

Brussels, 17 February 2012

**Socioeconomic benefits of GMES: A synthesis  
derived from a comprehensive analysis of  
previous results**

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# The European Space Policy Institute (ESPI)

## Mission Statement

The European Space Policy Institute (ESPI) provides decision-makers with an informed view on mid- to long-term issues relevant to Europe's space activities.

In this context, ESPI acts as an independent platform for developing positions and strategies.

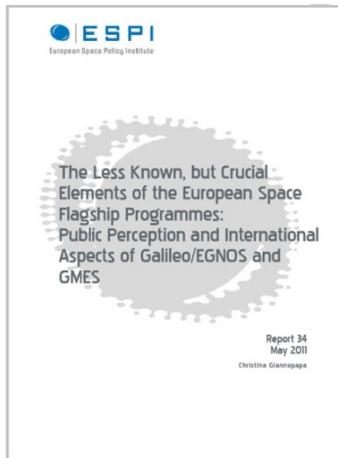
ESPI provides decision-makers and the global space community with:

- Arguments underpinning the “Case for Space”
- Policy concepts for international, regional and national activities
- Analyses for mid-term visions
- Platforms for expert exchanges
- Source for cutting-edge information



## ESPI Approach to Space and EU Space Policy Areas

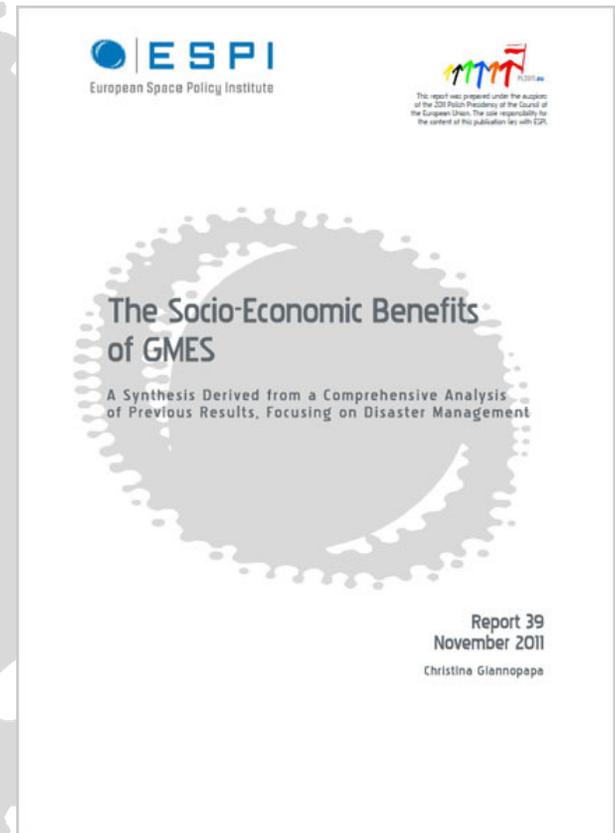
- Space as an instrument in supporting key objectives of sector policy areas
  - Recent reports
    - *Report 39 'The Socio-Economic Benefits of GMES'*
    - *Report 34 'Less Known Elements, but Crucial Elements of the European Space Flagship Programmes: Public Perception and International Aspects of Galileo/EGNOS and GMES'*
    - *Report 33 'Views on Public Perception and International Aspects of the European Space Flagship Programmes Galileo/EGNOS and GMES'*



# 1. Content of the ESPI Study Report

## Table of Content

- 1. Introduction.** Provides the setting and approach of the study
- 2. Natural and Man Made Disasters.** An overview of natural and man made disasters with focus on flooding and fires and overview of the public perception.
- 3. Socio-economic Benefits of GMES Service Element.** An overview and analysis of previous studies and benefits classification according to thematic topics, strategic and political benefits, global action benefits, and European policy benefits
- 4. Quantification of the Socio-economic Benefits.** An overview and analysis of the quantifiable socioeconomic benefits.
- 5. Conclusions and Recommendations.** Makes an analysis according to political, economic, social, technological and legal factors and draws policy recommendations



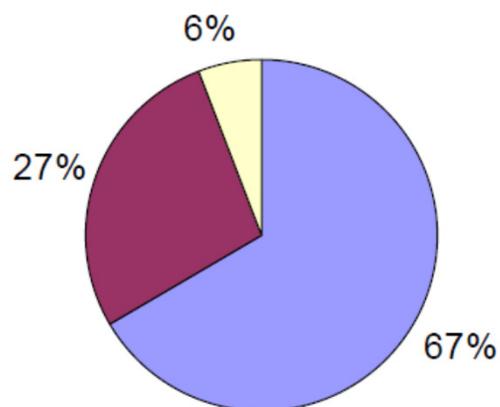
## 2. Public Perception in Europe

EU opinion on space activities:

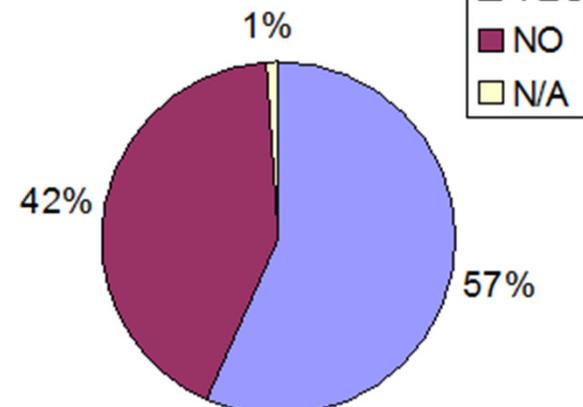
- 63% believes that they are important for the future international position of the EU
- 64% believes that they are important for industrial competitiveness, growth and creation of jobs



Importance to develop for Europe Earth observation systems to monitor our environment including natural disasters



Importance of space-based monitoring tools to improve citizen's security



Awareness of the European earth observation satellites

### 3. Studies on Socioeconomic Benefits

- Socioeconomic benefits studies on GMES Service Elements

GSE Study	Main Topic	CBA Provider	Year
ROSES	Ocean monitoring	ESYS	2004
TERRAFIRMA	Land monitoring for civil protection	AETS	2004
ForestMonitoring	Forest monitoring	ECORYS	2004
COASTWATCH	Coastal zone monitoring	AETS	2004
AquaSoilSAGE	Aqua-soil monitoring	ECORYS	2004
ICEMON	Sea ice monitoring	ControlWare	2004
GUS	Urban services	Indra	2004
GMFS	Food security	ESYS	2004
NorthernView	Arctic monitoring	ESYS	2004
RISK-EOS	Risk Management –floods & fires	AETS	2005
Respond	Humanitarian aid	ControlWare	2005
PROMOTE	Atmospheric monitoring - air quality	ControlWare	2006
Socio-Economic Benefits Analysis of GMES	Assessment of previous studies and evaluation of total benefits	Price Waterhouse Cooper (PWC)	2006
Cost-Benefit Analysis of GMES	Assessment of four funding options for GMES	booz&co	2011

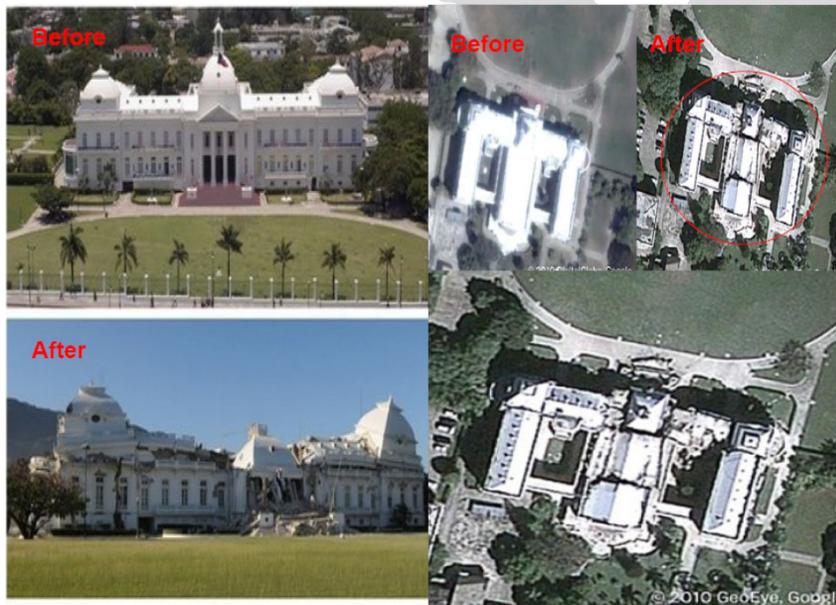
## 4. Strategic and Political Benefits

- The strategic and political benefits of GMES are of significant importance for the Union and its Member States but are not quantifiable.
- They include benefits at national, European and global level around the main political agreements: a) access to independent information to support European interests and b) European autonomy in critical technologies and capabilities.
- In order to make informed and autonomous decisions, Europe needs to have access to complete and independent information.
- Currently in Europe such information is fragmented, scattered and not constantly accessible to all Member States. Often there is a need to depend on foreign assets without possibility of cross-checking.
- Thus GMES will add value to the previously heterogeneous data streams by joining them into a complete, integrated, consistent system that will provide an over-all perspective to more effectively and efficiently support the European Union, national governments, and European and national agencies in making informed decisions in developing, implementing and monitoring policies.

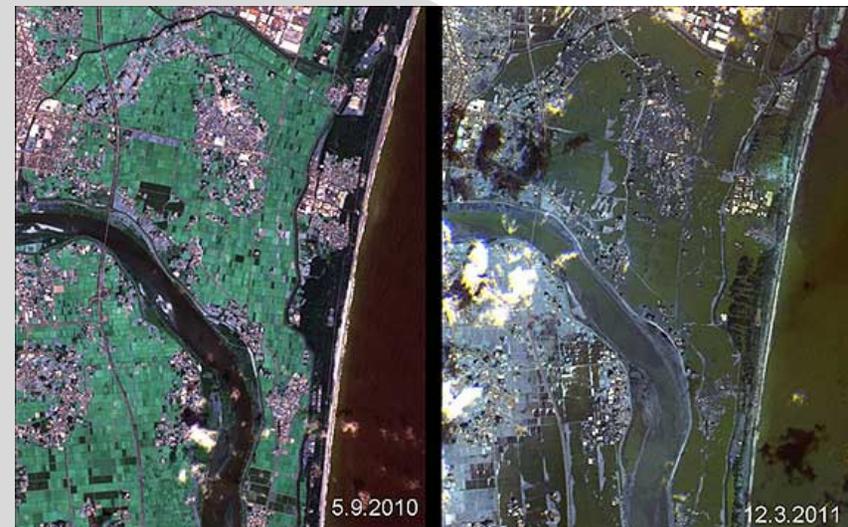
## 5.1 Global Action Benefits

- Environmental and security issues are of constantly growing socioeconomic importance with global impacts.

Haiti



Japan



## 5.2 Global Action Benefits



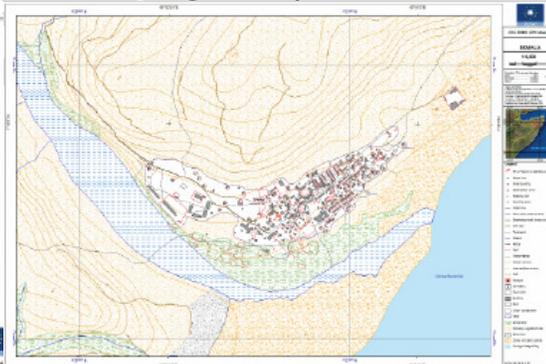
Hijacked vessels



Changes of pirate base



Analysis of area of pirate bases



Detailed map of pirate base

- The impact of GMES on the Union's Common Foreign and Security Policy (CFSP) in commercial policy, development aid, humanitarian aid and external relations, is of great importance.
- Space assets and applications can contribute to the Union's external policy through meteorological forecasting, terrain mapping, maritime surveillance, border control, intelligence, monitoring proliferation of weapons of mass destruction, etc. These capabilities already exist to a certain extent and will be under further development mainly through GMES.

## 6.1 European Policy Benefits – Civil Protection

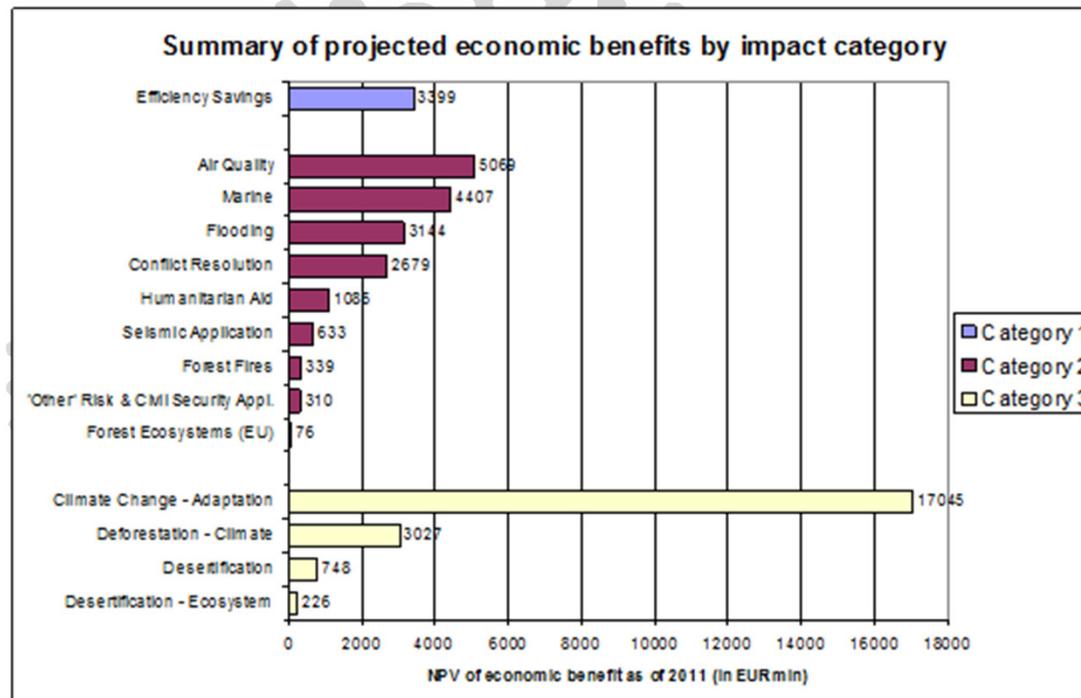
<b>RISK AND CIVIL PROTECTION MAIN OBJECTIVES</b>	<b>GMES –CONTRIBUTION</b>
<ul style="list-style-type: none"> <li>• support and supplement efforts at national, regional and local level with regard to disaster prevention, the preparedness of those responsible for civil protection and intervention in the event of disaster;</li> <li>• provide better public information to enable increased levels of self-protection for European citizens;</li> <li>• establish a framework for effective and rapid cooperation between national civil protection services when mutual assistance is needed;</li> <li>• enhance the coherence of actions undertaken at international level.</li> </ul>	<p><b>Flood and fire</b></p> <ul style="list-style-type: none"> <li>- Pre-event – risk assessments based on land cover. (for fires: fuel availability, fire spread paths and possibly affected areas; for flooding: land cover changes that affect flood wave propagation rate);</li> <li>- During-event – services that allow the scale and coverage of the event to be assessed in support of rescue activities</li> <li>- After-event –services to support damage assessment and assist future preparedness and impact reduction.</li> </ul> <p>-Reduce social and economic impacts from forest fires.</p> <p><b>Seismic, Landslide</b></p> <ul style="list-style-type: none"> <li>- Landslide monitoring, inventory and susceptibility: reduced impact of localized land movement (landslides and urban subsidence);</li> <li>- Ground movement maps for use in assessments of seismic processes.</li> <li>- Reduce the social and economic impact of major seismic events (earthquakes and volcanoes);</li> <li>- Reduce damage and business interruption (better warning, fewer false alarms)</li> </ul>

## 6.2 European Policy Benefits Agriculture Policy

AGRICULTURE POLICY AND MAIN OBJECTIVES	GMES –CONTRIBUTION
<ul style="list-style-type: none"> <li>• Increase agricultural productivity by promoting technical progress and by ensuring the rational development of agricultural production and the optimum utilisation of the factors of production, in particular labour;</li> <li>• Ensure a fair standard of living for the agricultural community, in particular by increasing the individual earnings of persons engaged in agriculture;</li> <li>• Stabilise markets;</li> <li>• Assure the availability of supplies;</li> <li>• Ensure that supplies reach consumers at reasonable prices.</li> </ul>	<ul style="list-style-type: none"> <li>-support rational use of fertile lands;</li> <li>-monitoring of variables such as the vegetation state or the water cycle;</li> <li>-exploitation of natural resources;</li> <li>-monitor weather and soil moisture for agriculture to improve irrigation system.</li> </ul> <p><i>Examples</i></p> <ul style="list-style-type: none"> <li>-<b>food security</b>. Using satellite images and data to identify areas of food shortages;</li> <li>-<b>crop monitoring</b>. Provide objective, near real-time assessments of crop conditions and yield forecasts in support of European policies in the fields of agriculture, trade and food security;</li> <li>-<b>monitoring of agricultural land use</b>, its state and any changes. To register agricultural land use and trends, farming pressure on water and soil resources, and to measure the impact of agricultural land use changes on biodiversity and landscapes;</li> <li>-<b>monitoring seasonal and annual changes</b> for geographical information on land cover.</li> </ul>

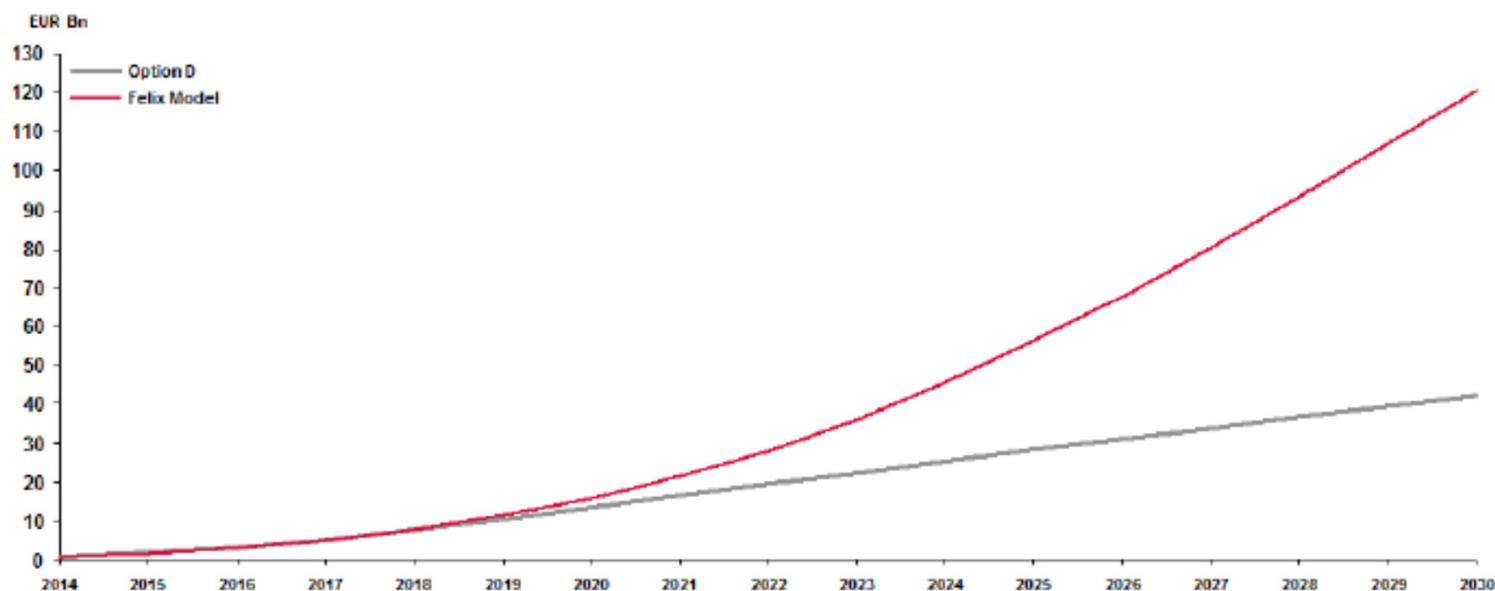
## 7.1 Socioeconomic Benefits of GMES

### PwC (2006) projected to today's value



- The numbers present values in 2011 for category 1 (efficiency benefits), category 2 (European policy formulation benefits), and category 3 (global action benefits) and are taken from the 2006 PwC study translated to current situation.
- The sum of the present value is equal to 42 billion Euros excluding terminal values and 167 billion Euros including terminal values

## 7.2 Socioeconomic Benefits of GMES C/B Analysis Booz (2011)



- Lot of progress has been made since the beginning with a big boost in the last 5 years towards operations.
- Cost/benefit analysis demonstrates good value for money with positive Benefit/cost rate in different scenario's
- In the full scenario (long term commitment) the BCR is 3,7 in a static scenario and 10,5 in a dynamic perspective
- GMES is hence very good value for public money

## 8. Key Findings

- The GMES can enable significant socioeconomic benefits and that it can offer significant strategic and political benefits for Europe. This was the major conclusion from the PWC study, *as recently confirmed by the Booz study.*
- The socioeconomic benefits can be realized as a result of future decision on Environment and security policy by providing decision makers with better, more complete, consistent, timely and reliable information.
- The cost-benefit-ratio is about 10 this means that for every 1 euro of tax payer's money invested in GMES, the citizen receive the equivalent of at least 10 euros public benefits back in a dynamic scenario where the interrelationship between impacted areas is taken into account.
- The strategic and political benefits for Europe are inherently non-quantifiable, nevertheless they are capital elements of the GMES benefit area. These concern European leadership and have a global impact with long term perspectives on the quality of life of the European citizens.
- The main strategic and political benefits of GMES which are not quantifiable are: a) access to independent information to support European interests and b) European autonomy in critical technologies and capabilities.

9. Recommendations	
Political	<ul style="list-style-type: none"> <li>• Confirm the political commitment (GMES as a political and strategic asset for European non-dependence)</li> <li>• Capture adequately the policy objectives the GMES can serve (identify in a consistent manner which European and National policies GMES can assist and how )</li> <li>• Ensure a successful governance (considering the various stakeholders and time frames)</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Ensure appropriate continuous financing (safeguard previous investments and ensure adequate public funds are available in time for the operational phase of GMES)</li> <li>• Enhance financial instruments to stimulate innovative downstream applications (the most complete EO system in the world can provide additional markets not explored until now )</li> <li>• Develop new methodologies for socioeconomic benefit analysis for public investments (considering the non-quantifiable political, strategic, and social benefits of such investments)</li> </ul>
Social	<ul style="list-style-type: none"> <li>• Increase awareness and enhance communications by example (emphasis on the strategic importance, use in various areas e.g. agriculture, fisheries)</li> <li>• Increase community involvement in user applications (e.g citizen observatories)</li> <li>• Enhance the European identity though GMES</li> </ul>
Technological	<ul style="list-style-type: none"> <li>• Increase the development of European assets and user driven applications</li> <li>• Ensure compatibility, interoperability, standardisation and certification (data policy)</li> <li>• Increase the development of integrated applications (including synergies with Galileo)</li> </ul>
Legal	<ul style="list-style-type: none"> <li>• Implement appropriate legislation (data policy)</li> <li>• Implement appropriate governance (operational phase successful stories e.g. EUMETSAT)</li> </ul>