Ordnance Survey Ireland

science & technology in action
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14th edition

Ireland's Sustainable Development – the impact of maps

For many years, it has been accepted that economic and other forms of development can cause serious damage to our environment. Our atmosphere can be polluted, as can our water supplies. Even small changes in our climate could cause serious flooding or drought. There are many other possible outcomes, each posing a threat to human health and wellbeing and, indeed, to all forms of life. Renewed concern has resulted in a detailed updating of agreed approaches to these problems. The result is *The 2030 Agenda*, initially adopted by the 193 Member States of the United Nations including Ireland (www.un.org/sustainabledevelopment). The Agenda requires countries to take action to achieve 17 *Sustainable Development Goals (SDGs)*.

Ireland's Sustainable Development National Implementation Plan 2918/2020 sets out our initial response to this task.

In this lesson we discuss the objectives of this plan and illustrate how maps play a central role in the development and monitoring of such ambitious projects.

What is sustainable development?

Sustainable development (*SD*) means meeting the needs of the present without compromising the ability of future generations to meet their own needs. Essentially, it is an attempt to provide an acceptable standard of life for existing generations without damaging the prospects for future generations. The broad objective here is a society where economic prosperity provides a good standard of living, without exhausting our natural resources or damaging the environment, To accomplish these outcomes, a development plan must address economic, environmental and social considerations. This is graphically illustrated by the *5P model* shown here. No 'P' should be excluded.

The 5 Ps of Sustainable Development
- People
- Planet
- Prosperity
- Peace
- Partnership

Story maps bring statistics to life

In modern times, maps play a critical role in development decision making. This is because a map provides a visual image of a location and details of its surrounding environment. For example, if a local authority decided to construct a new *reservoir* to serve local water needs, detailed information on the location of rivers, roads and housing would be essential. In other words, the planners need *geospatial* information. A geospatial service, such as that provided by OSi, links various data sets with geographic locations. This is vividly demonstrated by the OSI *Story Maps* that deal with the 17 SD Goals. These maps provide us with geospatial information which indicate how we are doing in relation to the SDGs. To find the Story Maps go to http://irelandsdg.geohive.ie/. The following sections illustrate the Story Map experience.

Life on Land

Life on Land (*Goal 15*) aims to protect, restore and promote sustainable use of *ecosystems* and forests and to protect against land degradation and loss of biodiversity. In Ireland, certain areas are protected by *EU Directives* and by national law against activities that might cause damage to the natural environment. These areas include:
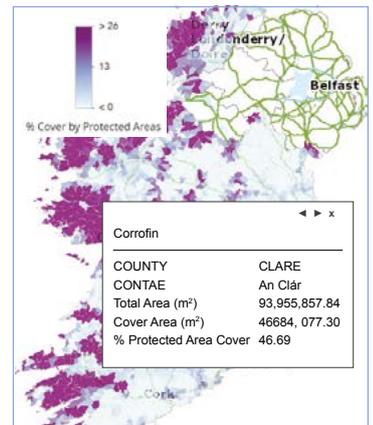

Special Protection Areas (*SPAs*): bird wildlife conservation

*Special Areas of Conservation* (*SACs*): rare animal and plant species

Natural Heritage Areas (*NHAs*): vulnerable habitats of plants and animals.

The Story Maps look at these protected areas across Ireland, identifying habitat types and national initiatives to protect biodiversity. The map shown identifies the protected areas. Clicking on a region reveals the location and shows the total area and the percentage of it that is protected. The Story Map also relates to *Goal 6: Clean Water and Sanitation*.

Corrofin	
COUNTY	CLARE
CONTAE	An Clár
Total Area (m²)	93,955,857.84
Cover Area (m²)	46684, 077.30
% Protected Area Cover	46.69

Work and Poverty

This Story Map illustrates changes in Ireland in relation to unemployment and poverty throughout the last decade. It relates to *Goal 8: Decent Work and Economic Growth* and *Goal 1: No Poverty*.
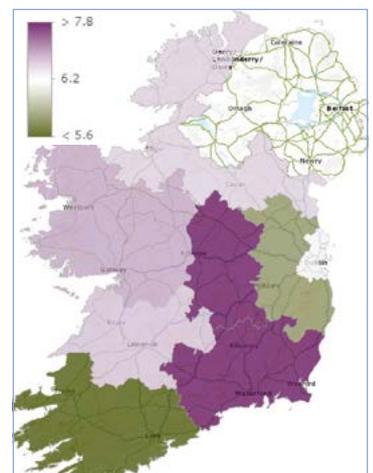
The map shown illustrates the level of unemployment across the country (Central Statistics Office for Q2 2017), using the colour code indicated. A review of data in the story reveals many other social factors. For example, we find that the proportion of the population in receipt of Job-seeker's Allowance is decreasing, while the number in receipt of Family Income Supplements is increasing.

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We are all responsible

In the year 2000, United Nations member states agreed a set of eight Millennium Development Goals. These goals included poverty, primary education and environmental sustainability. They were not met by the target date of 2015.

It took three years to agree on the 2030 Agenda. This agreement recognises that close global partnerships and the input of many communities and individuals will be necessary to achieve the ambitious 17 SDGs.

We must take notice of this. We need to know what is important, what we should be doing and how we are progressing in our efforts to achieve the Goals. Awareness is the key. For example, a visit to *http:// irelandsdg.geohive.ie/* will reveal that we have serious problems around energy supply (SDG7) and water quality (SDG6). A look at the other Goals will reveal even more challenges.

> ### Why education is important
>
> "The Department of Education and Skills National Strategy on Education for Sustainable Development in Ireland 2014-2020 aims to ensure that education contributes to sustainable development by equipping learners with the relevant knowledge, skills and values (the 'why') that will motivate and empower them throughout their lives to become informed active citizens who take action for a more sustainable future."
>
> *The Sustainable Development Goals National Implementation Plan 2018-2020*

Understanding geospatial language

The word *geospatial*, is a combination of the words 'geo' (from the Greek, meaning 'earth') and 'spatial' (meaning related to 'space'). Although relatively new, the word is now widely used to refer to the position of things on the earth's surface.

It is frequently used as a *synonym* for *GIS (Geographical Information System)* although such usage is debatable. Geospatial usually implies the combination of location and data related to that location. Hence, other terms such as *spatial data*, *geospatial data* and *geodata* are frequently used. Technologies such as *GPS (Global Positioning System)* and *remote sensing systems* are often referred to as geospatial technologies.

The first recorded use of geospatial data to solve a social problem was in 1854, long before the above terminology existed. Dr. John Snow wrote his data on *cholera* outbreaks on a map of London and concluded accurately that the disease was associated with contaminated water.

The future of maps?

How will maps develop in response to the growing need for powerful geospatial services? Will we see *holographic 3D* visualisations? We probably will, because the technologies necessary to generate such maps are already available. Such geospatial data would be a powerful tool for policy makers and planners. However, it must be realised that it is the integration of the map and the data that provides the power. This integration requires a mix of multiple technologies and statistics.

We live on a planet full of life. The Earth's surface area is some 510 million km², 71% of which is water. We must recognise the need to take care of it all. The geospatial industry and its maps will provide the data required to meet the challenges..

Ordnance Survey Ireland (OSi) is the national mapping agency of the Republic of Ireland. It produces and sells a very comprehensive range of urban, rural, tourist and leisure maps at a variety of scales in digital and printed form. OSi also produces aerial photographs and digital terrain models.

Customers include:

- Individual members of the public
- Tourists
- Schools
- The construction industry
- Architects
- Engineers
- Property and legal firms
- Government Departments and local authorities.

Annual revenues amount to €20 million.

OSi also licences data for a wide range of computer based applications such as Computer Aided Design (CAD) and Geographic Information Systems (GIS).

OSi products are state of the art, produced using the most up to date technology to international standards and, consequently, the company is a leader in the Irish geographic information market.

All products are available directly from the OSi shop (+353 1 802 5300) at the OSi headquarters in the Phoenix Park (near Castleknock Gate) through its online shop and through a national network of retail outlets.

In November 2017, OSi/CSO hosted the prestigious European Forum for Geography and Statistics (EFGS) Conference in Dublin.

The experts at that conference debated on the topics discussed in this lesson, while exploring the best ways of linking geography with other official statistics.

17 Goals to Transform our World

You can find out more about the work of Ordnance Survey Ireland at **www.osi.ie**

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Syllabus References

The main syllabus references for the lesson are:

Leaving Certificate Geography
- Geographical information systems (GIS) as a specialised investigative tool used to combine data sources in the study of particular areas or geographical problems. (p. 20)
- Elective Unit 5: Patterns and Processes in the Human Environment (pp. 28-29)

Leaving Certificate Biology
- Sub-unit 1.4: General Principles of Ecology
- Sub-unit 1.5: A Study of an Ecosystem

Leaving Certificate Technology
- Option: Information and Communications Technology (p. 30)
- The internet and the World Wide Web

Science and Technology in Action is also widely used by **Transition Year** classes.

Learning Outcomes

On completion of this lesson, students should be able to:

- Define the term 'geospatial' and outline the value of geospatial services for policy and decision makers
- Describe the role of OSi in providing geospatial services
- Explain why the 17 Goals are necessary in order to protect future generations
- Discuss the meaning of the term 'Sustainable Development'
- Identify some environmental issues on which Ireland requires improvement
- Use *http://irelandsdg.geohive.ie/* to explore Ireland's position with respect to the 17 SDGs.

General Learning Points

These are additional relevant points which are used to extend knowledge and facilitate discussion.

- The 2030 Agenda is meant to include businesses, communities and individuals. Businesses are expected to take the objectives into account when planning, communities to protect their local environment and individuals to make suitable consumer choices.
- UN-GGIM (UN Committee of Experts on Global Geospatial Information Management) is the publisher of 'Future trends in geospatial information management: the five to ten year vision. Second Edition December 2015'
- This report claims that current standards do not yet provide the required integration of statistical and geospatial information.

Student Activities

1. Everything that happens, happens somewhere. Go to *https://www.youtube.com/watch?v=Mkge03NJhfU* and watch this 3 minute video produced by the United Nations. It illustrates vividly how geospatial information is critical to sustainable social and economic development across the globe.

2. Go to *http://irelandsdg.geohive.ie/* and click on the graphic for SDG 7. Then click on SDG 7.2.1 (UN) / 7.40 (EU), Renewable Energy Share in the Total Final Energy Consumption, NUTS 3, 2016, Ireland, SEAI, CSO & OSi. Click on any area on this map and a legend appears that shows renewable energy usage as a percentage of the total energy used in that region.

Note:
A search *http://irelandsdg.geohive.ie/* will reveal a wide range of subjects for possible projects intended for the BTYSE or SciFest competitions.

True/False Questions

a) The CEO of OSi is Ireland's representative on the UN Committee of Experts on Global Geospatial Information Management. **T   F**

b) Ireland's Protected Areas are categorised under three headings. **T   F**

c) Computer programming is the most important skill in the geospatial industry. **T   F**

d) Agenda 2030 targets 17 Sustainable Development Goals. **T   F**

e) Methods for integrating statistics with other geospatial information require improvement. **T   F**

f) The term 'geospatial' is a synonym for 'Geographical Information System'. **T   F**

g) Agenda 2030 does not include any social goals. **T   F**

h) The term 'geo' comes from the Greek word for 'earth'. **T   F**

i) Maps were not used to solve public health problems before the 20th Century. **T   F**

j) *http://irelandsdg.geohive.ie/* provides information on Ireland's sustainable development. **T   F**
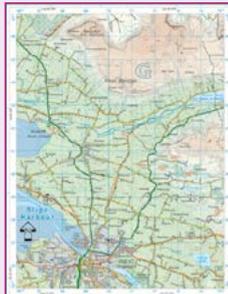
Check your answers to these questions on www.sta.ie.

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Examination Questions

Leaving Certificate Geography (HL) 2018, Q. 4

Examine the 1:50 000 Ordnance Survey map and legend for this paper and answer each of the following questions. (The map is available from **www.examinations.ie** as a .tif file)

(i) What is the height, in metres, of the highest point shown on the map?

(ii) Give a six-figure grid reference for an Independent Holiday Hostel in Sligo.

(iii) Measure the length, in kilometres, of the dual carriageway on the N4 road.

(iv) Calculate the approximate area, in km², of the land west of easting 70.

Leaving Certificate Geography (OL) 2018, Q. 10

Examine the 1:50 000 Ordnance Survey map and legend for this paper and answer each of the following questions. (Map as above)

(i) Name the features which can be found at each of the following grid references: G 743 359, G 681 421, G 736 432

(ii) If you were to walk the Benbulben Walk from the Mound at G 673 461 to where it leaves the map at G 685 470 in what direction would you be walking?

(iii) Draw the Ordnance Survey map symbol for a County Boundary.

Leaving Certificate Geography (HL) 2016, Q. 7

Locate point X, L 936 781, and point Y, L 937 825 on the 1:50 000 Ordnance Survey map for this paper. Figure below shows an elevation profile of the cross section of a line between point X and point Y on the Ordnance Survey map. Using the 1:50 000 Ordnance Survey map and legend and the elevation profile above, answer each of the following questions.
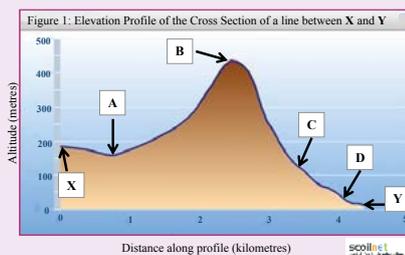
(i) Match each of the letters A, B, C and D on the elevation profile above, with the feature on the Ordnance Survey map that best matches it in the table below.

(ii) Indicate whether each feature in the table below is part of the physical landscape or cultural landscape, by ticking the correct box.

(In the pdf version the three images above are hyperlinked.)

Figure 1: Elevation Profile of the Cross Section of a line between **X** and **Y**

Did You Know?

- Colin Bray, Chief Executive and Chief Survey Officer of OSi, is Ireland's representative on the UN Committee of Experts on Global Geospatial Information Management (UN-GGIM).

- The term 'geographic information system' was first used by Roger Tomlinson in 1968 in a paper "A Geographic Information System for Regional Planning".

- According to the National Biodiversity Plan (NBP) 2017-2021, 91% of EU protected habitats in Ireland have unfavourable conservation status.

- The geospatial industry is forecast to become a very dynamic sector demanding a variety of skill sets.

- An interesting recent concept in the environmental sciences is that of 'planetary boundaries'. It is based on the evidence that humans are the main cause of global environmental change.

Biographical Note

Jack Dangermond

Jack Dangermond is an American businessman and environmental scientist. He studied landscape architecture, environmental science and urban planning at California State Polytechnic University, University of Minnesota, and Harvard University.

He is president of ESRI, the largest geographic information systems (GIS) software developer in the world', founded with his wife in 1959.

In December 2017, he and his wife donated $165 million to establish the Jack and Laura Dangermond Preserve on the Pacific coast. He has received many awards.

'It's not the map itself that necessarily matters, but the overlaying of those maps with spatial analysis tools to help organisations understand more.' (Jack Dangermond)

Revise The Terms

Can you recall the meaning of the following terms? Revising terminology is a powerful aid to recall and retention.

cholera, ecosystems, EU Directives, 5P model, geodata, geospatial, GIS (Geographical Information System), GPS (Global Positioning System), holographic 3D, Natural Heritage Areas (NHAs), remote sensing systems, reservoir, spatial data, geospatial data, Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Story Maps, sustainable development (SD), Sustainable Development Goals (SDGs), synonym, the 2030 Agenda.

Check the Glossary of terms for this lesson on www.sta.ie