

GEOGRAPHIC INFORMATION AND REMOTE SENSING: ESSENTIAL TOOLS IN REDUCING POVERTY IN THE POST-2015 WORLD

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ABSTRACT: geographic information is an important tool in development. Unfortunately, many of those involved on both sides of development – donors and recipients – are not aware of this importance, or it is assumed that appropriate geo-information is or will be available. While agencies as diverse as the World Bank, UN-FAO, and US-AID have all been supporting the development and use of geo-information, more and better understanding is required in the development community. This paper attempts to both identify and, in a simple sense, quantify the importance of geographic information in a major development goal – the reduction of poverty. The paper uses the twelve illustrative goals and fifty-four targets identified in the Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda as a starting point. The paper closes with several conclusions, recommendations and some unanswered questions related to geospatial data policy and programs related to poverty reduction.

1. INTRODUCTION

It has long been recognized by professionals in the geospatial sciences that geographic information is an important tool in development. Unfortunately, many of those involved on both sides of development – donors and recipients – are not aware of this importance, or it is assumed that appropriate geo-information is or will be available. While agencies as diverse as the World Bank, UN-FAO, and US-AID have all been supporting the development and use of geo-information, more and better understanding is required in the development community. This paper attempts to both identify and, in a simple sense, quantify the importance of geographic information in a major development goal – the reduction of poverty. The remainder of this paper reviews the High Level Panel’s Report (United Nations 2013) including where the Panel believes the Millennium Development Goals fell short (and how that relates to geo-information); the United Nations view of infrastructure; and the role we see for geo-information in meeting the goals and targets of the Post-2015 World.

2. THE GOALS AND TARGETS FOR POVERTY ERADICATION POST-2015

While the Millennium Development Goals have not all been achieved, the reduction in poverty has been significant. The idea of having specific goals and targets was one of the strengths of the Millennium activity. This has led to the establishment of a High Level Panel of Eminent Persons to identify further goals and targets for the post-2015 period.

One of the first issues addressed by the High Level Panel was where the Millennium Development Goals (MDGs) fell short. The panel believes that the MDGs fell short “by not integrating the economic, social and environmental aspects of sustainable development.” The obvious question we ask is: How can one begin to integrate the economic, social and environmental aspects of sustainable development? Our answer is: You begin by organizing and making available information on all of these aspects. And the next question is: How can one organize and portray that integrated information? The answer is: one should organize and portray it by location...on a “map” or the digital equivalent in a GIS or spatial data infrastructure. The result then is that every aspect ends up with a specific location identifier so that any one aspect can be compared to any other aspect, or attribute, anywhere else. Such an approach allows comparisons, monitoring, communication of information and results, and does so in a transparent and consistent manner

The main output of the panel was a list and explanation of twelve illustrative goals and fifty-four targets. The goals are as follows: 1. End Poverty; 2. Empower Girls and Women and Achieve Gender Equality; 3. Provide Quality Education and Lifelong Learning; 4. Ensure Healthy Lives; 5. Ensure Food Security and Good Nutrition; 6. Achieve Universal Access to Water and Sanitation; 7. Secure Sustainable Energy; 8. Create Jobs, Sustainable Livelihoods, and Equitable Growth; 9. Manage Natural Resource Assets Sustainably; 10. Ensure Good Governance and Effective Institutions; 11. Ensure Stable and Peaceful Societies; and 12. Create a Global Enabling Environment and Catalyse Long-Term Finance. Each of these goals is explained and elaborated upon by between four to six targets.

In the Panel's report one finds the word "land" repeated 23 times, while "location" and "geography" (used interchangeably) can be found 13 times. The word "information" is used 40 times. Every issue mentioned, every problem addressed, and every goal suggested seems to require someone to answer a question that begins with one word: "Where...?"

- Where are the inequalities?
- Where is the risk of disease (e.g. malaria) highest?
- Where are resources being illegally depleted?
- Where is the property boundary?
- Where must the quality of statistics be improved?
- Where should we be monitoring?
- Where has the disaster struck?

Simply put, at first glance the report reads like a call to action for the world's geospatial community. However, in spite of the obvious need for geo-information, there is no specific reference in the report to maps or geospatial information, and there is no indication that anyone sees either a need for, or use of, such information. This may be yet another example of maps and geographic information being "taken for granted," with the assumption being that such information in the form of maps is always available. But this assumption is a dangerous one to make. Appropriate geo-information is rarely available in a form that easily allows the necessary comparisons and assessments. And without appropriate geospatial information and tools how can we answer the "Where" questions? And thus how can the goals be met, or progress measured? Stated in another way "Where" matters in the Post-2015 world's development.

3. INFRASTRUCTURE AND DEVELOPMENT

In 1999 the United Nations recognized the importance of geospatial data in development and adopted the following motion: "Whereas maps and geospatial data derived from a combination of Earth observation information and other data were as much a part of a nation's infrastructure as the transportation network, the health-care system, telecommunications, and education, the creation of a national geospatial infrastructure should be accorded the same level of support as the other elements of national infrastructure." (United Nations, 1999)

To this one can add that the data must be accurate and believable. This leads to the conclusion that crowd sourcing may not be the answer. This is especially so in two cases: for land tenure accurate LEGAL descriptions are needed and in disaster response, where people's lives are at stake, one also needs accurate (for the purpose), credible and reliable information.

4. ASSESSING THE RELATIVE IMPORTANCE OF GEO-INFORMATION IN MEETING POST-2015 DEVELOPMENT GOALS AND TARGETS.

We have assessed each of the fifty-four targets and identified the relative importance of geo-information for each according to a seven point scale ranging from "key," or critically important, to not being used at all. The seven levels of importance are defined as follows:

1. Key: "where" information is important in meeting the target;
2. Monitor: "where" information is definitely needed to monitor or track results and achievements;
3. Analyze: "where" information is used in analysis relating to results of activities;
4. Organize: "where" information is important in organizing, communicating or displaying results;
5. Contributing: "where" information usefully contributes to achieving the goal and target, but is not central to their achievement;
6. Limited: "where" information may be useful to map/compare the situation from one place to another which is seen as a more limited use, of less importance and visibility than the preceding levels; and
7. No Role: there will be little or no use for "where" information.

Table 1 provides a summary of the qualitative ranking and analysis performed. The assessment has been made based on the author's personal experience in international development and geo-information gained in evaluating, planning, or executing more than 300 projects in over 25 developing countries in Asia, Africa, South America, the Middle East, and the Pacific. Where there has been any doubt, there has been a conscious effort to under-estimate the importance of geospatial information to avoid charges that there is bias in the analysis. For example, in Item 3.c in the table (Ensure every child has access to lower secondary education), the role has been considered to be "limited" in the analysis performed here. Some might argue that geospatial information will be

critical in identifying where there are gaps and where children do not have access to such education. While such information may be used and be useful in addressing this target, it has been assumed that such information will not be as important here, as it will be for others ranked higher. In other cases the role of geospatial has been considered to be contributing to meeting the target, while also playing a limited role to, for example, compare the situation from one place to another.

Following our analysis it appears that geospatial information will play some role in 47 of 54 targets associated with the reduction of poverty in the post-2015 world. “Where” information will be critically important in 22% of the targets, will be used for each of monitoring and analysis in 20%, in organizing, communicating or displaying results in 26%, and will play a limited but still necessary role for comparisons from one place to another in a total of 65% of the targets. **The importance of geospatial information in reaching the Goals and Targets specified by the High-Level Panel of Eminent Persons cannot, therefore, be over-emphasized.**

TABLE 1: ASSESSMENT OF THE ROLE OF GEOSPATIAL INFORMATION IN THE POST-2015 DEVELOPMENT GOALS	Limited	Contribute	Organize	Analyze	Monitor	Key	No role
1. End Poverty							
1a. Eliminate extreme poverty	*						
1b. secure rights to land		*	*	*	*	*	
1c. social protection systems	*						
1d. reduce deaths from natural disasters		*	*	*	*	*	
2. Empower Girls and Women and Achieve Gender Equality							
2a. Prevent/eliminate violence against girls and women	*						
2b. End child marriage	*						
2c. Ensure equal right of women to own and inherit property		*	*	*	*	*	
2d. Eliminate discrimination against women	*						
3. Provide Quality Education and Lifelong Learning							
3a. Increase % of children accessing/completing pre-primary education	*						
3b. Ensure every child is able to read, write and count	*						
3c. Ensure every child has access to lower secondary education	*						
3d. Increase # of young and adult women and men with work skills	*						
4. Ensure Healthy Lives							
4a. End preventable infant and under-5 deaths	*						
4b. Increase the % of vaccinated children, adolescents, at-risk adults	*						
4c. Decrease the maternal mortality ratio	*						
4d. Ensure universal sexual and reproductive health and rights	*						
4e. Reduce burden of disease from HIV/AIDS, tuberculosis, malaria, etc.	*						
5. Ensure Food Security and Good Nutrition	*						
5a. End hunger & protect the right of all to have access to food	*						
5b. Reduce stunting, wasting, and anemia for all children under 5	*						
5c. Increase sustainable agricultural productivity (smallholders/irrigation)			*	*	*	*	
5d. Adopt sustainable agricultural, ocean and freshwater fishery practices			*	*	*	*	
5e. Reduce postharvest loss and food waste		*					
6. Achieve universal Access to Water and Sanitation							
6a. Provide universal access to safe drinking water	*						
6b. End open defecation and Ensure universal access to sanitation	*						
6c. Bring freshwater withdrawals in line with supply and increase water efficiency			*	*	*	*	
6d. Recycle or treat all municipal and industrial wastewater prior to discharge							*
7. Secure Sustainable Energy							
7a. Double the share of renewable energy in the global energy mix							*
7b. Ensure universal access to modern energy services	*						
7c. Double the global rate of improvement in energy efficiency	*						
7d. Phase out inefficient fossil fuel subsidies							*
8. Create Jobs, Sustainable Livelihoods, and Equitable Growth							
8a. Increase number of good and decent jobs and livelihoods by x2	*						
8b. Decrease number of young people not in education, employment or training	*						
8c. Strengthen productive capacity by providing universal access to	*	*					

financial services							
8d. Increase new start-ups and value added from new products							*
9. Manage Natural Resource Assets Sustainably							
9a. Publish and use economic, social and environmental accounts in all governments and major companies			*	*	*	*	
9b. Increase consideration of sustainability in gov't procurements	*	*					
9c. Safeguard ecosystems, species and genetic diversity			*	*	*	*	
9d. Reduce deforestation by and increase reforestation			*	*	*	*	
9e. Improve soil quality, Reduce soil erosion and combat desertification			*	*	*	*	
10. Ensure Good Governance and Effective Institutions							
10a. Provide free & universal legal identity, e.g. birth registrations							*
10b. Ensure people enjoy freedom of speech, association, peaceful protest and access to independent media and information		*	*			*	
10c. Increase public participation in political processes and civic engagement	*						
10d. Guarantee the public's right to information and access to government data		*	*			*	
10e. Reduce bribery and corruption and ensure officials can be held accountable	*						
11. Ensure Stable and Peaceful Societies							
11a. Reduce violent deaths and eliminate all forms of violence against children	*						
11b. Ensure justice is accessible, independent, well-resourced and respect due-process rights							*
11c. Stem the external stressors that lead to conflict, including organised crime							*
11d. Enhance capacity, professionalism and accountability of security forces, police & judiciary	*	*	*				
12. Create a Global Enabling Environment and Catalyse Long-Term Finance							
12a. Support an open, fair and development-friendly trading system	*						
12b. Implement reforms to Ensure stability of the global financial system	*						
12c. Hold the increase in global average temperature		*	*	*	*	*	
12d. Make concrete efforts towards meeting targets for assistance	*						
12e. Reduce illicit flows and tax evasion and increase stolen-asset recovery	*						
12f. Promote collaboration on & access to science, technology, innovation, & development data	*	*					
Number in each group	35	11	14	11	11	12	7
Summary of importance and/or role of geospatial information	Limited	Contribute	Organize	Analyze	Monitor	Key	No role

5. CONCLUSION

We have reviewed the role of geospatial information in the reduction of poverty in the Post-2015 development goals and targets that have been identified by the High-Level Panel of Eminent Persons. It is clear after even a cursory analysis that without adequate geo-information, the goals cannot be reached. In that geospatial information does not seem to be top-of-mind – or even mentioned in the High-Level Panel of Eminent Persons report – we recommend a more comprehensive analysis to identify more specifically what information is required for which goal and which specific target. The resulting improved understanding of the required geospatial information will be critical in maximizing the number of the world's poor who escape poverty in the Post-2015 period.

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