Using mobile data and airtime credit purchases to estimate food security

More reliable and timely information on food security could be valuable for addressing challenges of food availability, volatility in food prices and emergency response. Global Pulse worked with the World Food Programme (WFP) to assess the potential of using mobile phone data to develop real-time indicators of food security that can be used in regions where standard household surveys (or early warning indicators) are not always possible or available.

Data from mobile airtime credit purchases (or “top-ups”) and mobile network activity in an East African country was accessed through an MNO analytics provider. The data was compared to a nationwide household survey conducted by WFP at the same time. Results showed high correlations between airtime credit purchases and survey results referring to consumption of several food items, such as vitamin-rich vegetables, meat or cereals in market dependent households. These findings demonstrated that, under certain circumstances, airtime credit purchases could serve as a proxy indicator for food spending.

http://unglobalpulse.org/WFP-GlobalPulse-Mobile-Data-Food

In September 2015 Member States of the United Nations adopted, by consensus, the 2030 Agenda for Sustainable Development. The 17 Sustainable Development Goals (SDGs) contained in the 2030 Agenda constitute a transformative plan for people, planet, prosperity, partnerships and peace.

A ‘data revolution’ was recognized as an enabler of the SDGs not only to monitor progress but to inclusively engage stakeholders at all levels to advance evidence-based policies and programs to reach the most vulnerable.

One of the key sources of data needed to unlock this potential is the range of data generated from mobile networks and devices. Information about location, social patterns, movement, population density, finances and even ambient environmental conditions can be derived from the data logged in mobile systems. As this data is uniquely detailed and tractable, it can capture information not easily found from other sources at a scale that would be difficult to recreate through other means.

Experts across sectors have suggested that despite its potential, the use of mobile data for social good remained largely in the pilot phase, a situation common to many cutting-edge fields. While the examples to date are compelling in showing the range of potential uses for this data to serve the social good through the achievement of the SDGs, the lack of examples that have scaled or become sustainable indicates there are still gaps in the field.

The ‘State of Mobile Data for Social Good’ report outlines the value of harnessing mobile data for social good and provides an analysis of the gaps. Its aim is to survey the landscape today, assess the current barriers to scale, and make recommendations for a way forward.

The report is informed by a series of expert interviews with representatives of international development agencies, mobile network operators (MNOs), civil society organisations and technical data experts and on analysis of case studies using mobile data. It also draws from the body of existing literature, and a number of consultations at recent conferences and workshops related to uses of mobile data for social good.
MOBILE DATA FOR SDGS

A digital data revolution is well underway, transforming sectors ranging from healthcare to e-commerce to transportation. The implication for international development and humanitarian action is that a whole range of information about human behaviour -- that previously would only have been available with months of surveying and at high costs -- is now accessible in real-time.

These factors are creating the expectation that the capacity to collect and analyse larger and more complex kinds of data is increasing. In particular, data derived from mobile devices has tremendous potential for the SDGs for several reasons:

- **Mobiles are ubiquitous, including in the developing world.** Global mobile subscriber penetration is 63%, and 90% of new subscribers forecasted to come from the developing world.

- **Mobile phone usage produces data related to location, movement, mobility, and environment.** When combined with more traditional sources like census, health, or weather data, mobile data can support humanitarian and development goals.

- **Data about mobile networks and usage is already being captured, stored, and secured by MNOs.** The opportunity exists for the development and humanitarian communities as well as governments to work with MNOs to apply thoughtful, creative, and privacy-respective layers of analysis on this data in order to extract useful insights.

Several categories of use cases for how mobile data can be particularly beneficial to the social sector are described below:

- **HUMANITARIAN:** Predict, mitigate, prepare for, respond to and recover from major crises like natural disasters, conflicts, or pandemics.
- **DEVELOPMENT:** Help describe and address long-term social issues by providing insight into people’s lives, habits, behaviors, health and financial security. Useful in understanding the appropriateness and effectiveness of development programs. Can be used for program design and adaptation. Potential to track the progress of programs in real time and at a lower cost than traditional data collection methods.
- **REPORTING/GOVERNANCE:** Complement traditional data sets supporting national statistical offices (NSOs) and informing policy at a national level. Track progress against the SDGs.
Monitoring population movement in earthquake-stricken areas with mobile data

In April 2015, a devastating earthquake hit Nepal destroying more than 500,000 buildings and killing and injuring thousands. Flowminder and researchers from the WorldPop project used mobile data to track the displacement of populations in the affected areas.

Following the initial earthquake, the project produced updated static population density maps including gender and age distributions for Nepal. These data were used by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and other key relief agencies to estimate the number of people affected. The Flowminder and WorldPop mobile analysis team then used these population data in combination with data from Ncell, the largest mobile operator in Nepal, to quantify the impact of the earthquake on population movements.

The team successfully released the first comprehensive analyses of population displacement less than two weeks after the earthquake. The results were released as a report to the United Nations and a range of relief agencies.


MODELS FOR DATA ACCESS AND MANAGEMENT

One of the defining steps in every mobile data for social good partnership is deciding on the appropriate mode for data sharing between the partners – namely those who provide the data and those who use it. The format in which data is shared has to conform with consumers’ privacy and data protection expectations and rights.

Several models have been proposed or tried:

- Data analysis conducted by the Data Provider where the User (an international humanitarian organization, a national statistical agency, research institution etc.) is provided with the insights (often visual assets, such as maps or graphics) as a result of data analysis.
- User is provided direct data access by the Data Provider either in-person or via VPN (virtual private network), following strict legal agreements, data access and data handling protocols.
- Sharing of physical copies of data by the Data Provider with the User according to rigorous data handling protocols, agreements and compliance with local laws.
- Data transfer to an intermediary - a neutral third party - designated to broker the relationship between the User and the Data Provider, ensure required compliance, data handling agreements as well as the set-up for secure data management.
CHALLENGES

Many efforts have been made to use data and technology, in general, to address global challenges. There is a body of literature evidencing the potential of mobile data to assist development and humanitarian efforts. However, there are still many challenges that prevent utilization of mobile data for social good on a systematic and operational level.

Some of these challenges include:
- Absence of or insufficient understanding of incentives to invest into data for social good opportunities
- Inadequate understanding (and often practical inability to understand and predict) of risks as well as absence of robust risk mitigation mechanisms
- Fragmented regulatory landscape and lack of unified cross border guidance on privacy and data protection
- Concerns regarding data security and insufficient methodologies and mechanisms to ensure proper data anonymization
- Lack of funding not only for pilot exploratory projects but also potential operational integration and implementation
- Lack of public trust in data use and re-use
- Lack of digital literacy as well as awareness on the risks for data use and data non-use
- Insufficient expertise and capacity in data analytics, data privacy and data management.

RECOMMENDATIONS

The report will outline recommendations for creating a more enabling environment, organized across key categories including:
- **Building business cases and models**: There is a need for stakeholders to develop comprehensive business cases which clarify the real value and scale of returns, as well as feasible business models which are sustainable and replicable for real implementation of solutions and reflect the incentives of all parties.
- **Resourcing and capacity**: Leveraging mobile data to be truly informative for social impact requires unique skills and expertise. Analysing data to derive insights and then using those insights for decision-making requires greater expertise and understanding of the realities on the ground, as well as the opportunities and limitations of data analytics. Greater investment of resources from governments, donors, and MNOs is recommended.
- **Privacy and data protection**: Considerations of privacy and data protection and the associated regulatory and ethical frameworks that govern them are essential to creating an enabling environment in which the field will thrive. Reducing fragmentation and duplication to create a normative framework for this field will be important.

In the literature and explicit in the views of subject-matter experts closest to this field is a cohesive and compelling vision for the future of mobile data for social good. With an abundance of research and pilot studies, the field is now poised to move beyond the short term and ad hoc to more systematic and institutionalized implementations. The vision is that mobile data for social good implementations become scalable, replicable, sustainable and driven by a compelling business case. With the endorsement of this vision from key stakeholders, the field now needs to rally behind an implementation roadmap to achieve it.
ABOUT

UN Global Pulse

Global Pulse is a UN initiative working to promote awareness of the opportunities big data presents for sustainable development and humanitarian action, forge public-private data sharing partnerships, generate high-impact analytical tools and approaches through its network of Pulse Labs and drive broader adoption of useful innovations.
(www.unglobalpulse.org)

The GSMA

The GSMA represents the interests of mobile operators worldwide, uniting nearly 800 operators with almost 300 companies in the broader mobile ecosystem, including handset and device makers, software companies, equipment providers and internet companies, as well as organisations in adjacent industry sectors. The GSMA also produces industry-leading events such as Mobile World Congress, Mobile World Congress Shanghai, Mobile World Congress Americas and the Mobile 360 Series of conferences.

The GSMA Mobile for Development Programme brings together our mobile operator members, the wider mobile industry and the development community to drive commercial mobile services for underserved people in emerging markets. We identify opportunities for social and economic impact and stimulate the development of scalable, life-enhancing mobile services.
(www.gsma.com/mobilefordevelopment/)