# Background Note on a proposed World Bank Digital Earth Partnership

# Rationale

## Accelerating Action on the 2030 Agenda

The United Nations called the 2020's as the Decade of Action for the 2030 Agenda on Sustainable Development Goals before the global COVID-19 pandemic hit. Now, in 2021, the international community stands at a critical point, facing two global crises of immense proportions that threaten the progress in international development: COVID-19 and Climate Change.

In January 2021, the World Bank updated its estimates on the impact the COVID-19 pandemic has had on the global poor and calculated that between 119 and 124 million people have been pushed into extreme poverty as a result – a doubling from the first estimate in April 2020. Compounding this economic and social shock are the impacts of Climate Change which has intensified in recent years.

These crises affect especially hard the poorest and more vulnerable, those who are also taking the brunt of regional crises derived natural disasters and violent conflict. For low- and middle-income countries, this could be a lost decade. Malnutrition rates are increasing around the world and child mortality is expected to rise by 45 percent globally. Closed schools have impacted the access to opportunities for acquiring knowledge, and skills specially for the youth but also for women.

The World Bank has stated that its goal of reducing extreme poverty to below 3 percent by 2030 may now be unachievable and that "exceptional and urgent global action must tackle the combined impact of cascading crises while adapting to post-pandemic realities."[1]

This need for a new approach to development that is adequate for the challenges of today— the COVID-19 pandemic, climate change, and growing inequality – has framed the World Bank Group's Spring Meetings 2021 agenda. The focus has been on a Green, Resilient, and Inclusive Development (GRID) framework that will enable a collective response to compounding risks and the interconnected nature of today's crises.

To implement this agenda, the World Bank aims to develop better lines of sight into the future, to provide credible and evidence-based guidance for investments and ensure that these are backed by solid evidence for efficiency and sustainability. The World Bank President David Malpass declared recently that the new approach intends to help countries accelerate the development and adoption of digital technologies[2] for development.

## Digital Earth Opportunity

New generation and next generation digital earth imaging technologies can support a step-change in service delivery and data for a smart recovery and the 2030 agenda. New approaches that can significantly

[1] World Bank, (2021), Development Committee, From COVID-19 Crisis Response to Resilient Recovery - Saving Lives and Livelihoods while Supporting Green, Resilient and Inclusive Development (GRID)

[2] WBG President David Malpass, Speech at the London School of Economics, March 29 2021, online at: https://www.worldbank.org/en/news/speech/2021/03/29/building-a-green-resilient-and-inclusive-recovery-speech-by-world-bank-group-president-david-malpass

scale the coverage and frequency of data collection whilst also lowering the costs and complexities involved are both necessary and possible.

The United Nations committee of experts on Global Geospatial Information Management, in their latest report, highlights the relevance of the digital revolution in geodata for tackling the macro challenges of climate change, public health and population change compounded by the pandemic. It asserts that technology – from increasing levels of automation to the Internet of things, Big Data, Artificial Intelligence, immersive technology and the rise of Digital Twins - represents great opportunities and challenges to those trying to prioritise recovery efforts and accelerate action on the 2030 agenda.

The expert committee predicts an unprecedented disruption that both private sector and public agencies face as a result from the volume, size, speed, variety, and complexity in which geospatial data is generated[3]. In addition, reductions in cost and complexity of Earth Observation services – from more affordable drones and satellite technologies benefitting from image classification capabilities – will bring benefits to developing nations and small island developing states that suffer from a significant geospatial digital divide.

The 2021 World Development Report: Data for Better Lives also identifies the "tremendous potential of the changing data landscape to improve the lives of poor people, while also acknowledging its potential to open back doors that can harm individuals, businesses, and societies".

The UK AID Frontier Technologies published in 2020 a guide to new opportunities on how to release the power of digital data for development concluding:[4]

1. There is justified excitement and proven benefits in the use of new digital data sources;
2. Combining new and traditional data sources is more effective than just new data alone;
3. Decision making around new data sources should be highly devolved;
4. Strong ethical frameworks for new data services are needed to avoid harming the vulnerable;
5. The highest potential added value new data source for exploitation now are Earth Observation (including satellites and drones) and passive location data from mobile phones;
6. Artificial Intelligence techniques such as machine learning have high potential to add value.
7. Next generation emerging data sources are likely to be: Artificial intelligence, next generation Earth observing platforms, privacy preserving data sharing, and the Internet of things.
8. An enabling environment for standards, for open data, data sharing, security, learning and continued support for capacity building in developing nations remains relevant for success.

Both the UN report and the UK AID Frontier Data study make the case for increased investments in new geodata sources and related services, but also call for changes to the processes by which these services are developed. The pace of change of technology, emergence of global and local actors and digital services, and opportunity for accelerated impact, suggest a need to pivot towards cocreation models. Partnerships that support the hybridization of traditional and new data models, as well as developing inclusive opportunities for skills and innovation in demand driven manner.

The most promising opportunities are in new generation and next generation Earth Observing technologies – satellite and drones when incorporated together with a broader digital value chain such as local data training and calibration data as well as artificial intelligence tools.

[3] UNGGIM, (2020), Future Trends in Geospatial Information management: the five to ten year vision, Third Edition
[4] UKAID, (2020), Frontier Data Study: Releasing the power of digital data for development

Satellite technology has been used successfully at the World Bank, as it can convey information quickly and cost-effectively through clear visual impressions[5]. Furthermore, there is on ongoing revolution in satellite remote sensing capabilities – with increasing temporal frequencies of measurements, greater variety of sensing modes and great standardization of archives and service continuity. DigitalGlobe and Ecopia can detect buildings from satellite imagery with quarterly refresh rates[6]. Computer Vision competitions indicate that buildings and roads can accurately be extracted from satellite imagery[7]. However, these algorithms require a very large number of training samples, which must be representative for the application and geography in question. For example, building extraction algorithms trained with examples from European or North American cities may not work well in African cities, where buildings have a different appearance. Obtaining a representative collection of samples with which to train the algorithms can be expensive and time-consuming - especially in smaller and medium-sized Sub-Saharan African cities.

## Partnership for Inclusive Innovation

The opportunity exists therefore to leverage new advances in satellite and remote sensing technologies for sustainable development. For this transition to be successful however, the flow of knowledge transfer as well as data and services must be two-way, with users enabled to contribute requirements, calibration and validation data, as well as able to build their own data ecosystems.

Digital Earth services, to have impact and remain sustainable, should strive for true cocreation between cutting edge technology providers and local ecosystem users and providers. Such service cocreation should also provide for inclusive opportunities to build skills, jobs and businesses locally in new and next generation Earth Observation.

[5] http://www.worldbank.org/en/news/feature/2013/08/20/earth-observation-for-development-success-stories

[6] http://explore.digitalglobe.com/GBDX-Building-Footprints.html

[7] http://deepglobe.org/index.html

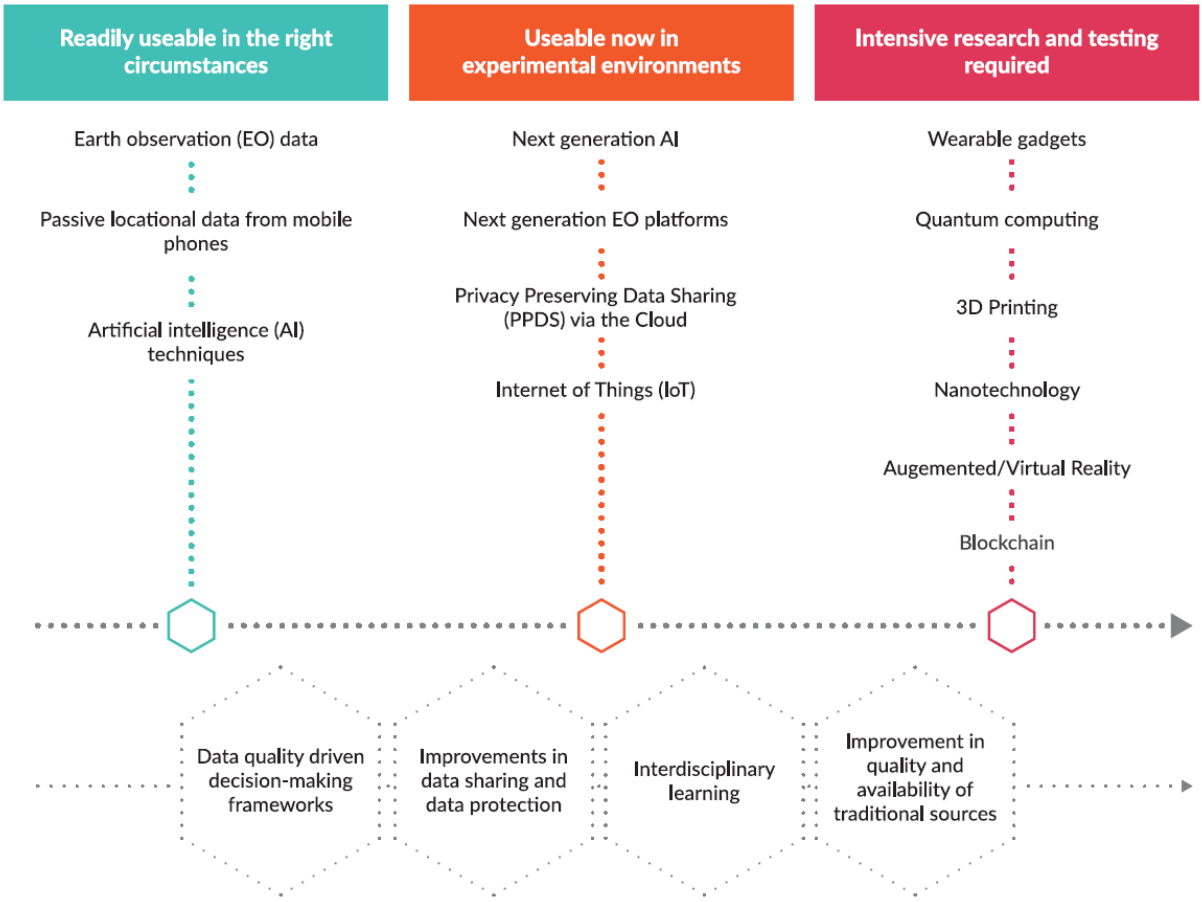
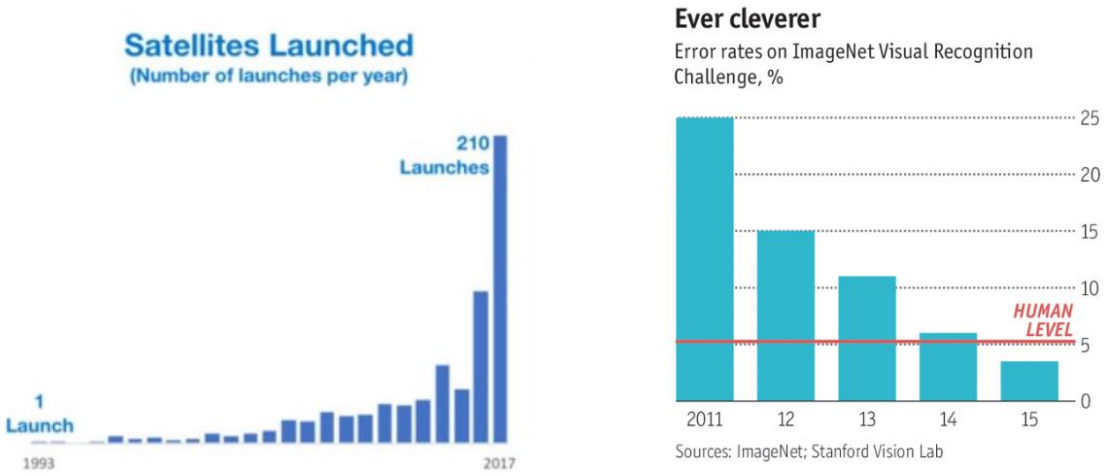



*Figure 1 Summary of emerging opportunities in the digital data landscape, Source: UKAID, 2020, Frontier Data Study – releasing*




(a) (b)

*Figure 2:* # Earth Observation satellites launched per year[8] (a) and improvements in algorithms for image recognition tasks (b).

[8] Source: UCS Satellite Database, https://www.ucsusa.org/nuclear-weapons/space-weapons/satellite-database#.W6qBA2hKg2w