Worldmapper: The world as you've never seen it before

Anna Barford and **Danny Dorling** introduce www.worldmapper.org, an online resource which will provide a series of 365 educational posters by the end of 2006, mapping variables from refugees to house prices, on a worldwide scale. Each map can be viewed and downloaded for free with accompanying information about each subject on the website.

Precedents of the Millennium Development Goals

In September 2000 the leaders of 187 member states of the United Nations committed their peoples to achieving eight Millennium Development Goals by 2015. The vision that resulted in these commitments had its origins in many things: from images of starvation in the 1980s, from campaigns to relieve world debt in the 1990s, from war in more recent years, from 1960s idealism, from the establishment of the United Nations itself in the 1940s, from what the United Nations' Millennium Declaration itself called a desire to make globalisation inclusive and equitable based upon our common humanity in all its diversity; and from earlier ideals formalised during the First ('rich nations') World War that had its origins almost a century earlier.

The United Nations' changing remit

Peace and security were the aims of the United Nations' predecessor, the League of Nations, founded in 1919. When the United Nations was established in 1945, its mandate was also to prevent war. Within half a century that mandate had widened to include providing for education, health, human rights, refugees, the environment, development, trade, children, food, preventing gender-based and race-based discrimination, and more. The United Nations also came to include the International Labour Organisation, which was established alongside the League of Nations, but outlived it. When the International Labour Organisation began, the mass of the world's people were of little interest to its statisticians, and so too when the United Nations first started collecting data in the 1940s. The lives, hopes, fears and well-being of most people in the world were not its concern; it collected no data on them, let alone mapped them. By 2000 all that had changed.

Projection

There is no official map of the world. The nearest to such an image is the map used in the United Nations emblem, where the centre of the circular map is the North Pole, and as the map extends to 60° South, all areas of concern – containing almost all people – are shown. In 1974 Arno Peters' area-accurate projection of the world altered perceptions of the shape of the world by demonstrating the relative sizes of land areas. This projection was itself very similar to others, but succeeded in becoming the map used on many classroom walls, at least in Britain, and for good reason. An example of the effect of area accuracy is that Peters' projection shows that Africa is 14.5 times bigger than Greenland, contrasting with the well-known Mercator, projection in which these places appear to have similar areas. This redrawing of the world map by Peters assisted in rescaling what at least two generations of students thought to be the size and shape of the world. It also gave continents some colours that some readers may remember subliminally: on Peters' projection Africa is yellow, the Americas are green, Europe red, Australasia orange, Russia pink and Asia purple (Figure 1).

Whilst Peters' Projection made an important contribution to perceptions of the shape of the world, and it is undeniably beneficial to have a general understanding of how spacious various parts of the world actually are, what was being challenged remained within the domain of presenting land area accurately. What if you were interested in how many people live where, not how many hectares there are? In the past maps have overcome the challenge of representing population by using different colours or patterns to show different densities or characteristics of population; these would be mapped onto a land area map. The resultant choropleth map is limited by its artificial imposition of category boundaries, sacrificing subtleties within these. Such a map also continues to privilege land area as the variable mapped. The variable of interest is only shown secondarily within the outline of land area, despite land area bearing little or no relation to variables such as wealth or refugees. The benefit of choropleth maps is that territorial dimensions remain recognisable and therefore legible, but they draw your attention away from where most people live.

Re-sizing rectangles

A more striking way of mapping population is to treat it in the same way as land area is treated by the Peters' projection – as a value to be shown – so the size of the territory you are mapping is determined by how many people live there, not how many hectares there are. This has been done in the past using rectangles, or cuboid shapes, to represent territories. The term territory is used in Worldmapper because some areas are not officially recognised as countries, although separate data is available for them which allows greater detail to be shown. For example, China and Hong Kong are recorded separately by United Nations agencies. These rectangles, representative of territories, are re-sized so that if the variable is bigger the rectangle becomes larger. Unlike with choropleth maps, the variable of interest is given primacy as it determines the relative sizes of territories. However, the choropleth style can be incorporated within these rectangles, so the map can show two related variables – for example, share of the world arms trade and source of arms. Using rectangles for such presentation relies on the recognition of places by their name labels or relative positions.

Expanding and shrinking

Worldmapper maps differ from preceding mapping techniques because the original shape of territorial boundaries is retained, as much as possible, whilst the area within these is expanded or shrunk, depending on the variable.

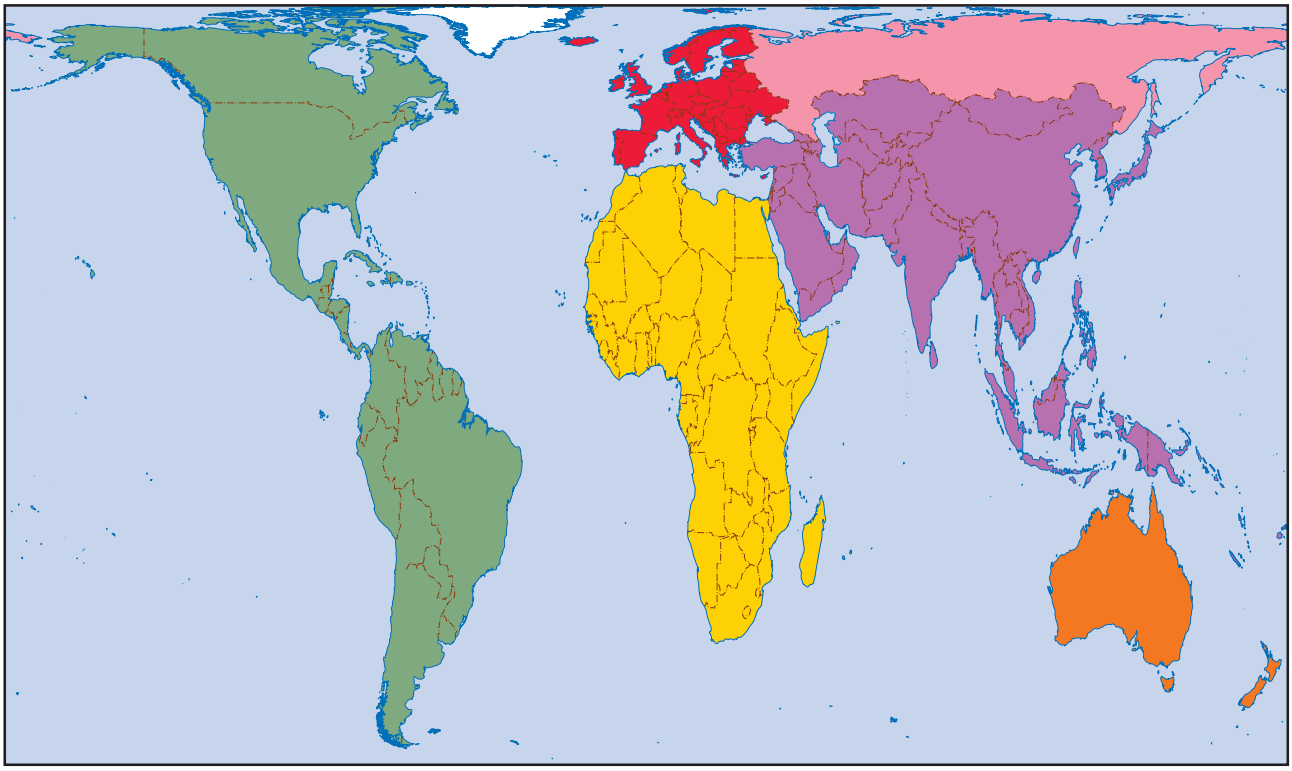


Figure 1: Peters' projection.

Thus the maps remain recognisable and incorporate the striking re-sizing used previously in 'rectangular maps'. An example of a Worldmapper population map is shown on the centre pages of this issue of *Teaching Geography*. Worldmapper maps are also unique in that they employ a new version of a computer algorithm that re-projects the boundaries of territories on the surface of the sphere – rather than on the plane. The basic algorithm uses a diffusion equation from the physics of heat transfer and molecular mixing developed by Mark Newman of Michigan University in the United States. A detailed discussion of the method is given by Gastner and Newman (2004).

To understand these new map projections – called cartograms or density-equalising maps – think of the example of population. These cartograms distribute the total space on the map between territories based on the number of people living in each territory, so that the same amount of space in any territory represents the same number of people. The mapped size of the territory will therefore indicate the proportion of the worldwide population living there.

What about the sea?

Depicting the sea presents a problem for density-equalising projections, because people do not live there. To map the sea as having a population of zero would result in a world map that was so distorted that the benefit of mapping (a readable presentation of data) would be negated. To overcome this here the sea has been given a 'neutral buoyancy' or fixed area despite the lack of people living there. Antarctica has been treated in the same way as the sea. Once you re-project by population, the resultant map poses the question of why we should imagine the shape of the world merely in terms of land area or population. Why not in proportion to children, aircraft flights or fruit exports?

Demand for data

One reason for not producing world cartograms in the past was a lack of worldwide territory-level data on many variables. Such data is needed for these maps or has to be estimated as it is not possible to depict an area as having 'no data' on a cartogram. It was the United Nations Millennium Development Goals that gave the impetus for so much data of this type to be produced and also – more importantly – for preliminary datasets to be corrected and more areas included. This data is necessary to monitor progress in achieving these goals; its collection has made much more comprehensive world mapping possible for at least the 365 subjects which the Worldmapper project aims to include (see Figure 2).

Eight goals by 2015

The Millennium Development Goals (MDGs) declare what the leaders of most of the territories of the world say they want humanity to achieve by 2015. The maps in Worldmapper show mainly where we were around the year 2000, and in many cases where trends have been moving since 1990. The maps also present many issues which are not currently covered by the goals, some of which may become future goals. The current goals are:

Goal 1: Eradicate extreme poverty and hunger

Over time, definitions of poverty and the ways in which it is measured change. In the 1940s worldwide poverty was not a key issue for debate at international level. In the 1980s it was absolute poverty and starvation that drew most attention – typically through an image of an emaciated child. By 2000 the definition of extreme poverty adopted by the MDG was living on US$1 a day. Unless time stops still, this will not remain the definition for long. We will be more ambitious in the near future. Indicators of hunger used for this MDG are the prevalence of underweight children and the proportion of the population receiving food such that they secure below the minimum level of dietary energy consumption – in better words: go very hungry. Worldmapper shows a dozen maps showing different measures and levels of poverty and hunger: including those earning US$1, US$10, US$20, US$50 a day; where the poorest (and richest) tenth and twentieth of the population live; child undernourishment in 1990 and 2000; and children underweight.

Goal 2: Achieve universal primary education

Achieving universal primary education is an especially important goal for girls

– who are more likely to be excluded from primary education than are boys. The goal is for all girls and boys to complete a full course of primary education by 2015. Again it is possible to envisage how this goal would have been seen as impossible 50 years ago. And some would have considered it undesirable that an international effort be made to achieve this. Universal primary education is unlikely to remain one of our greatest aspirations, even in just nine years' time, because our values and benchmarks rise. Worldmapper maps enrolment in primary, secondary and tertiary education; spending on education, and changes in this; youth and adult literacy; and female illiteracy. While it is girls that are more likely to be excluded from primary school, a small majority of the world's 105 million university students are women. The world can even be drawn in proportion to its university graduates!

Goal 3: Promote gender equality and empower women

The MDG to promote gender equality ranges from the struggles for women's right to vote to concerns about the under-representation of women as members of parliaments and in high office. Although calls for gender equality have not subsided, in the United Kingdom the only time in the past 100 years when gender inequalities have increased was shortly after the Second World War, when women often had to leave their war-time employment and return to domestic labour. The fact that this MDG exists at all is a reflection of women's empowerment to the extent that they are in a position to be able to demand gender equality. Worldmapper shows the following indicators of gender equality on a world scale: women and men working in agriculture, industry, services, management and the home; female and male incomes and youth unemployment; gender empowerment; and some education indicators including those listed above. These maps show the current patterns of inequality. In the future will it be the poorer men of richer countries that need gender empowerment in order to achieve calls for gender equality?

Goal 4: Reduce child mortality

Child mortality is concerned with the deaths of children under the age of five. Such deaths were often previously seen as natural, inevitable and unavoidable. Young children are particularly vulnerable to diarrhoea (preventable by good hygiene and sanitation), malaria (preventable by using bed nets with insecticide), respiratory diseases and malnutrition (see MDG 1). Strong health care systems also help to prevent most child deaths, yet such care is not available to most of the world population. The 'naturalness' of high child mortality is challenged by the different levels found in different places, whilst only one in one thousand children born to the most affluent parents in Britain may be expected to die during their first year of life, that level was one hundred times higher for the servant-keeping classes living in this country a century ago. If there is progress in the future, then current rates of infant mortality in much of the world will soon be unimaginable, and our attention will shift partly to other aspects of child health. Among many relevant maps Worldmapper shows the following variables related to child health: nurses, pharmacists and physicians working; public and private health spending; health service quality; hospital beds; affordable drugs; and measles immunisations.

Goal 5: Improve maternal health

The aspiration for improving maternal health, like that for reducing child mortality, has resulted from a change of understanding: from seeing maternal deaths as being a likely occurrence, to viewing safe births as being achievable for every mother. Nevertheless, in much of the world, giving birth remains a major killer of women of child-bearing age. Worldmapper maps many elements that can add to, or detract from maternal health. The preceding MDGs of promoting gender equality and reducing poverty themselves help to contribute a social context for assisting improvements to maternal health. Other more directly health-related indicators are also mapped: births attended; midwives, nurses, pharmacists and physicians working; public and private health spending; health service quality; hospital beds; affordable drugs. Perhaps future goals will shift away from the physicality of maternal health considered here, to be more concerned with issues such as the mental health of people of all ages?

Goal 6: Combat HIV/AIDS, malaria and other diseases

The MDG to combat HIV/AIDS, malaria and other diseases is more precisely defined by the World Health Organisation as an aim to reverse the spread of HIV/AIDS, and to halt and reverse other major diseases, including malaria. Unlike some other MDGs, the obstacle to development posed by disease is a burden that has recurred throughout history, with people tackling the diseases of their time. However, the focus of much health research is on 'diseases of the rich' – termed the '10/90 Gap' because only 10% of global health research is on 90% of the disease burden in the world. Worldmapper maps show the different levels of many diseases around the world, as well as the facilities available for prevention and care. Worldmapper includes images ranging from the prevalence of now rare diseases such as yellow fever to deaths from rabies and tuberculosis; to measles and tuberculosis immunisations; to condom availability; health professionals working; health spending; health service quality; hospital beds; and maps of the availability of affordable drugs. Whilst we tackle current diseases, others will develop and reappear. Although the basic level of worldwide health and life expectancy may well improve, premature mortality is currently becoming a less equal risk, there will almost certainly remain major diseases to be treated for many years to come.

Goal 7: Ensure environmental sustainability

Environmental sustainability is multifaceted – usually we understand this to refer to the large-scale environmental questions such as climate change and oil spills. However, the environment is also the smaller-scale physical context in which we live. For instance, the World Health Organisation's concerns for the environment are with safe drinking water and good housing. Concern for the sustainability of the environment is argued to be fundamental to the continued existence of our species, yet the terms of debate are likely to change from 'sustainability' to 'equality of access to resources' as finite environmental resources are split between an increasingly demanding world population. Worldmapper shows environmental variables across a range of issues: sanitation and poor water; urban slums and slum growth; overcrowded homes; water resources; forests; fuel used; forest destruction; aquiver depletion; CO_2 pollution; and the geography of the extinction of species.

Goal 8: Develop a global partnership for development

MDG 8 has been a particular focus of attention during the past year, as the G8 leaders met in Gleneagles in July 2005 to discuss their future commitments, and the Make Poverty History campaign identified the three areas for improvement: trade, debt and aid. Most of the Worldmapper maps are of relevance to MDG 8 as they show the many relationships between territories; many maps can in turn be interpreted as a representation of worldwide inequalities. Currently this is often conceptualised as unequal levels of development, positioning richer territories as being more advanced. Perhaps in the future the differences will be

Basic
1. Land Area
2. Total Population
3. Total Births
4. Births Attended
5. Total Children
6. Total Elderly
7. Population Year 1
8. Population 1500
9. Population 1900
10. Population 1960
11. Population 2050
12. Population 2300

Movement
13. Refugee Destination
14. Refugee Origin
15. International Immigrants
16. International Emigrants
17. Net Immigration
18. Net Emigration
19. Tourist Destinations
20. Tourist Origins
21. Net In-Tourism
22. Net Out-Tourism
23. Tourism Receipts
24. Tourism Expenditure
25. Tourism Profit
26. Tourism Loss

Transport
27. Aircraft Departures
28. Aircraft Flights
29. Aircraft Passengers
30. Rail Passengers
31. Passenger Cars
32. Mopeds & Motorcycles
33. Vehicle Freight
34. Rail Freight
35. Road Network
36. Rail Network
37. Aircraft Freight
38. Container Ports
39. Oil Tankers
40. Cargo Shipping

Food
41. Fruit Exports
42. Fruit Imports
43. Vegetables Exports
44. Vegetables Imports
45. Dairy Exports
46. Dairy Imports
47. Cereals Exports
48. Cereals Imports
49. Meat Exports
50. Meat Imports
51. Fish Exports
52. Fish Imports
53. Groceries Exports
54. Groceries Imports
55. Alcohol & Cigarettes Exports
56. Alcohol & Cigarettes Imports

Goods
57. Toys Exports
58. Toys Imports
59. Gas & Coal Exports
60. Gas & Coal Imports
61. Ores Exports
62. Ores Imports
63. Steel Exports
64. Steel Imports
65. Refined Petroleum Exports
66. Refined Petroleum Imports
67. Medicines Exports
68. Medicines Imports
69. Valuables Exports
70. Valuables Imports
71. Metals Exports
72. Metals Imports
73. Wood & Paper Exports
74. Wood & Paper Imports
75. Crude Petroleum Exports
76. Crude Petroleum Imports

Manufacturers
77. Cars Exports
78. Cars Imports
79. Other Vehicles Exports
80. Other Vehicles Imports
81. Natural Products Exports
82. Natural Products Imports
83. Clothing Exports
84. Clothing Imports
85. Chemicals Exports
86. Chemicals Imports
87. Machines Exports
88. Machines Imports
89. Electronics Exports
90. Electronics Imports
91. Computers Exports
92. Computers Imports

Services
93. Transport And Travel Exports
94. Transport And Travel Imports
95. Other Services Exports
96. Other Services Imports
97. Finance And Insurance Exports
98. Finance And Insurance Imports
99. Royalties And License Fees Exports
100. Royalties And License Fees Imports

Resources
101. Rainfall Volume
102. Water Resources
103. Groundwater Recharge
104. Water Use
105. Forests 1990
106. Forest 2000
107. Forest Growth
108. Forest Loss

Fuel
109. Traditional Fuel
110. Hydroelectric Power
111. Oil Power
112. Gas Power
113. Coal Power
114. Nuclear Power
115. Fuel Exports
116. Fuel Imports
117. Electricity Production
118. Electricity Increase
119. Fuel Use
120. Fuel Increase

Production
121. Tractors Working
122. Tractors Increase
123. Cereals Production
124. Vegetables Consumed
125. Meat Production
126. Meat Consumed
127. Agricultural Women
128. Agricultural Men
129. Industrial Women
130. Industrial Men
131. Services Women
132. Services Men

Work
133. Managers Women
134. Managers Men
135. Child Labour
136. Teenage Mothers
137. Home-Hours Women
138. Home-Hours Men
139. Market-Hours Women
140. Market-Hours Men
141. Commuting Time
142. Public Transport
143. Unemployed People
144. Long-Term Unemployed
145. Female Youth Unemployed
146. Male Youth Unemployed

Income
147. Income Women
148. Income Men
149. Poorest Tenth
150. Richest Tenth
151. Poorest Twentieth
152. Richest Twentieth
153. Earning up-to-10
154. Earning 10-to-20
155. Earning 20-to-50
156. Earning 50-to-100
157. Earning 100-to-200
158. Earning over-200

Wealth
159. Wealth Year 1
160. Wealth Year 1500
161. Wealth Year 1900
162. Wealth Year 1960
163. Wealth Year 1990
164. Wealth Year 2015
165. R-and-D Expenditure
166. R-and-D Employees
167. Patents Granted
168. Royalty Fees
169. Absolute Wealth
170. Relative Wealth
171. Wealth Growth
172. Wealth Decline

Poverty
173. Human Development
174. Human Poverty
175. Development Increase
176. Development Decrease
177. Undernourished 1990
178. Undernourished 2000
179. Wretched Dollar
180. Absolute Poverty
181. Gender Empowerment
182. Children Underweight

Housing
183. Poor Sanitation
184. Improved Sanitation
185. Sewerage Sanitation
186. Poor Water
187. Urban Slums
188. Slum Growth
189. Urban Areas
190. Urban Growth
191. Households
192. Overcrowded Homes
193. Durable Dwellings
194. Housing Prices

Education
195. Youth Literacy
196. Adult Literacy
197. Female Youth Illiteracy
198. Female Adult Illiteracy
199. Primary Education
200. Secondary Education
201. Female Primary Education
202. Female Secondary Education
203. Tertiary Education
204. Female Tertiary Education
205. Science Research
206. Science Growth
207. Primary-Education Spending
208. Primary-Education Growth
209. Secondary-Education Spending
210. Secondary-Education Growth
211. Tertiary-Education Spending
212. Tertiary-Education Growth

Health
213. Public-Health Spending
214. Private-Health Spending
215. Midwives Working
216. Nurses Working
217. Pharmacists Working
218. Dentists Working
219. Physicians Working
220. Health-Service Quality
221. Hospital Beds
222. Affordable Drugs
223. Measles Immunisation
224. Tuberculosis Immunisation
225. Condom - Availability Women
226. Condom - Availability Men

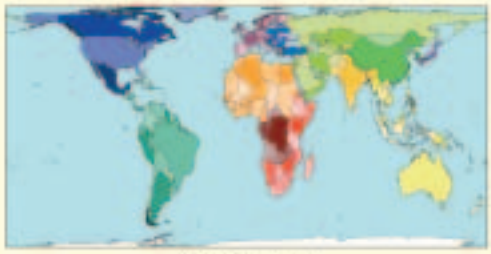
Disease
227. HIV Prevalence
228. Tuberculosis Cases
229. Malaria Cases
230. Malaria Deaths
231. Cholera Cases
232. Cholera Deaths
233. Childhood Diarrhoea
234. Blinding Disease
235. Polio Cases
236. Yellow Fever
237. Rabies Deaths
238. Influenza Prevalence
239. Diabetes Prevalence
240. Alcohol Consumption
241. Women Smoking
242. Men Smoking
243. Road Deaths
244. Years of Unhealthy Life

Disaster
245. Disasters Affected
246. Disasters Killed
247. Disasters Earthquakes
248. Disasters Volcanic
249. Disasters Droughts
250. Disasters Floods
251. Disasters Storms
252. Disasters Slides
253. Disasters Extreme Temperatures
254. Disasters Insect Infestation

Further sections include:
Death
Destruction
Violence
Pollution
Depletion
Communication
Action
Exploitation

Figure 2: Topics Worldmapper will be mapping.

Total Population



Land area

Technical notes

- Data source: United Nations Development Programme, 2004, Human Development Report.
- Population data is from 2002
- The population not included is estimated as 2 to 3 million (see Appendix map 2).
- See website for further information.

MOST AND FEWEST PE

Rank	Territory	Value	Rank
1	China	1295	191
2	India	1050	192
3	United States	291	193
4	Indonesia	217	194
5	Brazil	176	195
6	Pakistan	150	196
7	Russian Federation	144	197
8	Bangladesh	144	198
9	Japan	128	199
10	Nigeria	121	200

millions

"Out of every 100 persons added to the population in t

The University Of Sheffield. The Leverhulme Trust Geographical Association
Produced by the SASI group (Sheffield) and Mark Newman (Michigan)

In Spring 2000 world population estimates reached 6 billion; that is 6 thousand million. The distribution of the earth's population is shown in this map.

India, China and Japan appear large on the map because they have large populations. Panama, Namibia and Guinea-Bissau have small populations so are barely visible on the map.

Population is very weakly related to land area. However, Sudan, which is geographically the largest country in Africa, has a smaller population than Nigeria, Egypt, Ethiopia, Democratic Republic of Congo, South Africa or Tanzania.

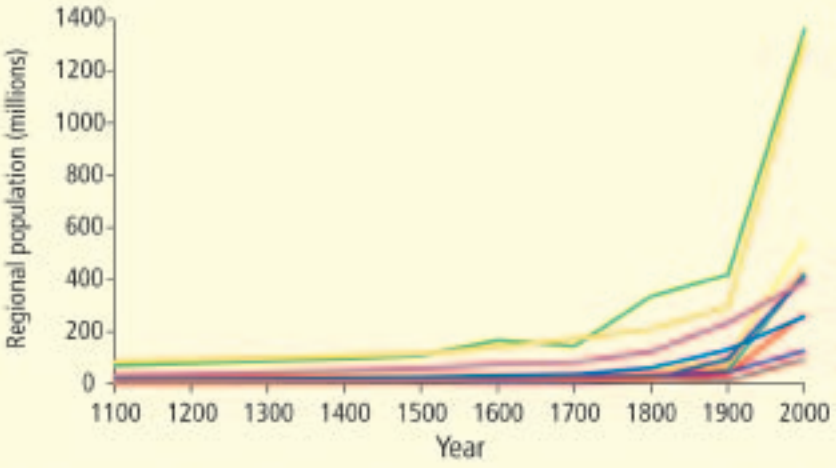
The size of each territory shows the relative propotion of the world's population living there.

EOPLE

Territory	Value
Saint Kitts & Nevis	42
Monaco	34
Liechtenstein	33
San Marino	27
Palau	20
Cook Islands	18
Nauru	13
Tuvalu	10
Niue	2
Holy See	1

thousands

WORLD POPULATION BY REGION



the coming decade, 97 will live in developing countries."

Hania Zlotnik, 2005

Map 002

Central Africa

Angola	13.2
Burundi	6.6
Central African Republic	3.8
Congo	3.6
Democratic Republic of Congo	51.2
Equatorial Guinea	0.5
Gabon	1.3
Rwanda	8.3
Sao Tome & Principe	0.2
Zambia	10.7

Southeastern Africa

Botswana	1.8
Comoros	0.7
Djibouti	0.7
Eritrea	4.0
Ethiopia	69.0
Kenya	31.5
Lesotho	1.8
Madagascar	16.9
Malawi	11.9
Mauritius	1.2
Mozambique	18.5
Namibia	2.0
Seychelles	0.1
Somalia	9.5
South Africa	44.8
Swaziland	1.1
Uganda	25.0
United Republic of Tanzania	36.3
Zimbabwe	12.8

Northern Africa

Algeria	31.3
Benin	6.6
Burkina Faso	12.0
Cameroon	15.7
Cape Verde	0.5
Chad	8.3
Cote d'Ivoire	16.4
Egypt	70.5
Gambia	1.4
Ghana	20.5
Guinea	8.4
Guinea-Bissau	1.4
Liberia	3.2
Libyan Arab Jamahiriya	5.4
Mali	12.6
Mauritania	2.8
Morocco	30.1
Niger	11.5
Nigeria	120.9
Senegal	9.9
Sierra Leone	4.8
Sudan	32.9
Togo	4.8
Tunisia	9.7
Western Sahara	0.3

Southern Asia

Bangladesh	143.8
Bhutan	2.2
India	1049.5
Maldives	0.3
Nepal	24.6
Pakistan	149.9
Sri Lanka	18.9

Asia Pacific

Australia	19.5
Brunei Darussalam	0.3
Cambodia	13.8
Cook Islands	0.02
Fed. States of Micronesia	0.11
Fiji	0.8
Indonesia	217.1
Kiribati	0.09
Lao People's Dem. Republic	5.5
Malaysia	24.0
Marshall Islands	0.05
Myanmar	48.9
Nauru	0.01
New Zealand	3.8
Niue	0.002
Palau	0.02
Papua New Guinea	5.6
Philippines	78.6
Samoa	0.2
Singapore	4.2
Solomon Islands	0.5
Thailand	62.2
Timor-Leste	0.7
Tonga	0.1
Tuvalu	0.01
Vanuatu	0.2
Viet Nam	80.3

Middle East

Afghanistan	22.9
Armenia	3.1
Azerbaijan	8.3
Bahrain	0.7
Gaza Strip & West Bank	3.4
Georgia	5.2
Iraq	24.5
Islamic Republic of Iran	68.1
Israel	6.3
Jordan	5.3
Kazakhstan	15.5
Kuwait	2.4
Kyrgyzstan	5.1
Lebanon	3.6
Oman	2.8
Qatar	0.6
Russian Federation	144.1
Saudi Arabia	23.5
Syrian Arab Republic	17.4
Tajikistan	6.2
Turkmenistan	4.8
United Arab Emirates	2.9
Uzbekistan	25.7
Yemen	19.3

Eastern Asia

China	1294.9
DPR Korea	22.5
Hong Kong (China)	7.0
Mongolia	2.6
Republic of Korea	47.4
Taiwan	21.0

South America

Antigua & Barbuda	0.1
Argentina	38.0
Barbados	0.3
Belize	0.3
Bolivia	8.6
Brazil	176.3
Chile	15.6
Colombia	43.5
Costa Rica	4.1
Cuba	11.3
Dominica	0.1
Dominican Republic	8.6
Ecuador	12.8
El Salvador	6.4
Grenada	0.1
Guatemala	12.0
Guyana	0.8
Haiti	8.2
Honduras	6.8
Jamaica	2.6
Nicaragua	5.3
Panama	3.1
Paraguay	5.7
Peru	26.8
Puerto Rico	3.9
Saint Kitts & Nevis	0.04
Saint Lucia	0.1
St Vincent & The Grenadines	0.1
Suriname	0.4
Trinidad & Tobago	1.3
Uruguay	3.4
Venezuela	25.2

Eastern Europe

Albania	3.1
Belarus	9.9
Bosnia Herzegovina	4.1
Bulgaria	8.0
Croatia	4.4
Cyprus	0.8
Czech Republic	10.0
Estonia	1.3
Hungary	9.9
Latvia	2.3
Lithuania	3.5
Macedonia FYR	2.0
Poland	38.6
Republic of Moldova	4.3
Romania	22.4
Serbia & Montenegro	10.5
Slovakia	5.4
Slovenia	2.0
Turkey	70.3
Ukraine	48.9

North America

Bahamas	0.3
Canada	31.3
Greenland	0.1
Mexico	102.0
United States	291.0

Western Europe

Andorra	0.01
Austria	8.1
Belgium	10.3
Denmark	5.4
Finland	5.2
France	59.8
Germany	82.4
Greece	11.0
Holy See	0.001
Iceland	0.3
Ireland	3.9
Italy	57.5
Liechtenstein	0.03
Luxembourg	0.4
Malta	0.4
Monaco	0.03
Netherlands	16.1
Norway	4.5
Portugal	10.0
San Marino	0.03
Spain	41.0
Sweden	8.9
Switzerland	7.2
United Kingdom	59.1

Japan

Japan	127.5

Figure 3: World population (millions).

seen less as a 'slowness' on the part of 'developing countries', and more as a result of the unequal relationships between the peoples living in each territory and within territories? The maps that are particularly relevant to what is currently termed 'development' are available under the following sections of the Worldmapper website: trade; income; wealth; poverty; housing; education; health; and exploitation.

The project

There are 100 posters up on the Worldmapper website as we type. By the time you read this there should be 150 posters there, and by the end of this year some 365. All are free to print and use in teaching. Each poster is accompanied by notes which explain where the data came from, how it has been used and how missing values have been estimated. An Excel file containing the data for each poster and showing how that data has been derived is also available on the website.

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Classroom activities using Worldmapper

I would be very interested to know how the exciting new maps found on Worldmapper are used in the classroom. If you have used Worldmapper in your lessons successfully and would like to share your ideas, I would like to hear from you. There is no need for you to write a whole article for *Teaching Geography*. I would like to publish, in the spring issue of *Teaching Geography*, a selection of your ideas – under a title of 'Ten ways of using Worldmapper'. I am particularly interested in activities that involve students in using Worldmapper to investigate topics and issues for themselves. A few paragraphs will suffice, but please include the curriculum context in which you used Worldmapper (year group, topic or issue being studied), what the students had to do with Worldmapper and what you think they learned through doing this in terms of knowledge, understanding, skills and values. Please write this so that other teachers could use or adapt your own ideas easily. You may want to include a worksheet.
If I am inundated with good ideas I will publish a further selection of your ideas in later issues of *Teaching Geography*. E-mail your ideas before the end of September to: margaret.roberts20@btinternet.com

Margaret Roberts, Editor

References and further information

Dorling, D. and Barford, A. (2006) 'What's wrong with this Picture?', *New Scientist*, 6 May, pp. 37-9.

Gastner, M. T. and Newman, M. E. J. (2004) *Diffusion-based method for producing density equalizing maps*. http://aps.arxiv.org/abs/physics/0401102/ or via the Worldmapper website.

Peters Projection (includes teacher resources) www.petersmap.com

United Nations www.un.org

World Health Organisation www.who.int

Worldmapper www.worldmapper.org

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