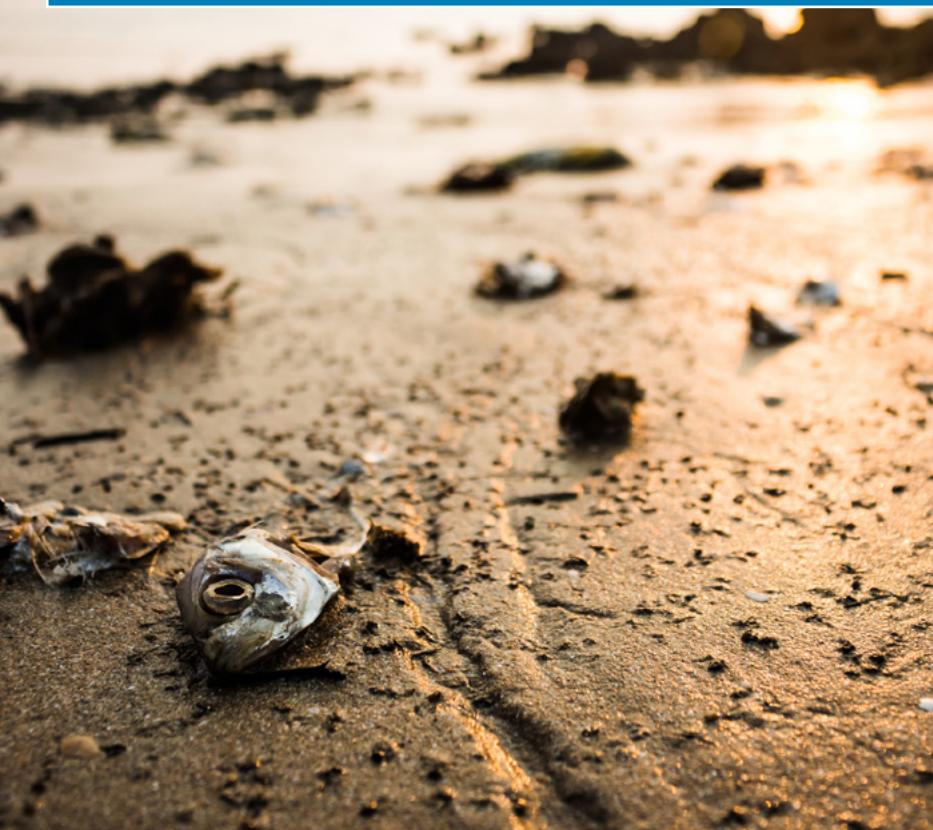




Harmful Algal Blooms



Red Tides are detrimental to local economies that depend on tourism, transportation through waterways, farming, and the fishing industry. Toxic waters can poison shellfish beds for weeks and destroy an entire fish farm's production overnight.



SDG 14 | LIFE BELOW WATER

Oceans make up over 70% of our planet and provide vital resources such as food, oxygen, energy, and transportation. Yet, this vulnerable ecosystem is suffering from pollutants, oil and gas spills, chemicals, debris, and harmful toxins.

More than 3 billion people depend on marine and coastal biodiversity for their livelihoods

- [United Nations](#)

Monitoring harmful algal blooms

In recent years, one threat plaguing many of our oceans and lakes is harmful algal blooms (HABs). This phenomenon is also known as Red Tides because affected waters appear red, brown, or green on the surface. Caused by the Karenia brevis organism, Red Tides commonly occur in the Gulf of Mexico, southwest coast of Florida, and the Everglades. Karenia brevis produces potent neurotoxins called brevetoxins. In humans, if inhaled, it can cause respiratory illnesses; and if ingested can lead to gastrointestinal issues, loss of motor control, and other ailments. Marine life, animals, and seabirds are especially vulnerable – causing devastating loss of sea life.

At DigitalGlobe, we developed a technique to help aquaculture farms globally monitor the emergence of Red Tides in near-real time through the applications of detection algorithms to oceanographic big data. With Red Tide forecast estimates of a few days, those living in the coastal regions can avoid those areas and commercial farm managers and governments can stay informed.

Key solutions

- » DigitalGlobe's Red Tide service combines the power of our [SeaStar Fisheries Information Service](#) with algorithms that best identify coastal algal blooms – alerting commercial farms and governments when this threat emerges.
- » Modeled upon the highly-respected [National Oceanic and Atmospheric Administration \(NOAA\) CoastWatch program](#), the Red Tide service is available globally and enhanced to include advanced and relevant coastal algorithms for identifying algal blooms.





As we speak, habitats for chimpanzees, orang-utans, and other species are converted into lands for industrialized agriculture.



Credit: The Jane Goodall Institute/Hugo van Lawick



SDG 15 | LIFE ON LAND

Forests are a vital component of our earth's ecosystem. They absorb greenhouse gases, provide habitat, prevent erosion, and supply food. Covering over one third of our world's surface – they are steadily shrinking – impacted by industrialized agriculture, natural disasters, logging, and more.

Despite United Nations-led efforts to halt deforestation, nearly 10 percent of undisturbed forests have been fragmented, degraded or simply chopped down since 2000, according to the analysis of satellite imagery.

- Daily Nation

Saving our forests

In sub-Saharan Africa, forests are disappearing. Human activities such as logging, agriculture, and infrastructure developments are depleting vital natural resources

For over 55 years, [the Jane Goodall Institute \(JGI\)](#) has collected data on chimpanzees in Gombe National Park in Tanzania, and they have made great strides towards achieving their goals to protect and restore critical chimpanzee habitats and preserve the health of our planet.

DigitalGlobe proudly partners with JGI to help the institute achieve these goals. Using satellite data between 2005 and 2014, the JGI staff can visualize – and share with the world – that Kigalye Village has successfully implemented a land-use plan in its village forest reserve that minimizes farming, logging, and fires, and allows Miombo woodlands (which are the most extensive habitats available to Tanzania's chimpanzees) to regenerate naturally.

JGI staff can clearly demonstrate their results to decision-makers. By leveraging Landsat MSS, publicly available imagery, DigitalGlobe imagery, and historical aerial photos they can show that the forest size decreased, but recovered through preservation efforts. In 1972, the Kigalye Village Forest Reserve had 370 hectares of woodlands (70 percent of its total area covered by forest). By 2005 (when the village reserve was created), its woodlands had decreased to 156 hectares, just 42 percent of the forested area. And satellite imagery shows that in 2014, community efforts helped restore up to 82 percent of the woodlands – approximately 302 hectares.

Key solutions

- » DigitalGlobe provides remote sensing data from 50-cm, high-resolution satellite imagery, which provides a bird's-eye view of land use and changing forests in Tanzania.
- » DigitalGlobe GBDX and land use/land cover data layers are leveraged to understand deforestation/reforestation and the drivers of change.



[CLICK TO LEARN]



SDG 16 | PEACE, JUSTICE AND STRONG INSTITUTIONS

Peace and justice are foundational for human rights, law and order, and security. Yet it is frightening to believe that every day millions of people are exploited, abused, and fall prey to corruption, theft, human trafficking, and other atrocities. Particularly in developing countries, people live in areas of perpetual conflict and violence, where safety is a daily concern.

“There are at least 350 million children living in areas affected by conflict in the world today”

- [Save the Children](#)



Amnesty International supports advocacy and investigation efforts by publishing images of ongoing violence, which helps to predict likely targets of attacks.



Measuring conflict in war

The Darfur region of Sudan has been a major sight of ongoing conflict since 2003. What began as a conflict between Arabs and non-Arabs in a country of famine, has escalated into mass genocide of non-Arabs. Sudanese president, Omar al-Bashir, continues to pursue these crimes – with ongoing attacks against civilians – even beyond Darfur.

The [American Association for the Advancement of Science](#), [Amnesty International](#), [Human Rights Watch](#), and the [Genocide Intervention Network](#) work together to monitor and document the ongoing violence in the Darfur region and eastern Chad with the support of DigitalGlobe satellite imagery. Efforts reveal that 75 percent of the 28 locations studied in the Darfur region have experienced village destruction and an increase in internally displaced persons (IDP) camp populations.

Key solutions

- » Satellite imagery from the DigitalGlobe QuickBird satellite and other data are analyzed to locate and measure structural damage, such as fires, camps, internally displaced persons (IDPs), and other signs of conflict.
- » DigitalGlobe EarthWatch is utilized to access global coverage. This high resolution imagery demonstrates evidence of human rights abuse, such as destroyed villages, mass graves, and other atrocities.



[CLICK TO LEARN]



SDG 17 | PARTNERSHIP FOR THE GOALS



At DigitalGlobe, we're committed to forming partnerships and empowering organizations to achieve the Sustainable Development Goals set forth by the United Nations.

See a Better World through Coordinated Partnerships

With advances in satellite imaging technology, cloud computing, and artificial intelligence, DigitalGlobe can make the impossible, possible. High-definition imagery and geospatial big data, empowers civil, state, local, national, and national governments, NGOs, and other organizations to unlock insights and intelligence that were once virtually invisible.

About Us

DigitalGlobe is the global leader in commercial high-resolution satellite imagery used by decision makers to better understand our changing planet in order to save lives, resources and time. Sourced from the world's leading constellation, our imagery solutions deliver unmatched coverage and capacity to meet our customers' most demanding mission requirements. Each day customers in defense and intelligence, public safety, civil agencies, map making and analysis, environmental monitoring, oil and gas exploration, infrastructure management, navigation technology, and providers of location-based services depend on DigitalGlobe data, information, technology and expertise to gain actionable insight. DigitalGlobe is a Maxar Technologies company (NYSE :MAXR ; TSX :MAXR).

For more information visit www.DigitalGlobe.com.



We invite you to learn more about how we can help you address our world's biggest global challenges.



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