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Population statistics: navigating the numbers that affect our future



David Leece summarises and discusses an address¹ to the Institute on 29 November 2011 by

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A nation-state's population size is a key strategic determinant and driver. David Leece discusses statistics presented by Rod Tiffen on population size and trends for the world and Australia, drawing out economic, social and strategic implications. Population is an issue that Australia can no longer ignore.

Key words: population trends; global; Australia; strategic implications

The global population is increasing at its fastest rate in human history and, at 7 billion, is now the largest it has ever been. This increase, however, is not spread uniformly. The greatest growth is in the developing nations, especially in Asia. In contrast, in some nation-states, primarily in the developed world, population size is actually in decline. The demographic factors of population size, trends in population size and population age distribution can have profound strategic implications and need to be taken into account when making strategic assessments and judgements.

This paper reviews key population statistics for the world and Australia; and assesses their implications for our future. Professor Tiffen, however, emphasises that he is not a demographer, an ecologist or an economist. Rather, he is a statistical jack-of-all-trades, who focuses primarily on the media and politics, especially in Australia and Asia. Accordingly, in his presentation, he approached the issue of population via a series of statistical tables. Nine of these tables are reproduced herein, with commentary on them by David Leece.

Population Trends - World

It took thousands of years for the human population to reach 1 billion, the size of the population at the start of the industrial revolution (Table 1). At the time of Christ, it was only 400 million. Since the industrial revolution, however, it has grown exponentially – indeed, it has grown three-fold since Tiffen's birth in 1950. An extra billion people are now added to the human population every 12 to 13 years. It reached 7 billion in November 2011 and is projected to reach 9 billion by 2054, although the rate of growth is

expected to be slowing by then as living standards improve in the developing world. Nevertheless, it is still likely to increase to 10 billion within 100 years.

Table 1: World population milestones (Tiffen and Gittens 2009)

World population	Year reached
1 Billion	1804
2 Billion	1927
3 Billion	1960
4 Billion	1974
5 Billion	1987
6 Billion	1999
7 Billion	2011
8 Billion	2028 (projected)
9 Billion	2054 (projected)

Food production

Tiffen notes that we are moving into a high-risk unknown, as it remains uncertain whether the planet can sustain such a high human population. Thomas Malthus, the late 18th century economist in his seminal work on population (Malthus 1798), predicted that population growth would outpace food growth unless the former was constrained by disease, warfare, natural disasters and the like. Since then human ingenuity, especially the industrial revolution and the spin offs that it brought for agriculture through scientific research and technological innovation, have served to keep growth in food production ahead of population growth at a global scale, but it has been a near-run thing aided by global disease pandemics (e.g. the 1919 influenza epidemic) and the major regional and world wars of the 19th and 20th centuries. Nevertheless, there have been many instances widespread famine at a local and regional scale, such as the Irish potato famine of 1845 to 1852, which resulted in global emigration of Irish people on an unprecedented scale.

¹Professor Tiffen was unable to prepare a paper for *United Service*. In his address, he spoke extemporaneously to 10 tables drawn from Tiffen and Gittens (2009), nine of which are reproduced herein. David Leece, editor of *United Service*, prepared this précis of the address from notes he took at it. Except where otherwise indicated, opinions expressed are those of the editor.

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Heretofore, we have largely been able to increase food production by bringing more arable land into cultivation and by intensifying use of the land through irrigation of crops and pastures. This is no longer possible, as we have reached the limit of arable land – indeed, it is now shrinking as more and more of it succumbs to degradation through the use of unsustainable cropping practices – and there is fierce competition for available water resources on a global scale. The challenge for agricultural science is now to produce more food and produce it sustainably, from less land and with less water and other resources. It may not be achievable.

Over-exploitation of the food resources of the sea is equally of concern, given the reliance of much of the world on fish protein, and there have been total collapses of many commercially-fished populations since fishing on an industrial scale became a global industry. Nevertheless, wild-fish harvesting levels have increased 20-fold in recent years. The Canadian navy recently was forced to fire on Spanish fishers who were violating its territorial waters, which is indicative of the way such disputes about natural resources can quickly escalate into major security issues. Fish farming is a partial answer to this dilemma and now constitutes 40 per cent of the global catch.

Some experts estimate that we have reached the peak in global oil exploitation and oil production will soon commence declining, yet demand for oil is still going up. Not only is oil still vital for secondary industry and transportation, it is a vital ingredient in modern agriculture, including in the manufacture of agricultural chemicals. Tiffen notes that whether or not ‘peak oil’ is upon us, the day when we run out of oil is still a long way off, but the oil price inevitably will go up in the short term.

Climate change

These food production dilemmas are already being exacerbated by global climate change induced by rising global temperatures since the industrial revolution 200 years ago. Whether or not this change is primarily human induced is still debated in some political quarters, although the argument seems long settled among climate scientists. Where there is uncertainty is in the projections about the extent of future climate change as the models relied on include estimates of parameters that have a broad range of realistic possibilities.

Addressing this challenge, other than by learning to adapt to climate change, is proving extraordinarily difficult for the nations of the world. In the 15 years from 1990 to 2005, the emission of greenhouse gases globally increased by 25 per cent (Table 2). The main producers of greenhouse gases in 2005 were China and the United States which accounted for one-third of global production, so any global agreement on carbon emission reduction must include them. Developing

Table 2: Global greenhouse gas emissions (Tiffen and Gittens 2009)
Data are tonnes of carbon dioxide equivalents (CO₂-e) per year

Country	Total 2005	Tonnes per capita	Change since 1990	Rate of change (annual %)
China	7485.3	5.7	3614.8	4.5
United States	7424.3	25.0	1115.5	1.1
India	2393.6	2.2	810.0	2.8
Russia	2200.7	15.4	-843.2	-2.1
Brazil	1856.5	9.9	660.7	3.0
Japan	1432.0	11.2	193.9	1.0
Germany	990.8	12.0	-186.5	-1.1
Indonesia	859.4	3.9	242.2	2.2
Canada	745.8	23.1	154.4	1.6
Mexico	696.0	6.7	180.6	2.0
United Kingdom	666.9	11.1	-41.9	-0.4
Australia	634.1	30.9	156.2	1.9
Iran	593.9	8.6	276.5	4.3
Italy	570.4	9.7	66.5	0.8
Korea	557.8	11.6	267.8	4.5
France	543.2	8.6	15.5	0.2
Netherlands	220.1	13.5	16.2	0.5
Belgium	145.4	13.8	8.4	0.4
New Zealand	94.3	23.0	10.5	0.8
Austria	93.4	11.4	17.8	1.4
Finland	68.8	13.2	-1.5	-0.1
Sweden	68.1	7.6	-3.4	-0.3
Denmark	63.0	11.7	-4.6	-0.5
Ireland	62.9	15.3	6.9	0.8
Norway	57.0	12.4	8.7	1.1
Switzerland	55.6	7.4	3.2	0.4
World 2005	43,475.9			
World 1990	34,391.7			

economies are prominent in Table 2, but are insisting that, in any global agreement, the historic legacy of emissions by the industrialised western powers be taken into account and that the developing economies be permitted to develop as the western powers did. Australia, although a relatively small emitter in gross tonnage terms (1.4 per cent; 12th largest emitter), was the clear world leader in tonnes per capita (another equity issue) and consequently is expected to take a lead in the global resolution of the issue.

While Tiffen makes no claim to expertise on global warming, he notes that food production, water supply, petrol and oil availability, and aspirations for a higher standard of living globally, will all be affected by the warming itself and potential remedial measures.

Relative standards of living

Income per capita (Table 3) and economic growth (Table 4), when compared among nation-states, are measures of relative standards of living. The world's richest nations, the so-called D18, which include Australia, enjoy income per capita more than three times the world mean and 15 times that of Africa. Economic growth, however, tells a different story. East Asia is growing at three times that of the D18, whereas Africa is experiencing negative growth (caused in part by the HIV/AIDS epidemic), as are several other non-African nations (Tajikistan, United Arab Emirates, Haiti and Brunei). As most peoples aspire to higher living standards, this becomes a significant equity issue.

Table 3: Global income per capita in 2005

(Tiffen and Gittens 2009)

Data are gross domestic product per capita in US\$PPP '000s

Region	Mean	Poorest		Richest		Other
World	9.5					
D18	31.8	NZ	24.9	USA	41.8	Australia 35.5
East Europe	9.5	Tajikistan	1.3	Slovenia	22.2	Russia 10.8
Latin America	8.4	Bolivia	2.8	Bahamas	18.4	Brazil 8.4
Arab States	6.7	Yemen	0.9	Qatar	27.7	Egypt 4.3
East Asia	6.6	Myanmar	1.0	Hong Kong	34.8	China 6.8
South Asia	3.4	Nepal	1.6	Sri Lanka	4.6	India 3.5
Africa	1.9	Malawi	0.6	Seychelles	16.1	South Africa 11.1

Note: PPP is purchasing power parity – data have been adjusted for equivalent purchasing power among the countries compared

Table 4: Global economic growth, 1975 – 2005

(Tiffen and Gittens 2009)

Data are mean annual growth rates (gross domestic product per capita %)

Region	Mean	Slowest		Fastest	
World	1.4				
D18	2.0	Switzerland	1.0	Ireland	4.5
East Europe	1.4	Tajikistan	-6.3	Poland	4.3
Latin America	0.7	Haiti	-2.2	Chile	3.9
Arab States	0.7	Emirates (UAE)	-2.6	Lebanon	3.2
East Asia	6.1	Brunei	-1.9	China	8.4
South Asia	2.6	Nepal	2.0	Bhutan	5.4
Africa	-0.5	Congo	-4.9	Equatorial Guinea	11.7

Population Trends – Australia

Some commentators say Australia's population is growing too slowly, especially given its ageing profile, and that this is inhibiting economic growth and has negative defence and security connotations. Certainly, our last prime minister, Kevin Rudd, said he believed 'in a big Australia' and proposed a population goal of 36 million by 2040. Others (*e.g.* Smith 2011), however, disagree, saying that Australia has already reached its peak in sustainable population, given that Australia is the world's driest inhabited continent; the population is largely confined to the coastline; and we have limited arable land, much of which has been seriously degraded since European settlement 200 years ago.

Life expectancy, aged dependency and fertility

Australians are now living longer than past generations did (Table 5), currently to 81 or 82, which is a wonderful success story. This is a consequence of making childbirth safer, eliminating infectious diseases, better nutrition, cardiovascular improvements and better treatment of cancer. Death through misadventure is the main cause of death among younger Australians now, drinking- and smoking-related deaths have declined but are still problems, and obesity has become a major problem and is increasing.

The dependency of those in retirement on the support of those in work, however, has increased (Table 6) as a consequence of the greater longevity (Table 5) and a decline in fertility (Table 7), although the problem in Australia is less acute than that in Europe or Japan and is similar to that in New Zealand and the United States.

The average number of children borne by a woman during her lifetime in Australia has declined from 3.4 in 1900 to 1.8 now (Table 7), which is below the natural replacement level. It is similar to the average of D18 nations which is 1.7. The United States tops the D18 list at 2.1 and Germany, Italy and Japan are at the bottom of it at 1.3. The biggest decline in Australian fertility has occurred since 1970, a period of great affluence; whereas previous declines have been caused by world wars and the great depression of the 1930s. Tiffen considers that it would be better if Australian women could have more children to bring the fertility rate closer to the traditional rate of 2.1 children per woman.

Table 5: Life Expectancy 1900 – 2000

(Tiffen and Gittens 2009)

Data are life expectancies at birth in years

Country	1900	1950	2000
Japan	44.5	63.9	80.7
Australia	56.5	69.6	79.8
... (next 13)			
United States	49.3	69.0	77.1
Ireland	49.5	66.9	76.8
Denmark	54.6	71.0	76.5
D18 Mean	50.3	68.5	78.3

Table 6: Aged dependency ratio (Tiffen and Gittens 2009)*Data are people aged 65 and over as a percentage of those aged 15-64*

Country	1980	2000	2030
Switzerland	20.8	23.8	53.0
Japan	13.4	25.2	51.7
Italy	20.4	26.7	47.3
... (next 11)			
New Zealand	15.7	17.9	33.7
United States	16.9	18.6	32.9
Australia	14.7	18.2	32.3
Ireland	18.3	16.9	26.3
D18 Mean	19.7	22.4	41.2

Table 7: Fertility rates (Tiffen and Gittens 2009)*Data are the average number of children borne by a woman during her lifetime at each year*

Country	1900	1950	1970	2005
United States	3.8	3.4	2.5	2.1
New Zealand	..	3.5	3.3	2.0
France	2.8	2.7	2.5	1.9
Ireland	..	3.3	3.9	1.9
Australia	3.4	3.2	2.9	1.8
... (next 10)				
Germany	4.8	2.2	2.0	1.3
Italy	4.4	2.3	2.4	1.3
Japan	5.2	3.6	2.1	1.3
D18 Mean	4.1	2.8	2.4	1.7

Immigration

Our population would be half its present size had it not been for immigration following the Irish potato famine and during the gold rushes of the 19th century and the post-war bursts of European immigration following the World War II and Asian immigration following the Vietnam War. In 2004, Australia added 11.32 persons per 1000 of population, of which 6.08 were due to natural increase and 5.24 (46 per cent) were due to net immigration (Table 8). In contrast, Japan added only 1.38 persons per 1000 of population and Germany had a net decline of 0.35 per 1000.

In 2005, 23 per cent of Australians were foreign born, compared to a D18 mean of 11.4 per cent and a Japanese figure of 1.2 per cent (Table 9).

Table 8: Components of population growth in 2004 (Tiffen and Gittens 2009)
Data are numbers added per thousand persons in the population, 2004

Country	Total	Natural increase	Net migration
Ireland	19.91	8.36	11.55
Australia	11.32	6.08	5.24
New Zealand	11.08	7.39	3.69
Italy	9.87	0.28	9.59
United States	9.55	5.88	3.67
Canada	9.45	3.25	6.20
Japan	1.38	0.85	0.53
Germany	-0.35	-1.36	1.01
D18 Mean	7.03	3.05	3.98

Table 9: Scale of immigration (Tiffen and Gittens 2009)
Data are the percentage of the population in 2005

Country	Total Foreign Born	Foreign Born Nationals	Foreign Born Foreigners	Native Born Foreigners
Australia	23.0	15.7	7.2	0.2
Switzerland	22.4	6.5	15.8	4.8
New Zealand	19.5	-	-	-
Canada	19.3	14.0	5.3	-
Austria	12.5	5.1	7.4	1.4
... (next 12)				
Finland	2.5	1.0	1.5	0.2
Japan	1.2	-	1.2	-
D18 Mean	11.4	6.0	5.3	1.1

Population distribution

The increase in the Australian population, however, has not affected population distribution. Indeed, rather than seeing the outback populated, there has been a strong drift in population from inland Australia to the coastal cities and towns since World War II. Above 85 per cent of the Australian population now lives within 50 kilometres of the coast and Sydney contains some 20 per cent of the Australian population. If as predicted under present government policy settings, immigration leads to Australia's population growing to 36 million by

2040, Sydney is likely to have a population of 7 million. Tiffen observes that we will not see a populated Northern Territory as some commentators wistfully hope.

Historically, infrastructure planning and provision in Sydney have not kept pace with population growth. The result has been the dispersal of the population throughout the Sydney basin, over-reliance on private transport and unacceptable travel times.

Housing affordability has become at least as problematic also and is unlikely to improve in the foreseeable future. In 2008, it was six times the annual median income in Australia overall and seven times in the capital cities (Keene 2011). Tiffen notes that the effect has been the transfer of resources from the property-less to the propertied citizens.

Conclusion

While Australia has a well-managed economy, it has not had a sound debate on population, in part as a consequence of the political debate in Australia being too short term. Population is a significant strategic driver globally and it has major implications for government policy. Australia can no longer afford to ignore the issue.

The Presenter: Rod Tiffen, an emeritus professor in the Department of Government and International Relations in the University of Sydney, is one of Australia's leading scholars of the media. His teaching and research interests are in the mass media, Australian politics, comparative democratic politics, democratisation, and Australian relations with Asia. His most recent book is *How Australia Compares* (Tiffen and Gittens 2009). He is also author or editor of several other books and numerous articles on mass media and Australian politics. He was an observer of South Africa's media during that country's first democratic election, and has worked with the Australian Broadcasting Corporation reviewing Radio Australia. He currently holds an Australian Research Council Discovery Grant to analyse changes in the Australian press's political reporting over the last 50 years; and is working on the government's media inquiry.

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