The Role of Geospatial Data Across the Dimensions of the SDGs

Towards Better Information Systems for the 2030 Agenda

Greg Scott

Inter-Regional Advisor
Global Geospatial Information Management
United Nations Statistics Division
Department of Economic and Social Affairs

Facebook Says It Has Created The Most Accurate Population Density Models Ever

Facebook analyzed 14.6 billion satellite images to create the models. It plans on making them available to anyone.

[Photo: Flickr user NASA's Earth Observatory]

DANIEL TERDIMAN | 02.22.16 | 2:00 AM

Mark Johnson
CEO and cofounder at Descartes Labs

Follow

Why Facebook's Satellite Imagery Analysis Announcement is Important

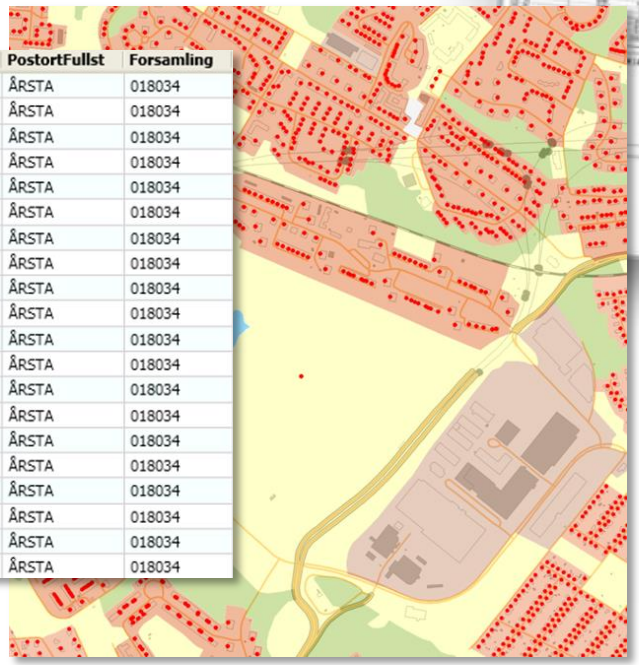
Feb 23, 2016 | 31,514 views | 744 Likes | 44 Comments

Yesterday, Facebook announced that they have mapped human population in 20 countries with unprecedented spatial granularity. It might seem odd for a social network to be diving into global population patterns using satellite imagery, but it was done for a practical reason: to figure out the best type of internet to deploy in the developing world. This is a powerful signal to all companies that satellites are about to change how global businesses understand our planet.

Simultaneous advances in commercial satellite technology, cloud computing, and machine learning have enabled a breakthrough in our understanding of the world. Emerging applications for this technological conjunction include real-time monitoring of global deforestation, understanding shipping traffic, and forecasting of food production.

Good decisions are based on solid evidence

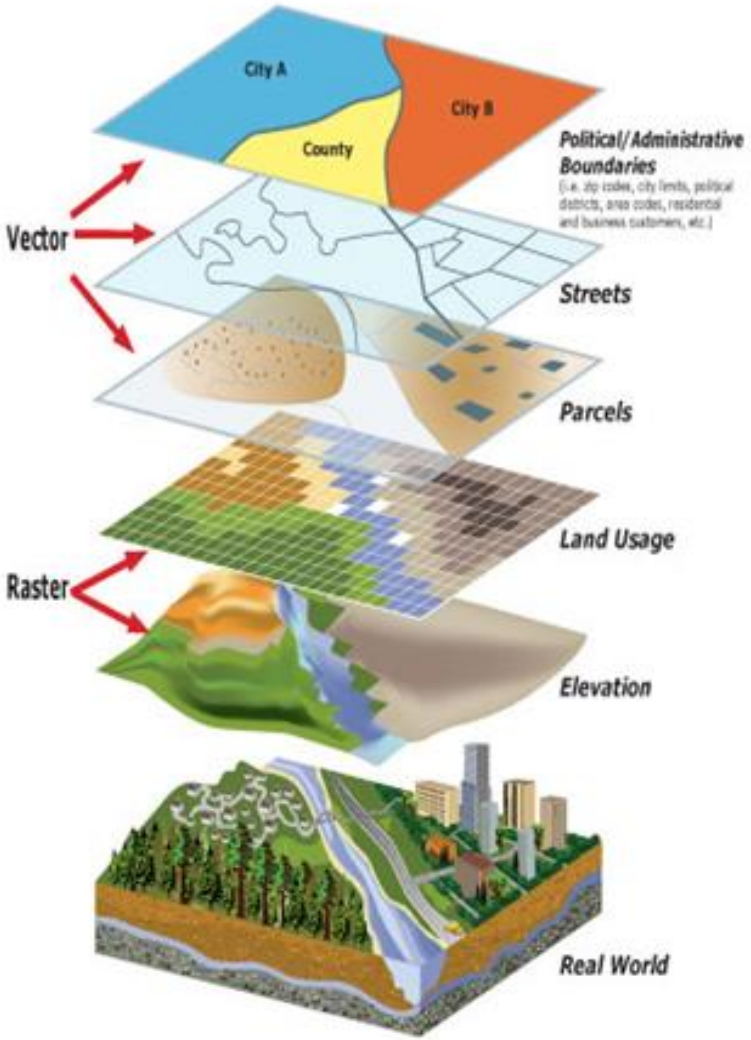
- Geospatial and statistical information are a strategic asset in national policy-making and evidence-based decisions.
- Requires consistently accurate, reliable and authoritative data over time.
- Without this data you are ‘data blind’ and ‘information illiterate’



Xkoord	Ykoord	UtdAdr2	AntalPersoner	Postnr	PostortFullst	Forsamling
673 367,2	6 576 823,05			12056	ÅRSTA	018034
673 380,81	6 576 782,43			12056	ÅRSTA	018034
673 945,1	6 576 943,03			12052	ÅRSTA	018034
673 870,78	6 576 907,06			12052	ÅRSTA	018034
673 989,24	6 576 644,34			12056	ÅRSTA	018034
673 978,16	6 576 648,94			12056	ÅRSTA	018034
673 978,16	6 576 648,94			12056	ÅRSTA	018034
674 034,04	6 576 630,01			12056	ÅRSTA	018034
673 807,97	6 576 615,27			12056	ÅRSTA	018034
674 078,62	6 576 824,77			12052	ÅRSTA	018034
673 998,13	6 576 807,61			12052	ÅRSTA	018034
674 003,31	6 576 957,69			12052	ÅRSTA	018034
673 976,28	6 576 971,67			12052	ÅRSTA	018034
673 851	6 576 733,44			12056	ÅRSTA	018034
673 743,91	6 576 749,21			12056	ÅRSTA	018034
673 248,59	6 576 946,39			12057	ÅRSTA	018034
673 248,59	6 576 946,39			12057	ÅRSTA	018034
673 497,53	6 576 883,77			12056	ÅRSTA	018034
673 510,8	6 576 842,13			12056	ÅRSTA	018034
674 200,63	6 576 852,26			12050	ÅRSTA	018034

Geospatial information systems

- A geospatial information system (GIS) is able to model real world conditions using defined geographic areas and linear paths; called “features.”
- GIS organizes and structures data into independent layers that can be overlaid and intersected to build data rich models.
- The power of GIS lies in the analysis of data; layers can be viewed together to better understand relationships, patterns and trends.
- Through interacting with interdependent geographic components, GIS can be used to describe virtually anything on, above and below the Earth with in-depth data.



The register of spatial units

Maps

Data

Analysis

Attributes of Major Sewer Size

Shape	Fnode_	Tnode_	Length	Mnswr_id	Mnswr_	
PolyLine	1	2	21.45785	1	1	18
PolyLine	2	3	229.31321	2	2	18
PolyLine	3	4	309.68191	3	3	18
PolyLine	4	5	302.86459	4	4	18
PolyLine	5	6	305.16379	5	5	18
PolyLine	6	7	317.66474	6	6	18
PolyLine	7	8	58.65101	7	7	18
PolyLine	8	11	187.63909	9	9	18
PolyLine	11	13	178.85775	11	11	18
PolyLine	13	17	180.11927	14	14	18
PolyLine	17	19	350.62512	17	17	18
PolyLine	19	21	341.70796	19	19	18
PolyLine	21	23	203.75333	21	21	18
PolyLine	23	24	158.25006	22	22	18

Linking tabular data with its real location

The register of spatial units

Attribute table

Table

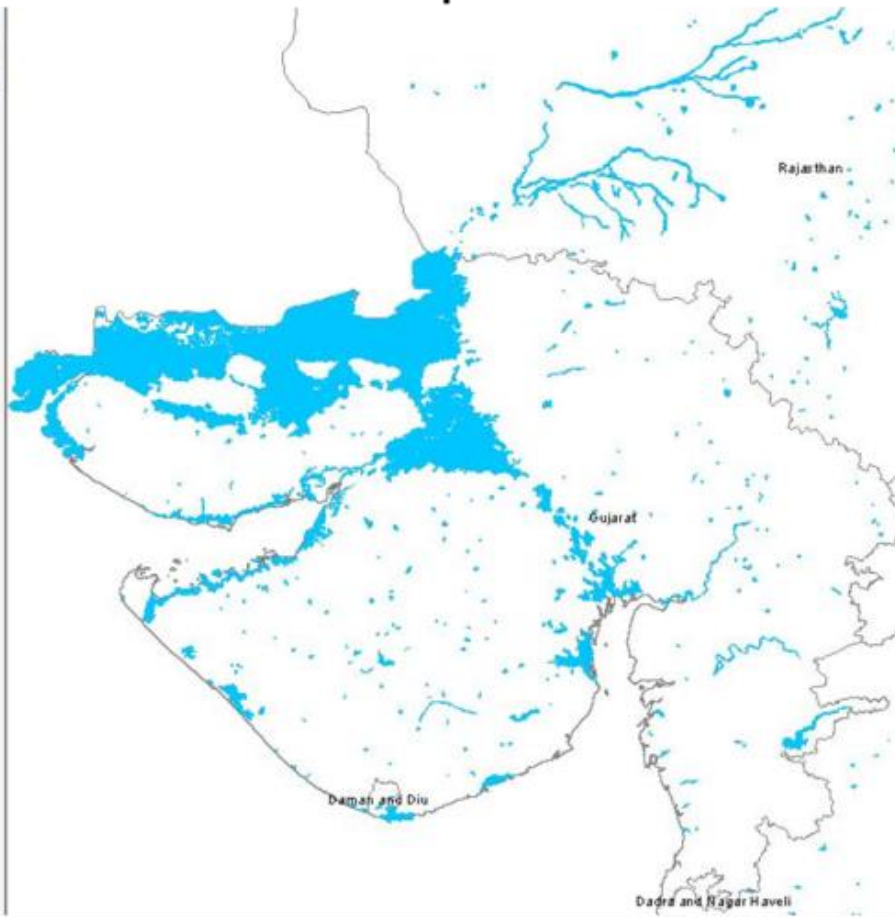
IND_water_areas_dcw

Type of River

Name of River

FID	Shap	ISO	COUN	F_CODE_DES	HYC_DESCRI	NAME
32	Polyg	IND	India	Inland Water	Perennial/Permanent	YANGSABATI
15	Polyg	IND	India	Inland Water	Perennial/Permanent	YAMUNA
22	Polyg	IND	India	Inland Water	Perennial/Permanent	YAMUNA
97	Polyg	IND	India	Inland Water	Perennial/Permanent	YAMUNA
23	Polyg	IND	India	Inland Water	Perennial/Permanent	YAMUNA
3	Polyg	IND	India	Inland Water	Perennial/Permanent	WULAR LAKE
58	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	WILLINGDON RE
58	Polyg	IND	India	Inland Water	Perennial/Permanent	WILLINGDON RE
43	Polyg	IND	India	Inland Water	Perennial/Permanent	WILA LAKE
37	Polyg	IND	India	Inland Water	Perennial/Permanent	WAINGANGA
32	Polyg	IND	India	Inland Water	Perennial/Permanent	WAGARDHRAI C
34	Polyg	IND	India	Inland Water	Perennial/Permanent	WADWANA TANK
58	Polyg	IND	India	Inland Water	Perennial/Permanent	VIRANAM ERI
40	Polyg	IND	India	Inland Water	Perennial/Permanent	VICTORIA TANK
60	Polyg	IND	India	Inland Water	Perennial/Permanent	VEMBANAD LAKE
39	Polyg	IND	India	Inland Water	Perennial/Permanent	VEHAR LAKE
48	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	VEDAVATI
48	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	VEDAVATI
48	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	VEDAVATI
49	Polyg	IND	India	Inland Water	Perennial/Permanent	VEDAVATI
49	Polyg	IND	India	Inland Water	Perennial/Permanent	VEDAVATI
42	Polyg	IND	India	Inland Water	Perennial/Permanent	VASHISHTI
54	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	VARTUR KERE
51	Polyg	IND	India	Inland Water	Non-Perennial/Intermittent	VANIVILASA SAG
51	Polyg	IND	India	Inland Water	Perennial/Permanent	VANIVILASA SAG

Spatial feature



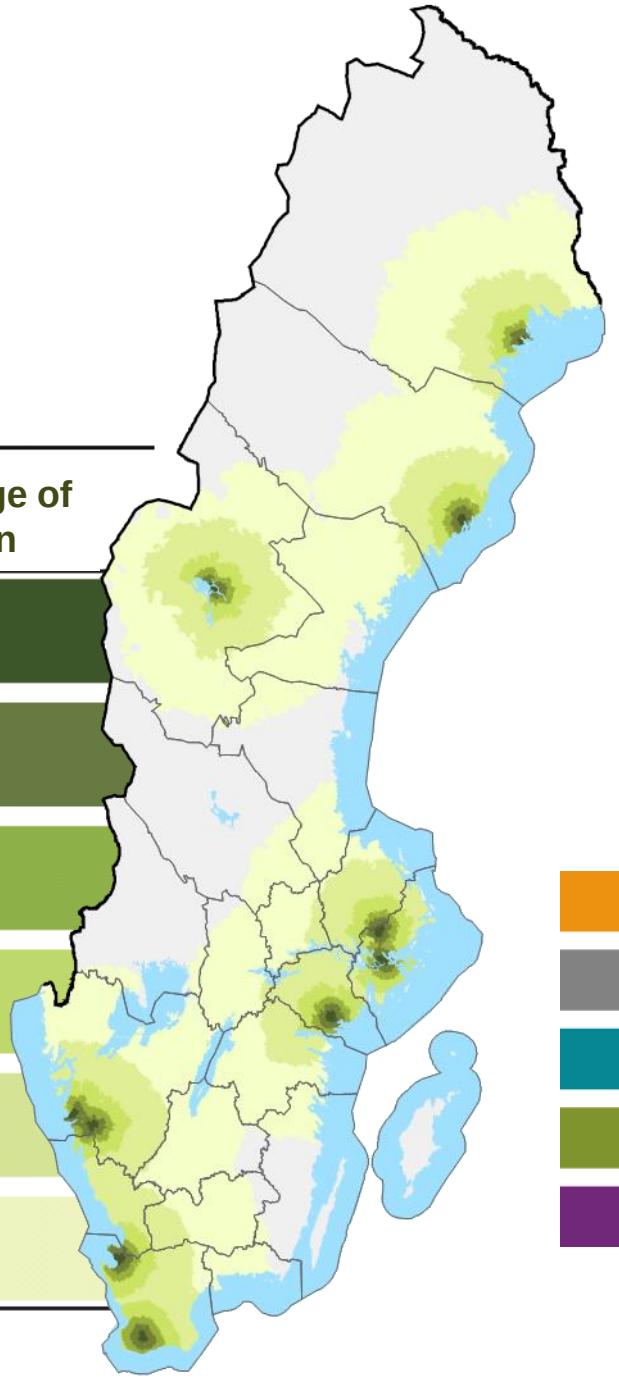
Policy making, impact assessment:

Catchment area for major airports

Statistics Sweden

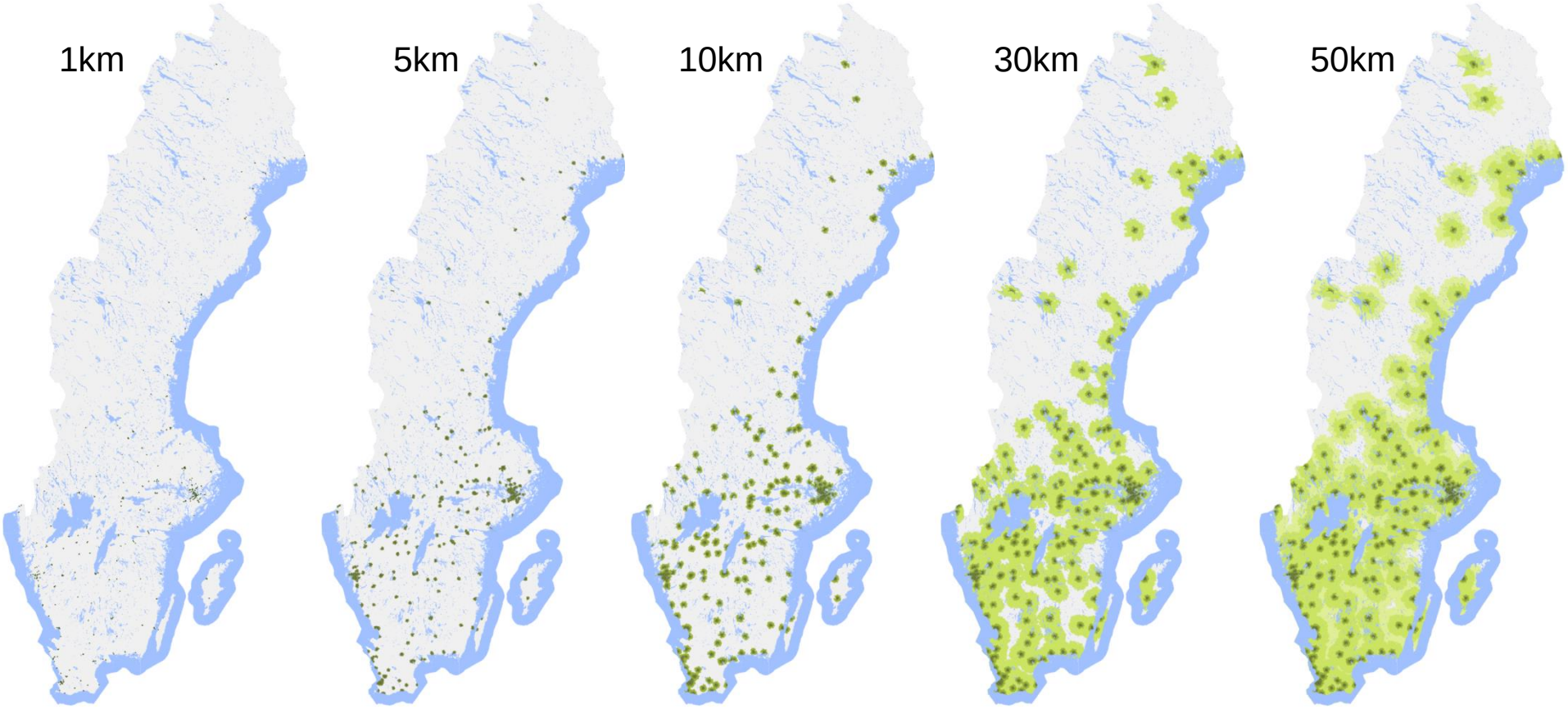
Statistiska centralbyrån

Catchment area	Number of inhabitants	Percentage of population
10 km	751 000	8 %
20 km	2 300 000	24 %
30 km	3 364 000	36 %
50 km	4 618 000	49 %
100 km	6 181 000	66 %
200 km	8 443 000	90 %



Prospering markets, customer analysis:

Access to Retail Trade Areas



1,4 MILLION INHABITANTS

5,9 MILLION

6,9 MILLION

8,7 MILLON

9,1 MILLON

Increased importance of ”Where”

- Geospatial statistics will become increasingly important supporting the UN 2030 Agenda for sustainable development.
- It is essential to embed consideration of the ‘Where’ in policy making, the statistical and geospatial community can provide professional support to make policies evidence-based.

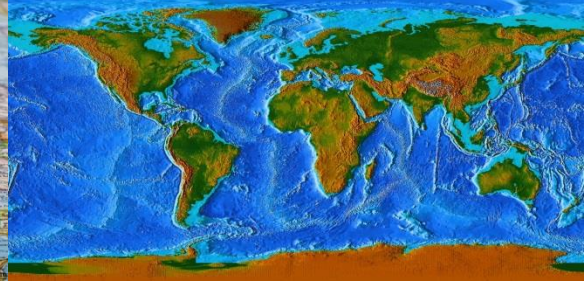
Integration of communities

Statistics

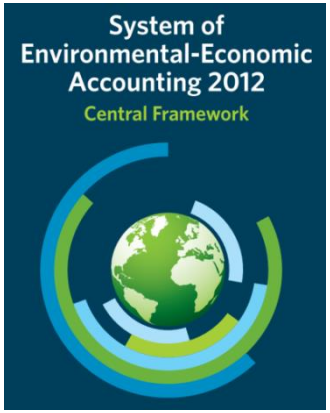
Geospatial

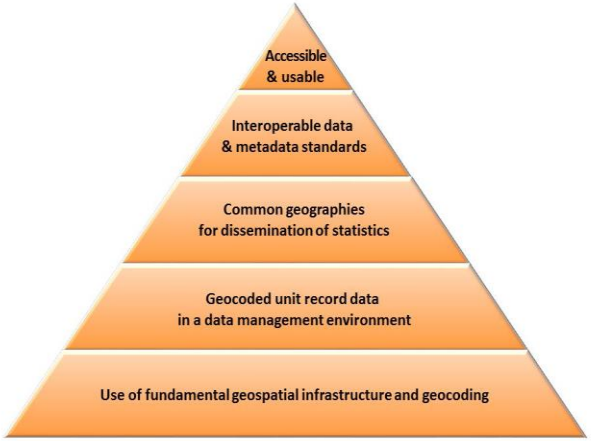
Observations

Thematic Areas



The global statistical community has laid the groundwork for the successful monitoring and realization of this new agenda.





BigData UN Global Working Group

UN-GGIM | United Nations Secretariat
Global Geospatial Information Management

Positioning geospatial information to address global challenges

ggim.un.org

17
Goals

169
Targets

230
Global Indicators

Global Outputs and Reporting

Official Aggregation and Integration into Indicator Framework by National Statistical Offices. Captures data integrity and validation.

SDG metrics for measuring and monitoring progress. Data compiled and disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location, etc.

National Data Integration

Earth Observations and Monitoring	National Spatial Data Infrastructure	National Statistics, Accounts, Administrative Registers, Demographics	Other Sources of Data, incl. Big Data
Imagery Water/Ocean Land use/cover Observations In situ monitoring Air/Pollution Ecosystems Forest/Agriculture Climate	Geodetic positioning Elevation Topography Land use & cover Transport/Infrastruct. Cadastre/Parcels Water & Oceans Cities & Settlements Administrative Bdys.	Population Demographics Poverty Trade/Business Environment Labour/Economics Agriculture Disability/Gender Civil Registration & Vital Stats.	Mobile phone Social media Sensors Automated devices Satellite imagery VGI Crowd sourcing ??

National Information Systems

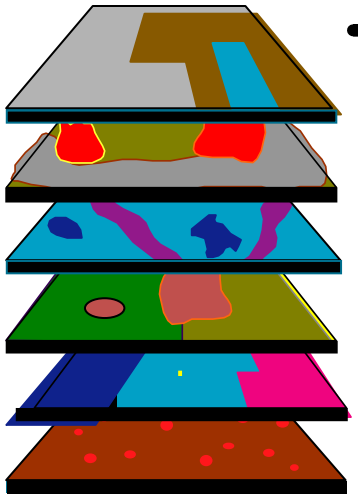
Data Inputs

Fundamental baseline data and new data sources

Local to national social, economic and environmental conditions and circumstances

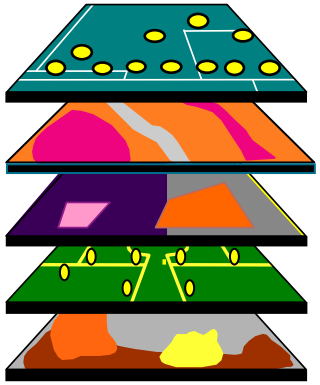
High quality, timely and reliable data

Geodetic
Elevation
Water/Ocean
Land use/cover
Transport
Cadastre
Population
Infrastructure
Settlements
Admin. Bdys.
Imagery
Geology/soils
Observations
etc.

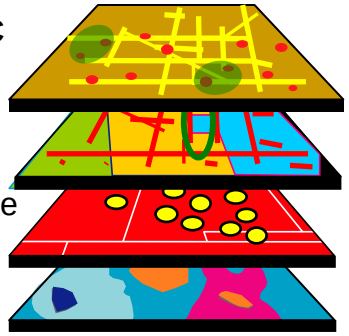


National Spatial Data Infrastructure

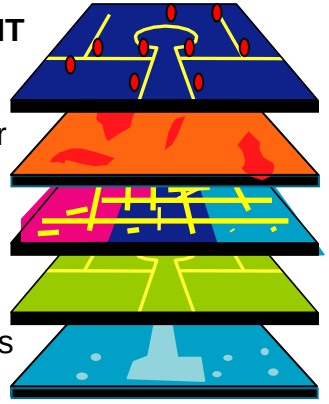
SOCIAL
Society
Poverty
Education
Health
Population
Employment
Water
Sanitation
Equality
Gender
Governance



ECONOMIC
Well-being
Cities
Water
Energy
Infrastructure
Industry
Sanitation
Economy



ENVIRONMENT
Water
Seas/oceans
Land use/cover
Ecosystems
Forests
Agriculture
Climate
Biodiversity
Natural hazards
Pollution



PERMANENT MISSION OF DENMARK TO THE UNITED NATIONS

SRE
PERMANENT MISSION OF MEXICO TO THE UNITED NATIONS

GEO GROUP ON EARTH OBSERVATIONS

UN-GGIM
UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT

Geospatial Information and Earth Observations:

Supporting Official Statistics in Monitoring the SDGs

Monday 7 March 2016
10:00am - 1:00pm
Conference Room 4

SUSTAINABLE DEVELOPMENT GOALS

In adopting the 2030 Agenda for Sustainable Development, world leaders agreed that a global indicator framework would be an essential method to measure, monitor and report progress on achieving the 17 transformational Sustainable Development Goals (SDGs) and 169 associated Targets. They also recognized the critical importance of "transparent and accountable scaling-up of appropriate public-private cooperation to exploit the contribution to be made by a wide range of data, including earth observation and geospatial information, while ensuring national ownership in supporting and tracking progress".

To track progress towards these Goals and Targets, the global indicator framework will also need to capture the multifaceted and ambitious aspirations for the continued development of nations and societies. Effective reporting of progress toward these indicators will require the use of multiple types of data, both what we have in hand - traditional national accounts, household surveys and routine administrative data – and new sources of data outside the national statistical system, namely Earth observation and geospatial information, and Big Data, in general.

EARTH OBSERVATION AND GEOSPATIAL INFORMATION RESOURCES FOR SDG MONITORING

SUSTAINABLE DEVELOPMENT GOALS

	Population distribution	Cities and infrastructure mapping	Elevation and topography	Land cover and use mapping	Oceanographic observations	Hydrological and water quality observations	Atmospheric and air quality monitoring	Biodiversity and ecosystem observations	Agricultural monitoring	Hazards, disasters and environmental impact monitoring
1 No poverty	■	■		■					■	
2 Zero hunger	■	■	■	■	■	■	■	■	■	■
3 Good health and well-being	■	■		■		■	■		■	■
4 Quality education	■	■								
5 Gender equality	■	■								
6 Clean water and sanitation	■	■	■	■	■	■	■	■	■	■
7 Affordable and clean energy	■	■	■	■	■	■	■	■		■
8 Decent work and economic growth	■	■	■	■					■	
9 Industry, innovation and infrastructure	■	■	■	■			■			■
10 Reduced inequalities	■	■								
11 Sustainable cities and communities	■	■	■	■			■	■	■	■
12 Responsible consumption and production	■	■	■	■				■		■
13 Climate action	■	■	■	■	■	■	■	■	■	■
14 Life below water	■	■	■	■	■	■	■	■	■	■
15 Life on land	■	■	■	■		■	■	■	■	■
16 Peace, justice and strong institutions	■	■		■						
17 Partnerships for the goals	■	■	■	■	■	■	■	■	■	■