

The Case of GMES as a Support Tool to Meet the Millennium Development Goals - Recommendations for the Current and Upcoming EU Council Presidencies in 2010 on Space Applications and Sustainable Development in Africa

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As the world celebrated the 50th Anniversary of the Space Age in 2007, one can observe that the digital divide between developed and developing countries has widened. This leaves most needy populations unable to benefit from technological innovations made in Space applications, despite a recognised potential to promote sustainable development. This article seeks to demonstrate the usefulness of Space applications as strong supports to meet the Millennium Development Goals (MDGs). It focuses on GMES for Africa which should be used as a starting point for Europe to meet the MDGs and promote capacity-building. Finally, it presents policy perspectives and recommendations for the current and the upcoming EU Council Presidencies in 2010 (Sweden, Spain and Belgium) for a more effective and thorough implementation of GMES for Africa and the MDGs in particular.

Europe is one of the most important donor and development policy provider for many regions of the world (mainly Asia and Africa). Challenges faced by the African continent offer a fertile ground for innovative European development policies. Africa has emerged as an important partner given the abundance of its primary resources. Emerging world powers such as China and India have shown a strong interest in tapping Africa's natural reserves. In the midst of this geopolitical context the need for Europe to build a strong partnership with the African continent, resting on mutually beneficial exchanges, is more salient than ever.

Sustainable development, MDGs and S&T: fostering capacity building?

Sustainable development has been defined in the 1987 Brundtland Report for the United Nations as "a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development; and institutional change [...] enhance both current and future potential to

meet human needs and aspirations."¹ Accordingly, the pursuit of sustainable development requires taking into consideration the interdependency of economic, social and environmental factors. The MDGs, adopted by the United Nation's General Assembly in the Millennium Declaration (2000)², encompass all three variables, hence providing a comprehensive and quantitative set of parameters to monitor development. These eight goals (Table 1) aim to halve extreme poverty, the number of people suffering from hunger and the number of people having no access to drinking water by 2015.

¹ "Our Common Future, Chapter 2: Towards Sustainable Development." A/42/427 Report of the World Commission on Environment and Development. <<http://www.un-documents.net/ocf-02.htm>>.

² United Nations General Assembly. "United Nations Millennium Declaration." 8th plenary meeting 8 September 2000. <<http://www.un.org/millennium/declaration/ares552e.htm>>.

Goal number	Millennium Development Goals
G 1	Eradicate extreme poverty and hunger
G 2	Achieve universal primary education
G 3	Promote gender equality and empower women
G 4	Reduce child mortality
G 5	Improve maternal health
G 6	Combat HIV/AIDS, malaria and other diseases
G 7	Ensure environmental sustainability
G 8	Develop a global partnership for development

Table 1: The eight Millennium Development Goals

Science & Technology (S&T) allows society and States to contribute, albeit in different ways, to the promotion of sustainable development. It provides understanding of natural phenomena as well as concrete solutions (for example recycling or filtering). S&T thus provides means to move from better understanding to action. Developing countries benefit from technologies but do not participate in the process of transforming science into technology, due to a lack of capacity in this regard.

S&T remains a broad denomination, thus capable to address all eight MDGs. Europe is committed to speed up the progress towards the MDGs by improving policy coherence as well as increasing funds and to focus strongly on Africa³. If the EU uses technological transfer as a mean to these goals, it would enhance chances to reach the MDGs within the timeframe set by the UN in the Millennium Declaration. But perhaps even more importantly it would allow the achievements to last positively in the long term, by providing developing countries with means to foster further research and development (R&D) in science and technologies, i.e. foster capacity building.

Case for Space - Space applications for MDGs:

In the past decade Space applications have started to be recognised as potential S&T tools to reach the MDGs: they can indeed help to promote not only the environmental branch of sustainable development but also the economic

³ European Commission. « Communication from the Commission to the Council, the European Parliament, the Economic and Social Committee and the Committee of the Regions of 9 April 2008-The EU- a global partner for development – Speeding up the progress towards the Millennium Development Goals.» COM(2008)177 final.

and social aspects. Earth observation, communications and Positioning Navigation and Timing (PNT) can provide useful data for the promotion of the MDGs if processed and used efficiently. The following table offers an overview of the potential of Space applications for the MDGs.

	Earth Observation	Communications	PNT
G1 Extreme Poverty and Hunger	X	X	
G2 Universal Primary Education		X	
G3 Gender Equality and Empowerment of Women		X	
G4 Child Mortality	X	X	
G5 Maternal Health	X	X	
G6 HIV/AIDS, Malaria and Other Diseases	X	X	X
G7 Environmental sustainability	X	X	X
G8 Global Partnership for development	X	X	X

Table 2: Matching Space applications potential with the Millennium Development Goals.

- Earth observation can help goals 1, 4, 5, 6, 7 and 8 (cf. Table 2). The data provided by Earth observation satellites can indeed help to eradicate extreme poverty and hunger by providing useful information to, among others, monitor agricultural yields or natural disasters, which may cause famine. These data can as well help to promote better health by observing inter alia the quality and quantity of water resources, thus helping to achieve goals 4 and 5. Moreover, Earth observation can be useful for the achievement of goals 6 and 7 by providing data to foster research in the domains of illnesses and environment.

- Satellite communication can help promote all eight goals as it can significantly enhance the dissemination of information on healthy habits, agricultural methods for better yields and information on the environment (cf. Table 2). Additionally, it can promote the development of tele-education and tele-medicine.
- PNT can help to advance goals 6 and 7 by providing data and information on the spread of diseases or environmental phenomena (cf. Table 2).
- Finally, all three forms of Space applications help to promote the last goal as they require for a partnership for development to be built (cf. Table 2). Multiple participants on many levels (international actors, domestic governments, grass-root groups, Non Governmental Organisations – NGOs etc) need to be involved and to cooperate in order for Space applications to be used to achieve MDGs.

Existing European Programmes of Space Applications used for Development

Several initiatives are undertaken worldwide to provide Space data and Space application services to developing countries. Furthermore, the European Space Agency (ESA) implemented programmes such as MERCURE, TIGER, GEO-AQUIFER, African Water facility or the tele-medicine task force for sub-Saharan Africa in Africa and SARI in Asia (Indonesia). Eumetsat has as well programmes such as PUMA, or as part of FP7, Devocast (environmental information), AIDA (ICT for Disaster Management), MIA-VITA (volcanic impact assessment) or AEGOS (georesources observation system). The European Union is an active member of the ITU and SPIDER programmes in space applications for disaster risk reduction. In addition, India has a long and growing tradition of using Space applications to foster development. Indian policy makers have grasped the tremendous potential that lies in these technologies: They are currently being used for environment monitoring, tele-education (EDUSAT satellite), and tele-medicine, three crucial components of the MDGs. Within the European Union framework however, developments in this regard are very recent and just start with the GMES for Africa initiative.

GMES for Africa

With the two Africa-EU Summits (Cairo 2000 and Lisbon 2007), the relationship between the EU and the African continent has taken a positive turn. Indeed, it abandoned the traditional one way “donor/recipient” dynamic to adopt a more fruitful form: partnership, as indicated in the Joint Africa-EU Strategic Partnership.⁴ One out of the eight partnerships identified in this document specifically targets Science, Information, Society and Space as domains of needed cooperation. Furthermore it aims at increasing S&T capacity building in Africa with the Africa Science and Technology Consolidated Plan of Action.⁵ The new relationship is thus based on an equal and reciprocal basis and amongst others promotes science and technology and more particularly Space technologies as elements of this partnership. Out of this new perspective on development, GMES for Africa took shape.

How can GMES support the MDGs?

G1 Extreme poverty and hunger	Security, Atmospheric
G2 universal primary education	Security
G3 gender equality and empowerment of women	Security
G4 child mortality	Land, Security, Atmospheric
G5 maternal health	Land, Security, Atmospheric
G6 HIV/AIDS, malaria and other diseases	Land, Emergency, Security
G7 environmental sustainability	Marine, Land, Emergency, Security, Atmospheric
G8 global partnership for development	Marine, Land, Emergency, Security, Atmospheric

Table 3: GMES Services as tools to support the Millennium Development Goals

As shown in Table 3, GMES’ services and data can help promote all eight MDGs. Since it uses

⁴ EU Africa Summit. “The Africa-EU Strategic Partnership: A Joint Africa-EU Strategy.” Lisbon December 2007.

⁵ African union Commission and the New Partnership for Africa’s Development. “Africa’s Science and Technology consolidates Plan of Action.” August 2005.

both Space and in situ data, the information provided can be used efficiently and on a case by case basis. Goals 7 and 8 can be promoted by all five services since they touch on environment sustainability and they require coordination and thus the formation of a partnership for development. (Table 3) In addition:

- Land services can help alleviate poverty and hunger by monitoring agricultural yields or natural disasters, thus making anticipation and prevention possible. This service can as well help to diminish health issues by studying the availability of fresh water or monitor existing nests of illnesses before they spread.
- Emergency services can help goals 1 and 6 as it can enhance disaster risk reduction management, and thus prevent population movements, epidemics or the spread of conflicts.
- Security can be a support to goals 1, 2, 3, 4, 5 and 6 as stable and secure environments and countries remains a prerequisite to development in general and to the achievement of the MDGs in particular.
- Finally, atmospheric services can be a tool to promote goals 1, 4 and 5 since the study, monitoring and understanding of climatic and atmospheric evolutions enhance the capacity to prevent natural disasters, foster better meteorological previsions, monitor pollution and thus warn populations. It helps to prevent diseases such as asthma or displacement of populations, which foster child mortality and the spread of diseases respectively.

GMES for Africa provides a partnership framework and the use of Space applications (in this case Earth observation), two essential elements to promote development in Africa. First, partnership provides a mean for dialogue regarding further decisions, priorities and concrete programme implementation. This gives African countries the chance to voice their concerns and needs, which both legitimises undertaken actions and adapts them to local necessities. Second, the use of Space applications promotes technology transfer and data sharing, all the while providing Europe and Africa with a means for local educational and scientific capacity-building. In the long term this will allow the African continent to share its findings and elaborate new programmes regarding common issues like climate change,

energy or transnational terrorism, thereby completing the circle of partnership, exchange and cooperation. The positive impacts described above indicate that further action can certainly be undertaken in this field by the EU.

Policy recommendations for the Spanish EU Council

For the Spanish Presidency, presiding over the EU at the beginning of 2010 when the third Africa-EU Summit is planned to take place, recommendations touch upon four different aspects. First, learn from implementation problems of GMES within Europe to avoid repeating mistakes in Africa. Second, create communications channels between end users and services providers in order for data to be adequate and efficient. Third, promote the implementation and crossing of all three Space applications (Earth observation; communications and navigation. Fourth promote GMES data sharing and programme implementation to more regions of the world.

In order for the GMES for Africa initiative to be efficient, it is important to solve problems affecting its implementation within Europe first: governance, communication between end users and service providers or data sharing. The African Union (AU) should be the only interlocutor to the European Commission. Ideally, one centre for each service from Europe would provide data to one centre in Africa in order to avoid inefficiency and communication complications. Data could then be disseminated through secondary centres all over the continent.

One also has to take into account the differences between the two continents. Problems that surfaced in Europe might not surface in Africa, while new sets of challenges might emerge. As such, Africa is presently not equipped to process data and use it to formulate policies to foster development and fulfil the MDGs. Hence, it would be a first step to finance data processing centres in universities for example, as well as training facilities and secondary centres disseminated across countries in order to provide data and information in remote places, where it is needed. A close link must as well be established between local governments and the data processing centres, in order to facilitate decision making and actions when needed (emergency response for example). In addition, links and dialogues must be established between data centres (in Europe and Africa)

and existing African infrastructures such as hospitals, dispensaries, schools, agricultural groups, grass root groups and local NGOs. Work must be done at each level to allow for the processed data to be used efficiently according to local needs and user requirements.

In need for a thematic and geographical expansion of the use of Space applications

Since Earth observation is a useful tool for the promotion of MDGs, the GMES for Africa initiative is a necessary first step to narrow the digital divide and provide needed services to end users in Africa. It is not sufficient and on its own cannot adequately address the needs of the African continent: it is necessary to provide the African continent with the use of all three Space applications. Indeed, as much as MDGs are interrelated and must be addressed simultaneously, all three Space applications supplement one another and their efficiency is multiplied if their data are used concurrently. For example, disaster risk reduction can only be efficient if populations can be warned once threats are identified and located. Following the same logic, agricultural yields monitoring can only trigger improvement if farmers can be informed in time of their yields (short term) and be taught new techniques to improve it (long term). The simultaneous use of all three Space applications must be the next step to supplement GMES for Africa, in order for the latter to be truly efficient.

Finally, while Africa seems to be the most adequate continent for Europe to provide data to and enhance capacity-building given previously mentioned reasons, other countries and regions of the world could benefit from the data provided by GMES. Latin America and Asia in particular could supplement information they already gather (with the SARI, ITU and UNSPIDER programmes, the CBERS programme from Brazil or Sentinel Asia for Member States of the APRSAF). Countries which do not possess any Space asset would use it as a primary source of data. GMES has the potential promote capacity building and MDGs. MDGs is a worldwide initiative which requires action on many levels vertically, but also horizontally in all impoverished regions. Hence, GMES will truly help to promote MDGs if its services are extended to other regions than Africa on the longer term.



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