Population Decline and Climate Change in the 21st Century

Achieving a Depopulation Dividend in the Asia-Pacific Region

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COP21·CMP11

JAPAN'S Shrinking Regions in the 21st Century

CONTEMPORARY RESPONSES TO DEPOPULATION AND SOCIOECONOMIC DECLINE

Peter Matanle and Anthony S. Rausch
with the Shrinking Regions Research Group

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On a finite planet, nothing physical can grow indefinitely. The more of us there are, the fewer resources there are for each of us — and for members of other species.

According to the World Wildlife Fund / Global Footprint Network *Living Planet Report*, we currently are collectively consuming the renewable resources of approximately 1.5 Earths.

Increasing populations are causing more and more competition for resources, services, housing and employment throughout the world. This is resulting in conflict and forced migration. Environmental degradation on land, sea and air meanwhile is accelerating.

Goals

Our strategy has the broad goals of:

- increasing awareness of the economic, social and environmental benefits of a smaller population, more sustainable lifestyles and environmental conservation;

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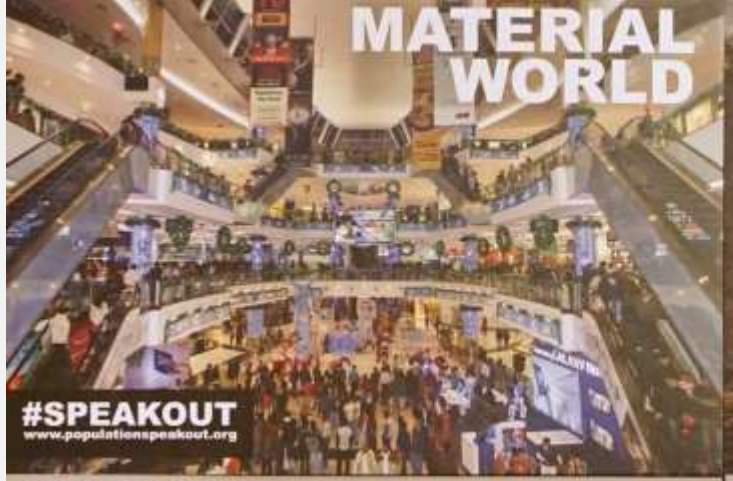
Our work

Strategy
Campaigns
Projects
Outreach
Awards
Alliances

Strategy documents

2015-18 Strategy
2015-16 Plan
2014-15 Plan

"We cannot confront the massive challenges of poverty, hunger, disease and environmental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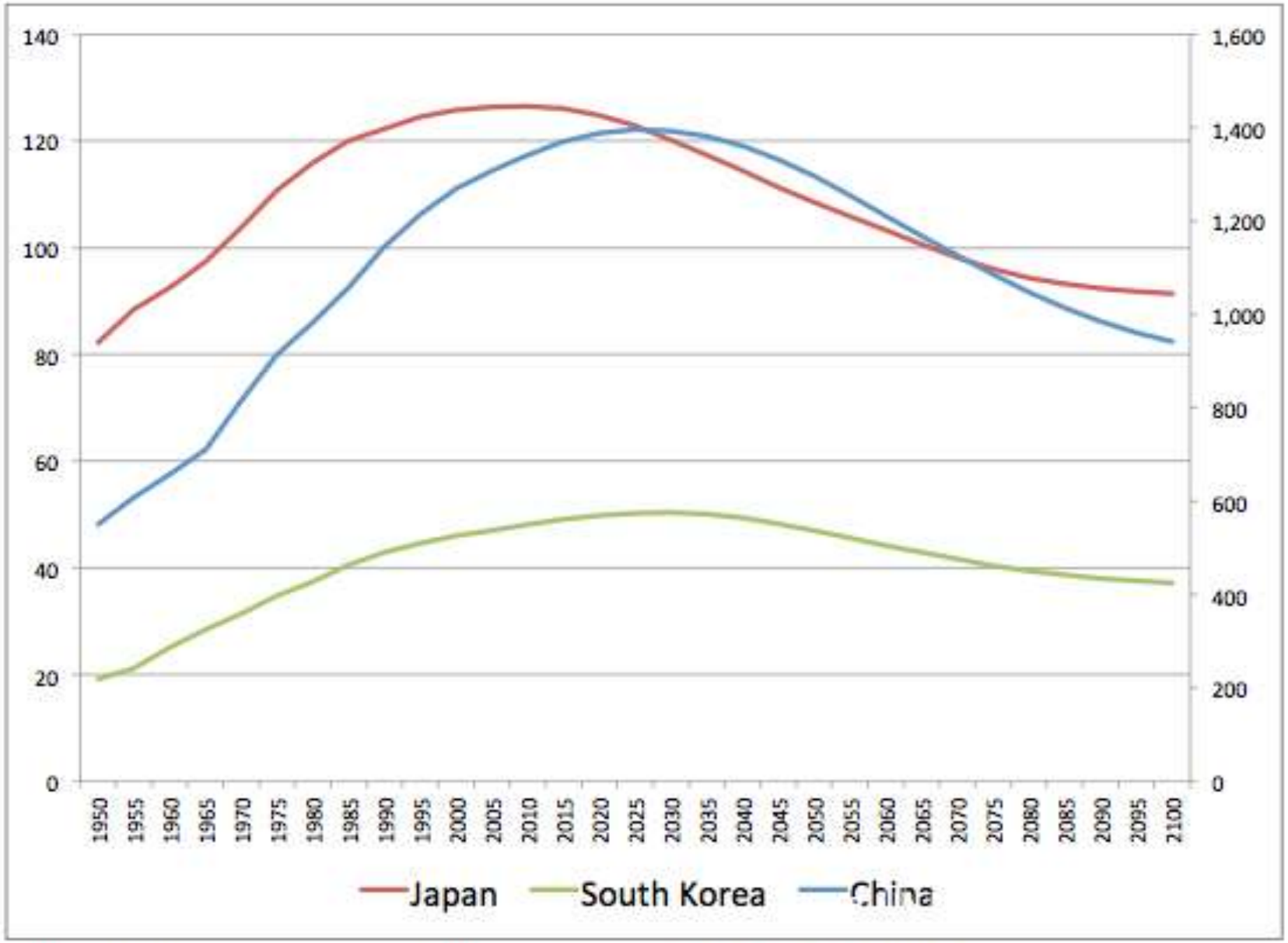
Growth and Shrinkage in East Asia



Source: UNPD, 2013. Note: Medium variant projections used throughout.

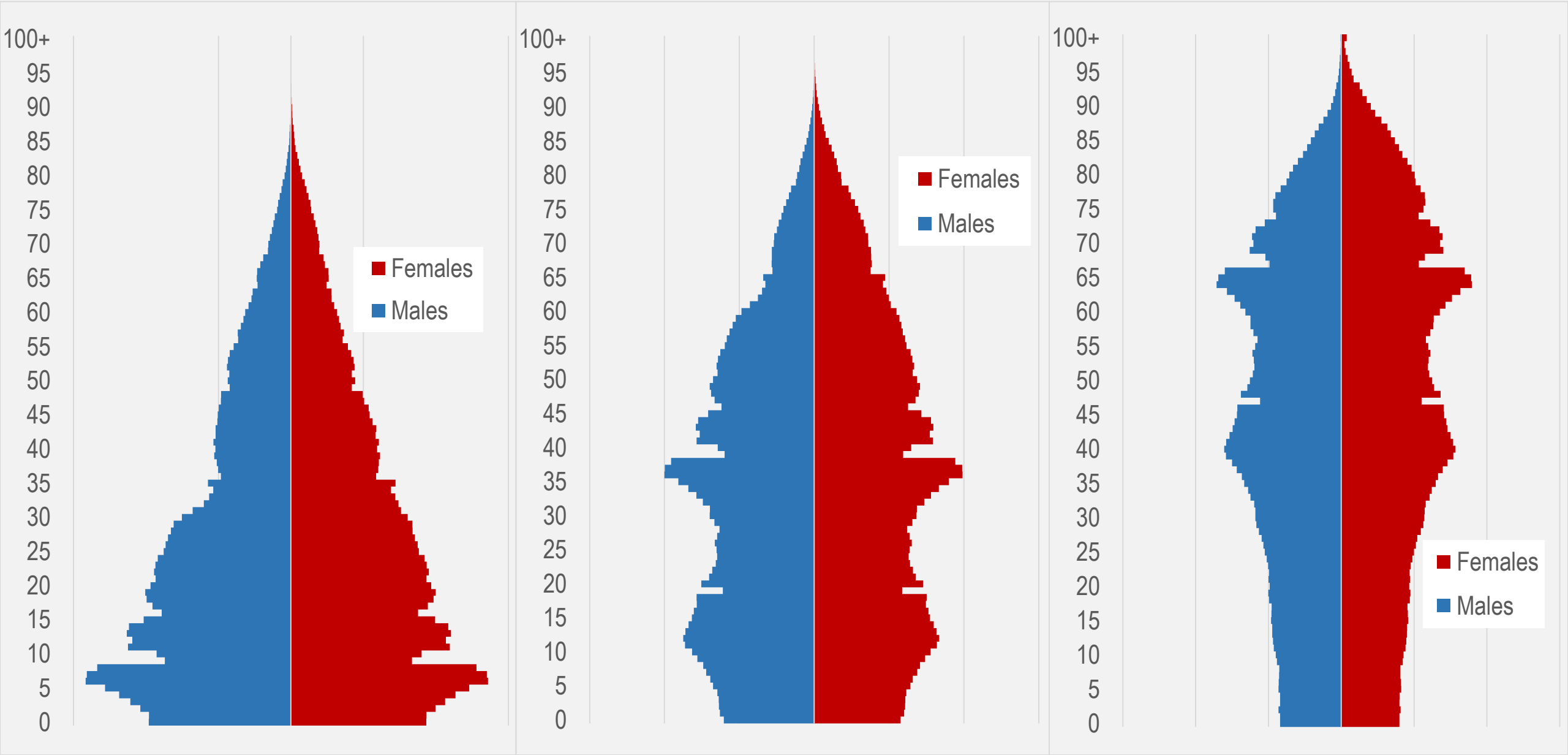
Many assume that depopulation will deliver some easy environmental gains.

Many assume that depopulation will deliver some easy environmental gains.

It's a seductive logic.

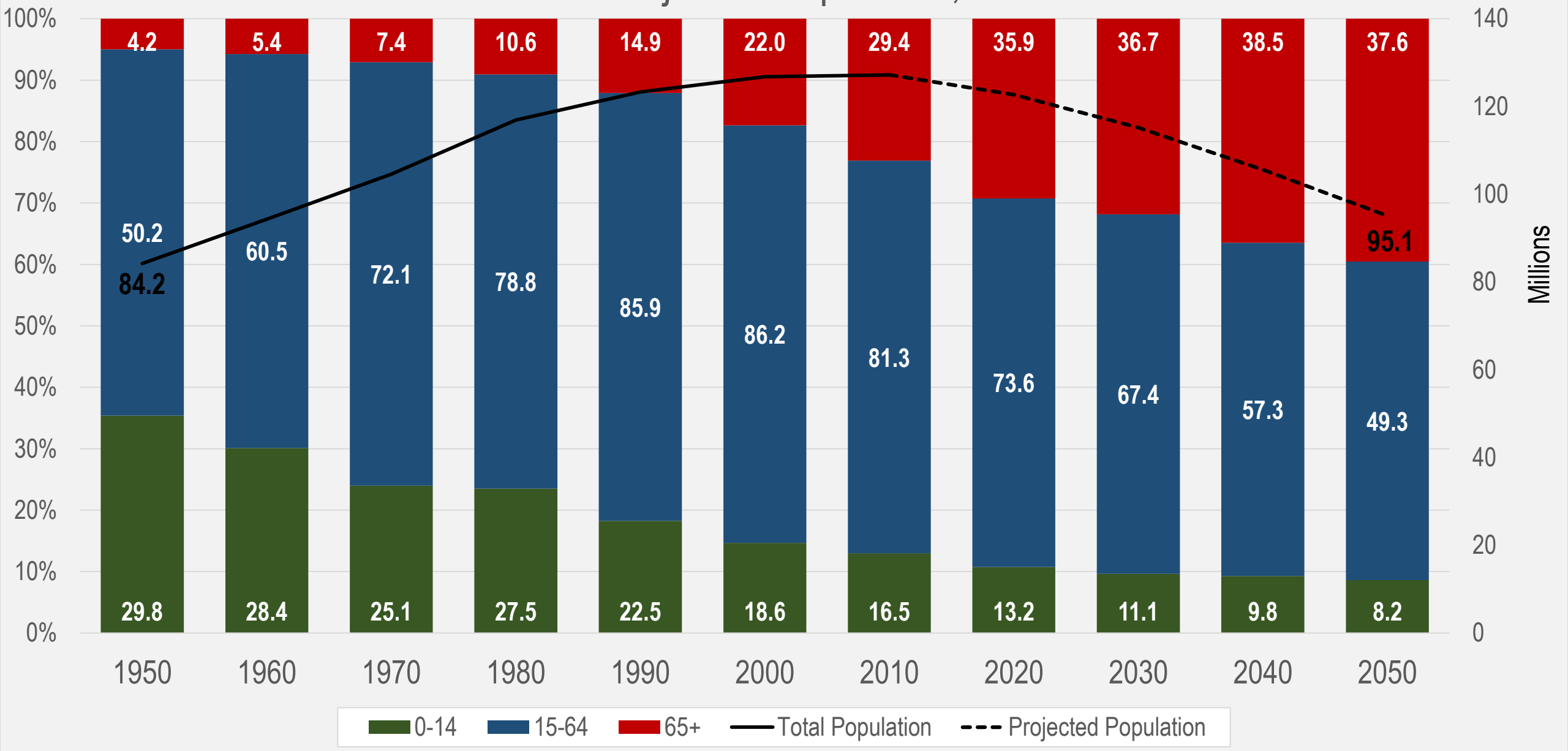
But is it true?

Ageing in Japan: 1955, 1985, and 2013



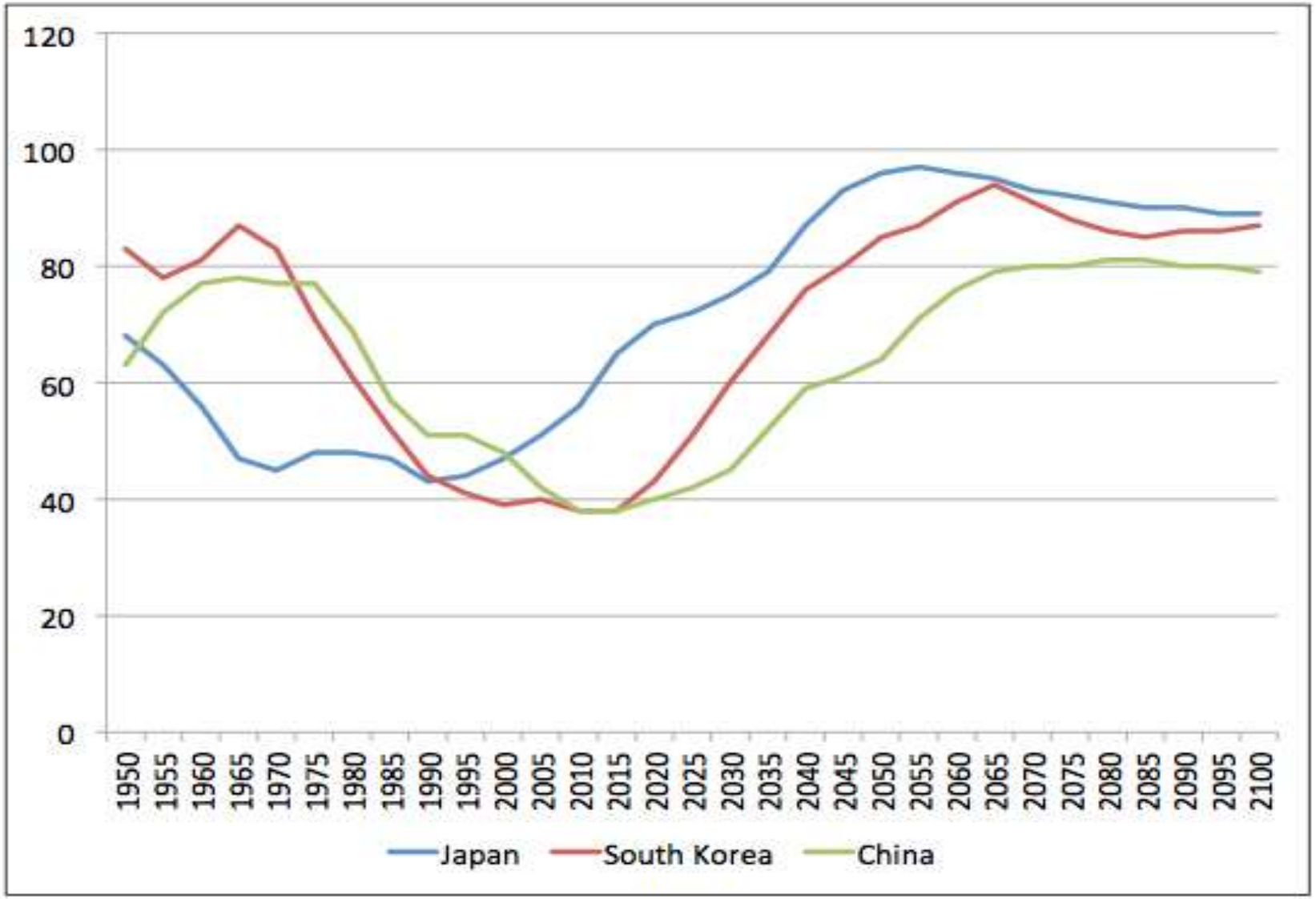
A Century of Growth and Shrinkage in Japan

Actual and Projected Population, 1950-2050



After the Demographic Dividend in East Asia

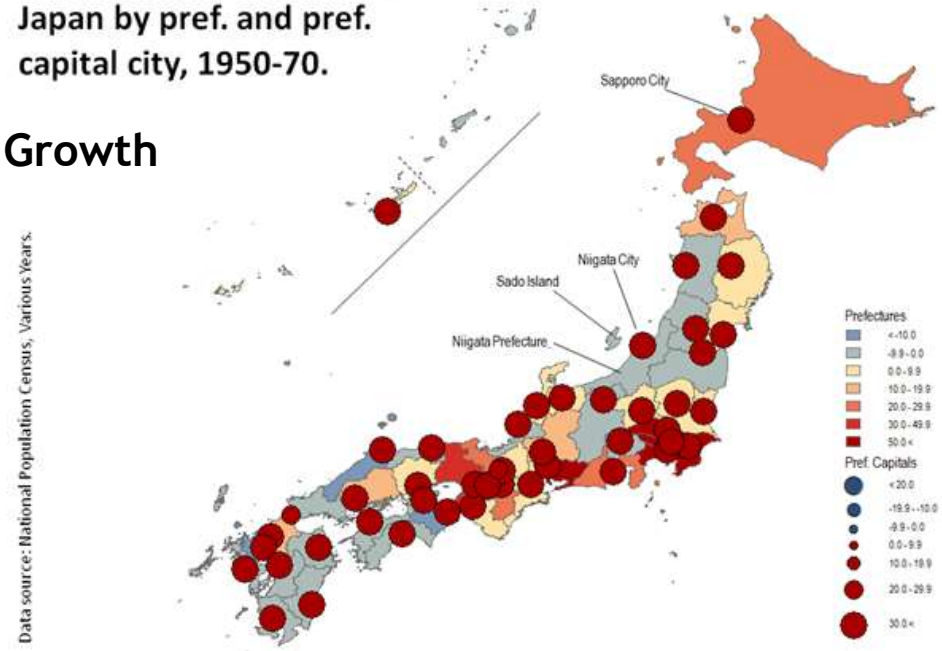
Child and Old-Age Dependency Ratios



Source: UNDP (2013); Medium variant projections.

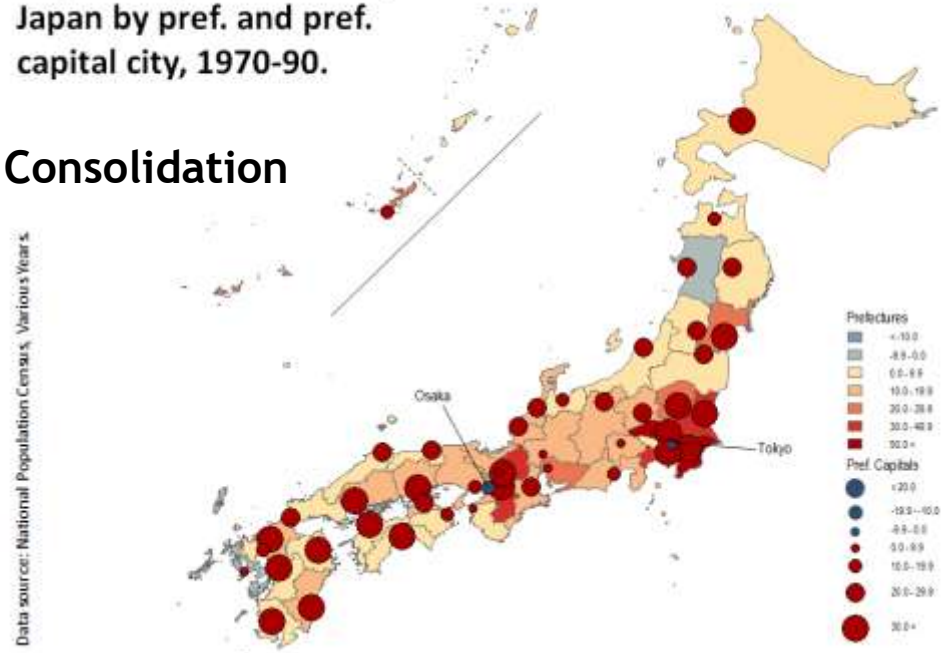
Map 1: Population change in Japan by pref. and pref. capital city, 1950-70.

Growth



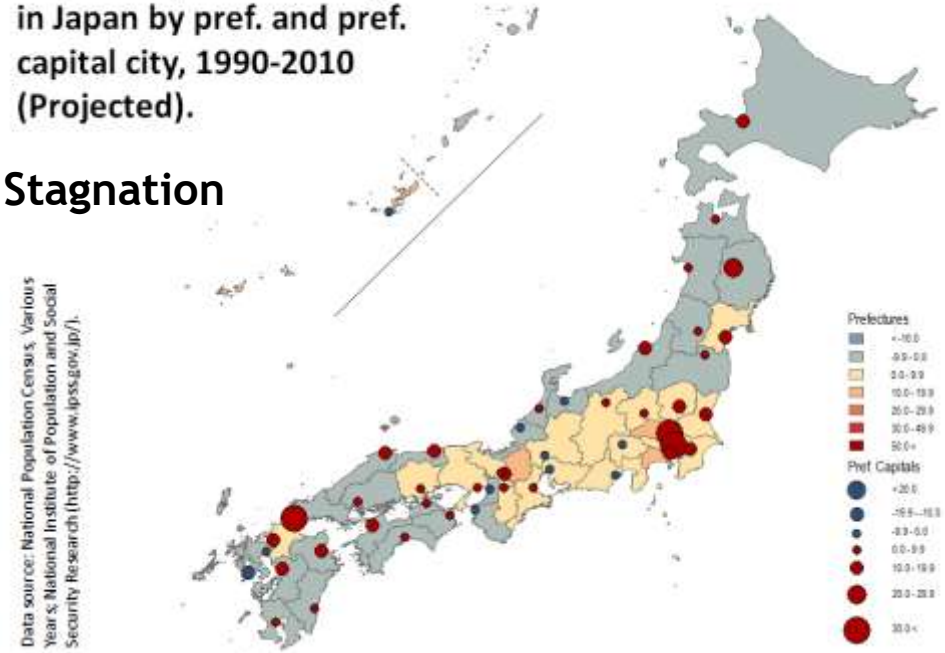
Map 2: Population change in Japan by pref. and pref. capital city, 1970-90.

Consolidation



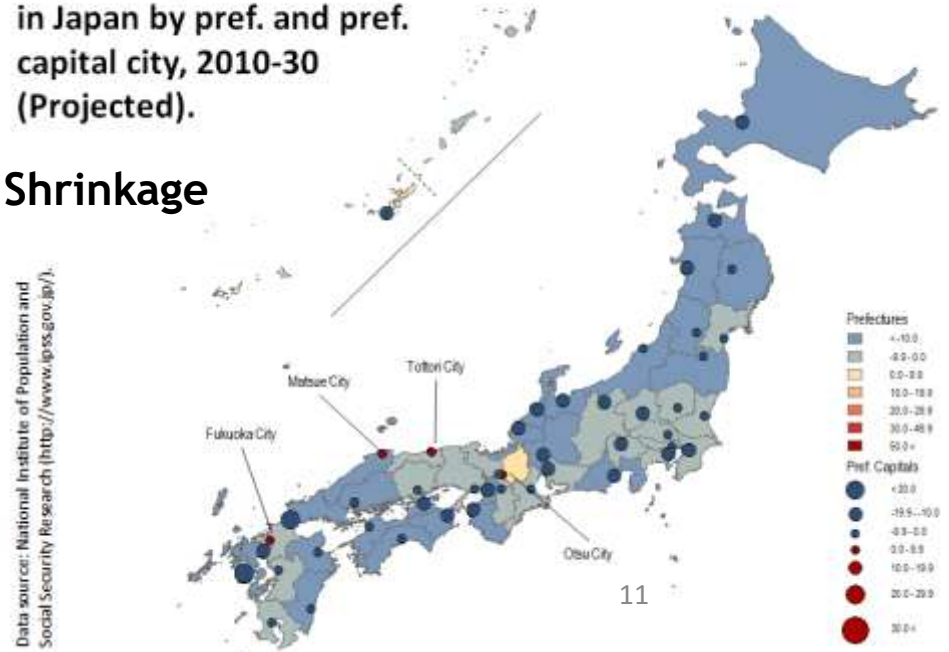
Map 3: Population change in Japan by pref. and pref. capital city, 1990-2010 (Projected).

Stagnation



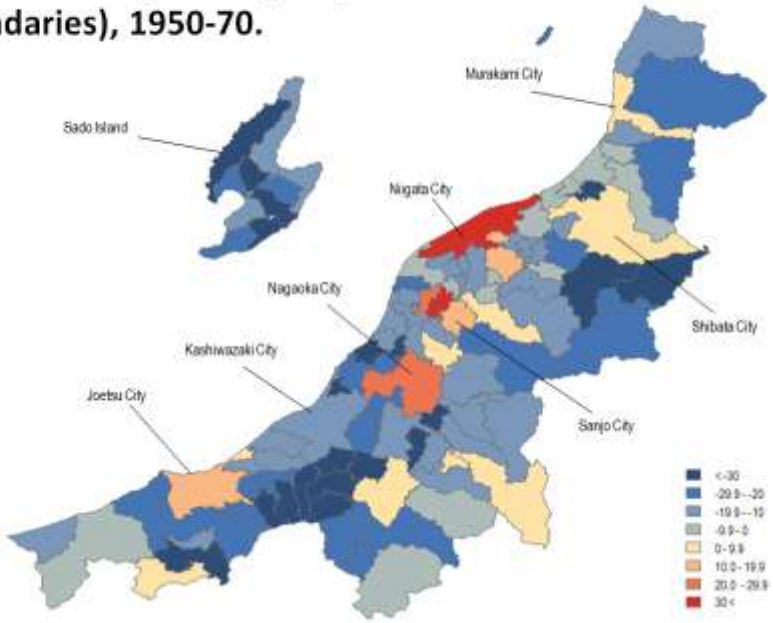
Map 4: Population change in Japan by pref. and pref. capital city, 2010-30 (Projected).

Shrinkage



Map 5: Population change in Niigata Prefecture by municipality (2000 boundaries), 1950-70.

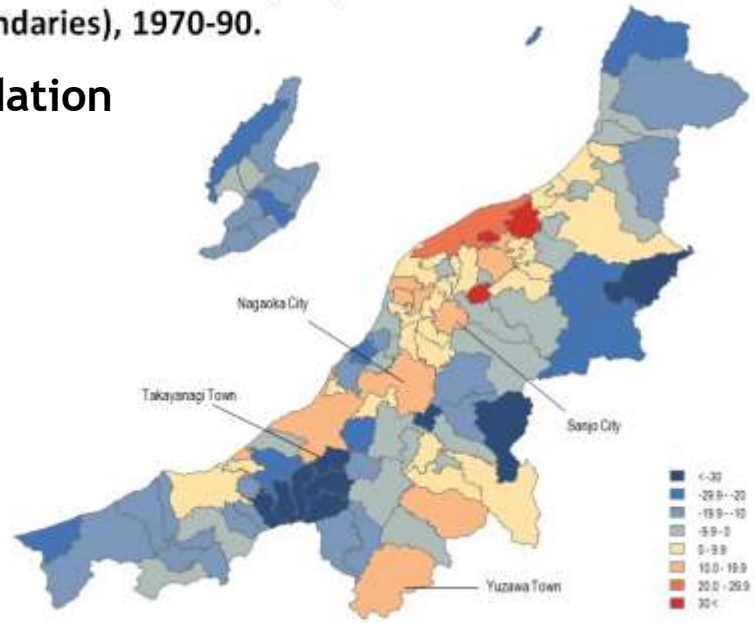
Growth



Data source: Niigata-ken, 2006; Niigata-ken Website, Various Pages(http://www.pref.niigata.lg.jp/); Higashide, 2008.

Map 6: Population change in Niigata Prefecture by Municipality (2000 boundaries), 1970-90.

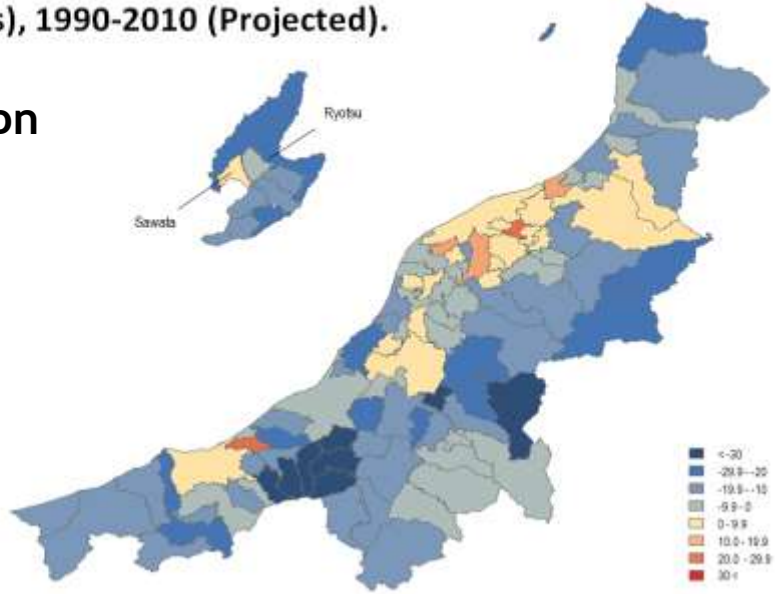
Consolidation



Data source : Niigata-ken, 2006; Niigata-ken Website, Various Pages(http://www.pref.niigata.lg.jp/); Higashide, 2008.

Map 7: Population change in Niigata Prefecturevby municipality (2000 boundaries), 1990-2010 (Projected).

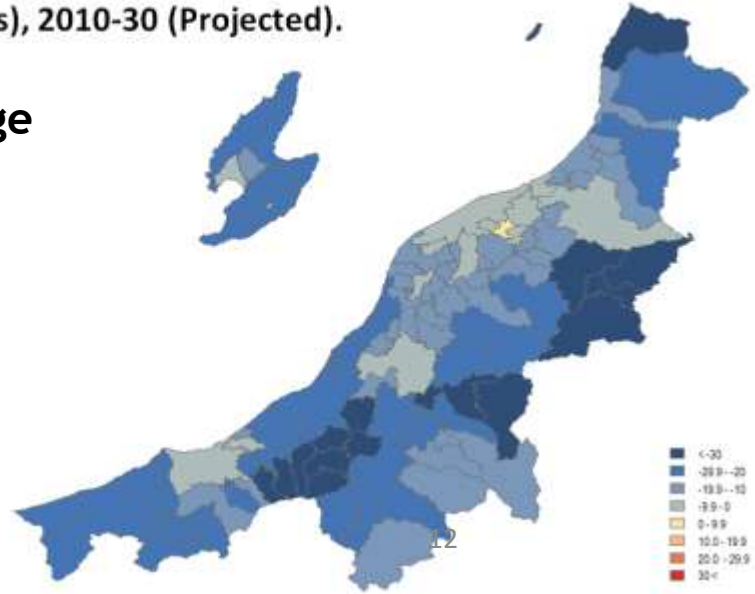
Stagnation



Data source: Niigata-ken, 2006; Niigata-ken Website, Various Pages(http://www.pref.niigata.lg.jp/); Higashide, 2008; National institute of Population and Social Security Research (http://www.ipss.gov.jp/).

Map 8: Population change in Niigata Prefecture by municipality (2000 boundaries), 2010-30 (Projected).

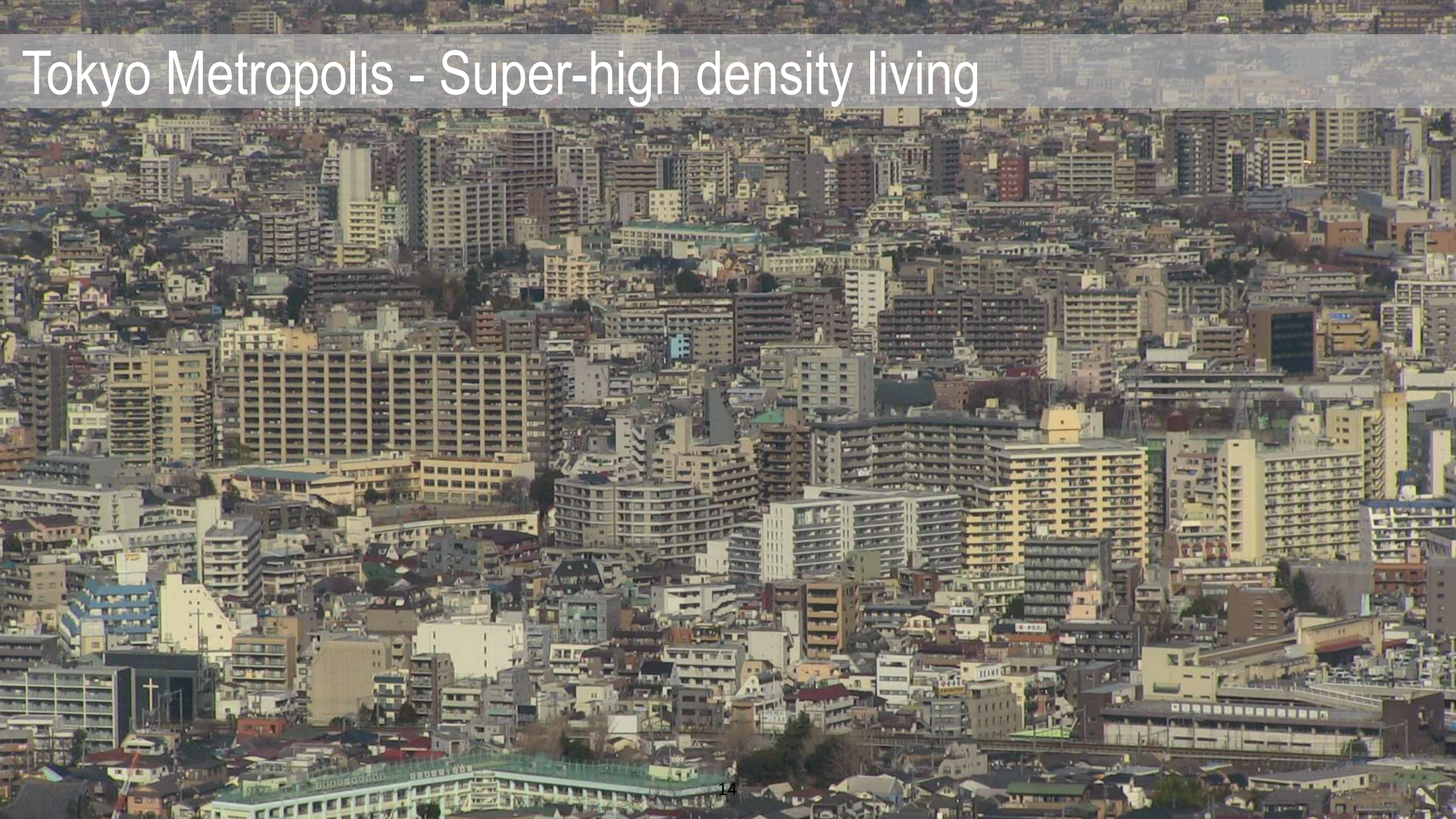
Shrinkage



Data source: National institute of Population and Social Security Research (http://www.ipss.gov.jp/).

Tokyo Metropolis - Massive-scale urbanization

Tokyo Metropolis - Super-high density living



Tokyo Metropolis - High-rise multi-use urban functions

Tokyo Metropolis - Sophisticated high-cost infrastructure

Rural Japan - Abandoned homes

Rural Japan - Abandoned farmland

Rural Japan - Disused and decaying infrastructure

Rural Japan - Collapsed industries

Rural Japan - Ghost towns

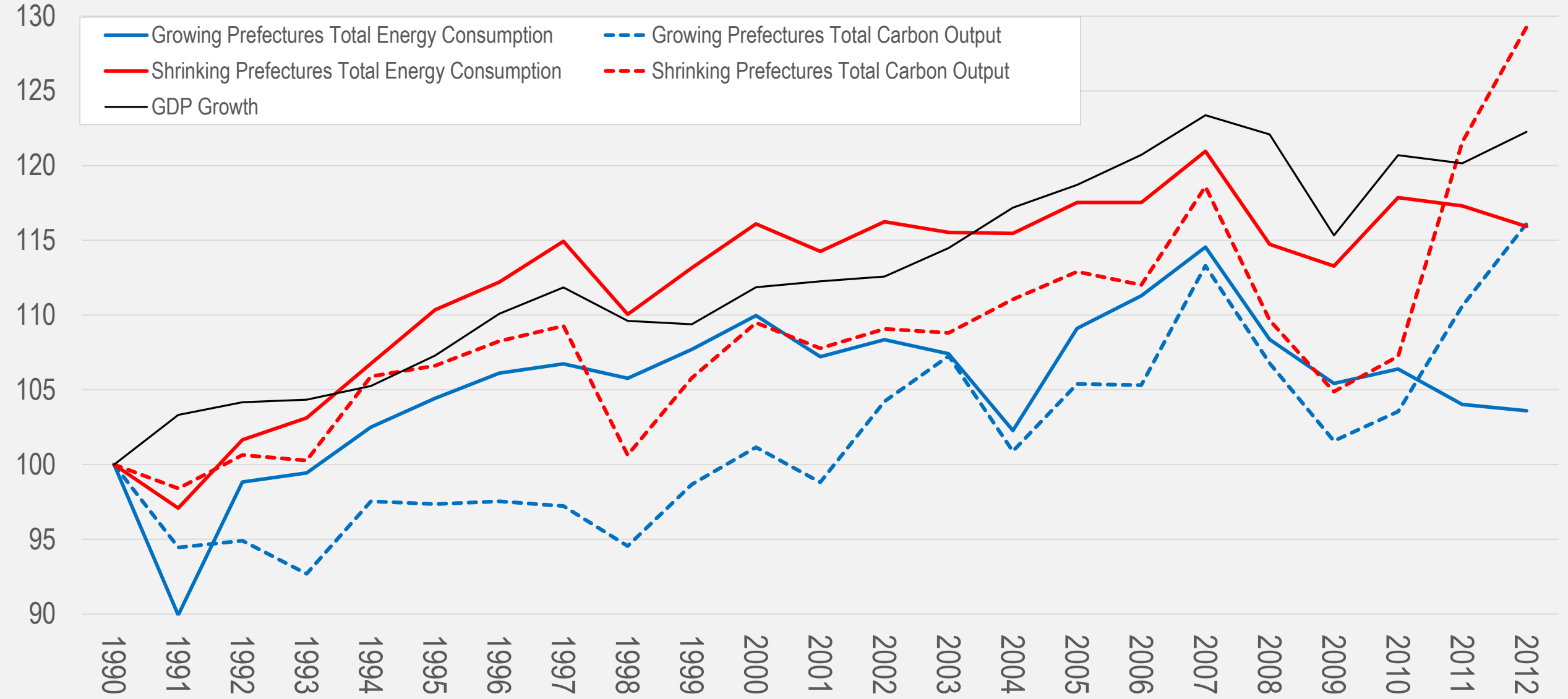
What is the ‘Depopulation Dividend’?

Any benefits for socially and environmentally sustainable living that can be gained from depopulation.

- Depopulation must occur in peace time,
- and via non-coercive means.

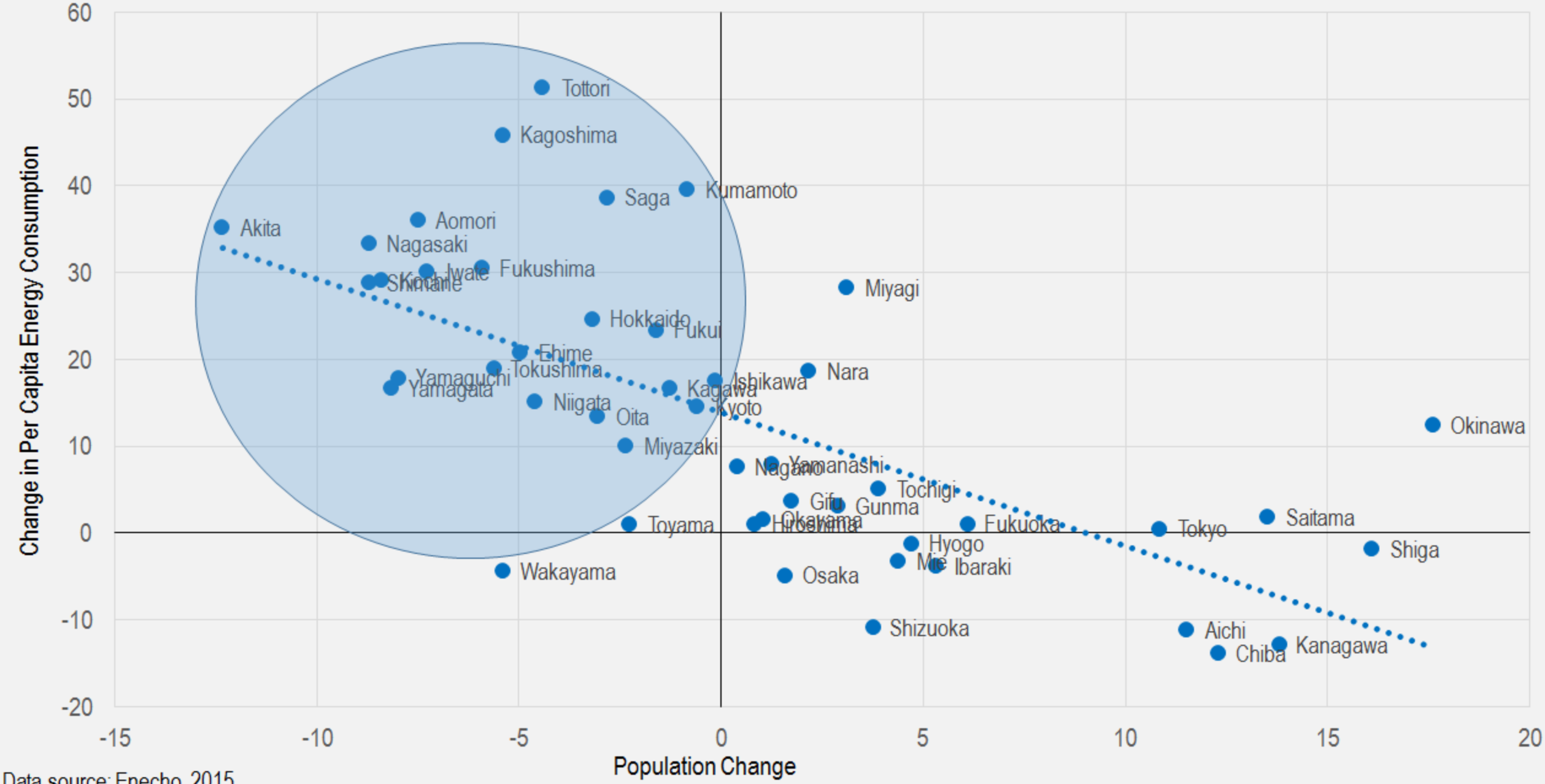
For example:
Reductions in energy, water, food, and resource consumption.
Biodiversity and ecosystem benefits.
Land management and living space.
Social benefits - gender equality and ethnic diversity, crime.
International order.

Index of Growing and Shrinking Prefectures' Total Energy Consumption and Carbon Output, and GDP Growth: Japan, 1990-2012.



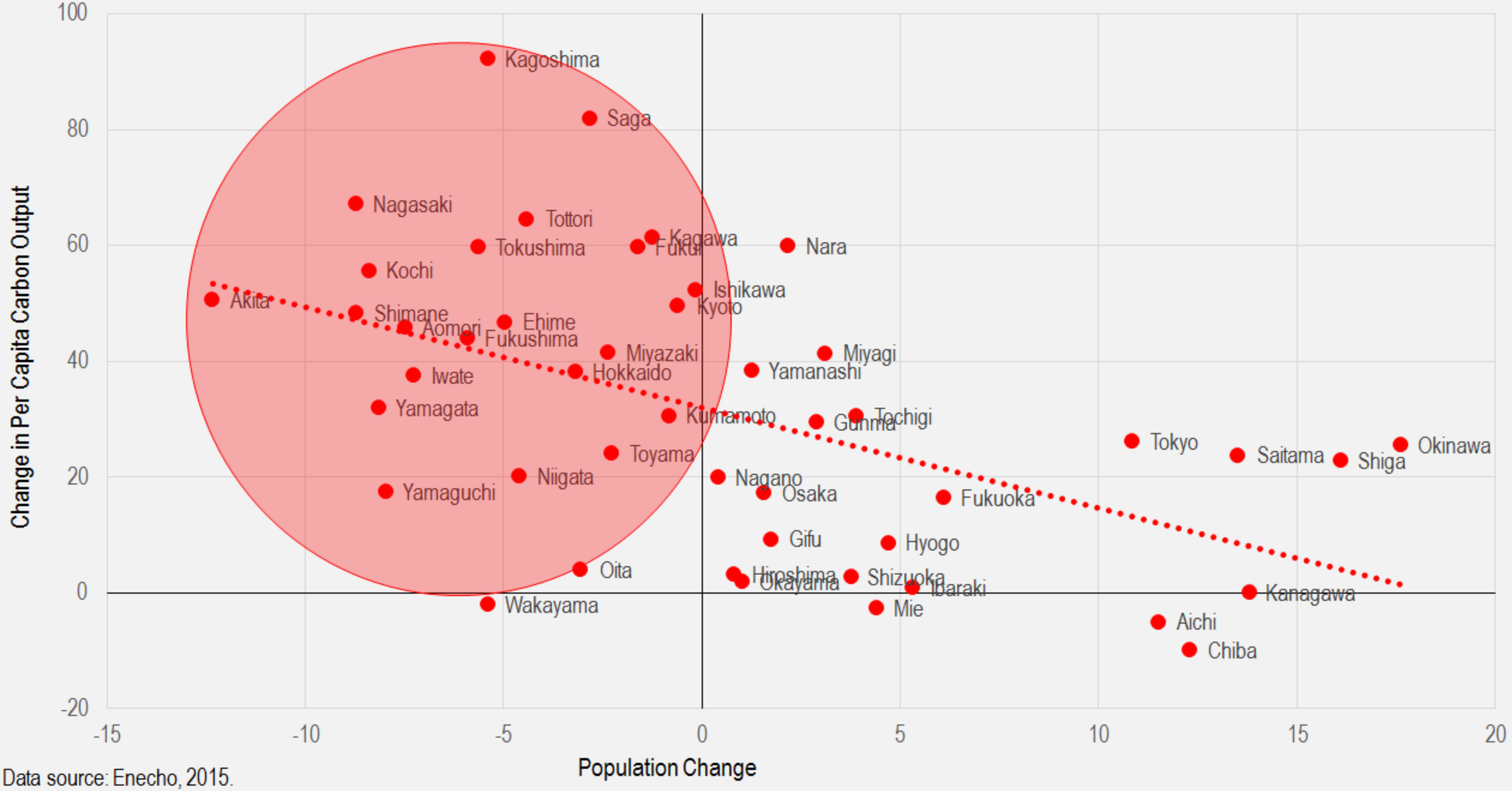
Data sources: Enecho, 2015; World Bank, 2015.

Change in per capita energy consumption in Japan by prefecture, 1990-2012 (per cent).

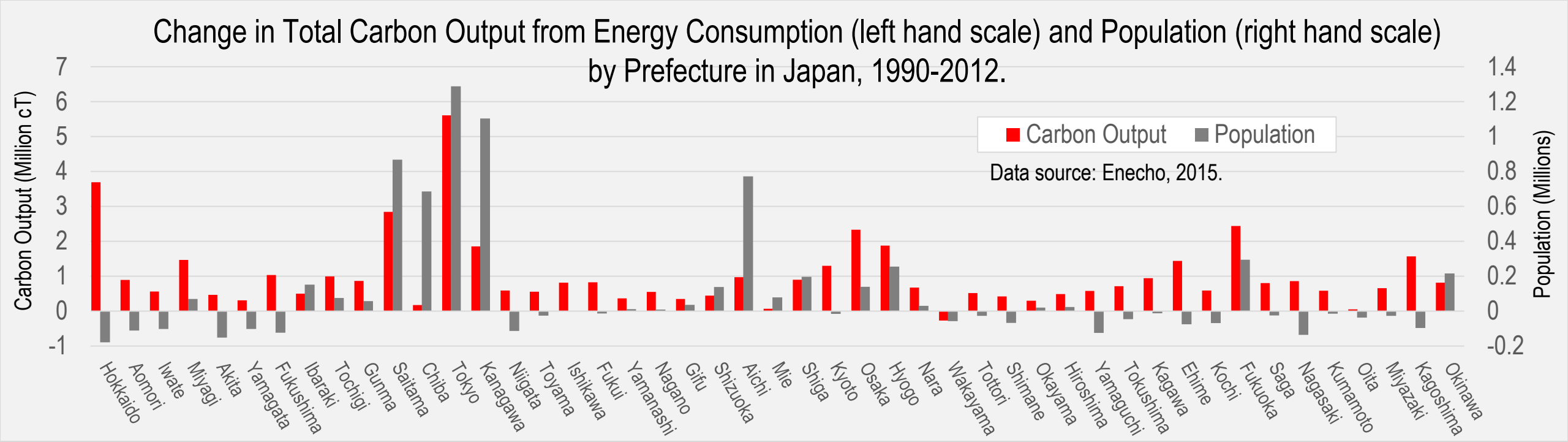


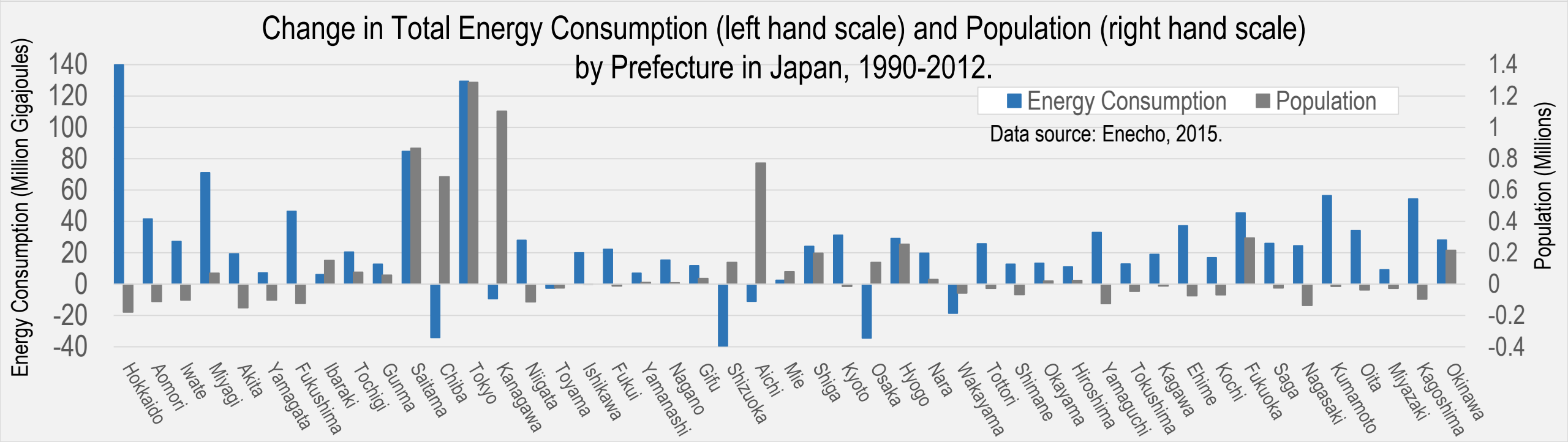
Data source: Enecho, 2015.

Change in per capita carbon output from energy consumption in Japan by prefecture, 1990-2012 (per cent).



Data source: Enecho, 2015.


Change in Total Carbon Output from Energy Consumption (left hand scale) and Population (right hand scale) by Prefecture in Japan, 1990-2012.
Carbon Output (Million cT)
Population (Millions)
Carbon Output
Population
Data source: Enecho, 2015.
7
6
5
4
3
2
1
0
-1
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
Hokkaido
Aomori
Iwate
Miyagi
Akita
Yamagata
Fukushima
Ibaraki
Tochigi
Gunma
Saitama
Chiba
Tokyo
Kanagawa
Niigata
Toyama
Ishikawa
Fukui
Yamanashi
Nagano
Gifu
Shizuoka
Aichi
Mie
Shiga
Kyoto
Osaka
Hyogo
Nara
Wakayama
Tottori
Shimane
Okayama
Hiroshima
Yamaguchi
Tokushima
Kagawa
Ehime
Kochi
Fukuoka
Saga
Nagasaki
Kumamoto
Oita
Miyazaki
Kagoshima
Okinawa


Change in Total Energy Consumption (left hand scale) and Population (right hand scale) by Prefecture in Japan, 1990-2012.
Energy Consumption (Million Gigajoules)
Population (Millions)
Energy Consumption
Population
Data source: Enecho, 2015.
140
120
100
80
60
40
20
0
-20
-40
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
Hokkaido
Aomori
Iwate
Miyagi
Akita
Yamagata
Fukushima
Ibaraki
Tochigi
Gunma
Saitama
Chiba
Tokyo
Kanagawa
Niigata
Toyama
Ishikawa
Fukui
Yamanashi
Nagano
Gifu
Shizuoka
Aichi
Mie
Shiga
Kyoto
Osaka
Hyogo
Nara
Wakayama
Tottori
Shimane
Okayama
Hiroshima
Yamaguchi
Tokushima
Kagawa
Ehime
Kochi
Fukuoka
Saga
Nagasaki
Kumamoto
Oita
Miyazaki
Kagoshima
Okinawa

Energy consumption went down in
2 of Japan's 25 shrinking prefectures in 1990-2012 …

Energy consumption went down in
2 of Japan's 25 shrinking prefectures in 1990-2012 …

and in
5 of Japan's 22 growing prefectures in 1990-2012.

Meaning and Implications

Meaning

- Resource consumption, carbon output and biodiversity gains from population decline may be harder to achieve than we expect.

Implications

- Requirements for considerable research into the environmental consequences of depopulation.
- Requirements for internationally coordinated structural intervention by government.

Just as Japan led Asia's development in the 20th century, so in the 21st Japan can once more lead Asia in achieving environmental gains from depopulation.

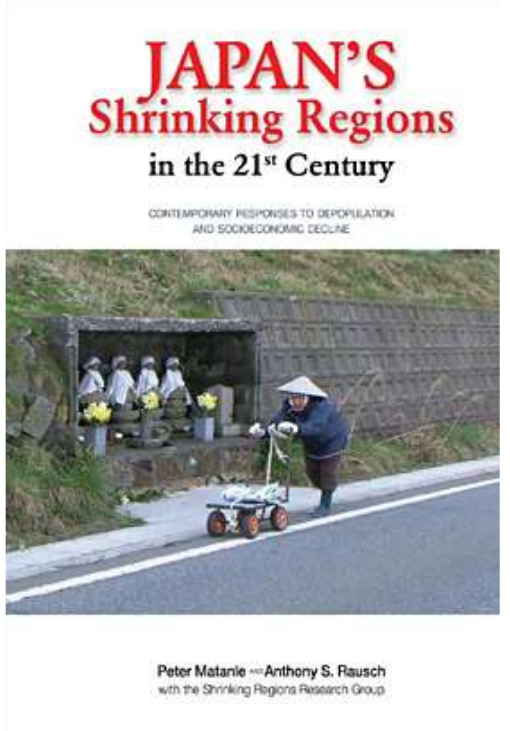
Recent publications

Matanle, P. (2013) Post-disaster recovery in ageing and declining communities: the Great East Japan disaster of 11 March 2011, *Geography*, 98 (2): 68-76.

Matanle, P. (2011) The Great East Japan Earthquake, Tsunami and Nuclear Meltdown: Towards the (Re)Construction of a Safe, Sustainable, and Compassionate Society in Japan's Shrinking Regions, *Local Environment*, 16 (9): 823-847

Matanle, P., Rausch, A., with the Shrinking Regions Research Group (2011) *Japan's Shrinking Regions in the 21st Century: Contemporary Responses to Depopulation and Socioeconomic Decline*, Amherst, NY: Cambria Press.

Matanle, P. and Sato, Y. (2010) Coming to a City Near You! Learning to Live 'Beyond Growth' in Japan's Shrinking Regions, *Social Science Japan Journal*, 13 (2): 187-210.



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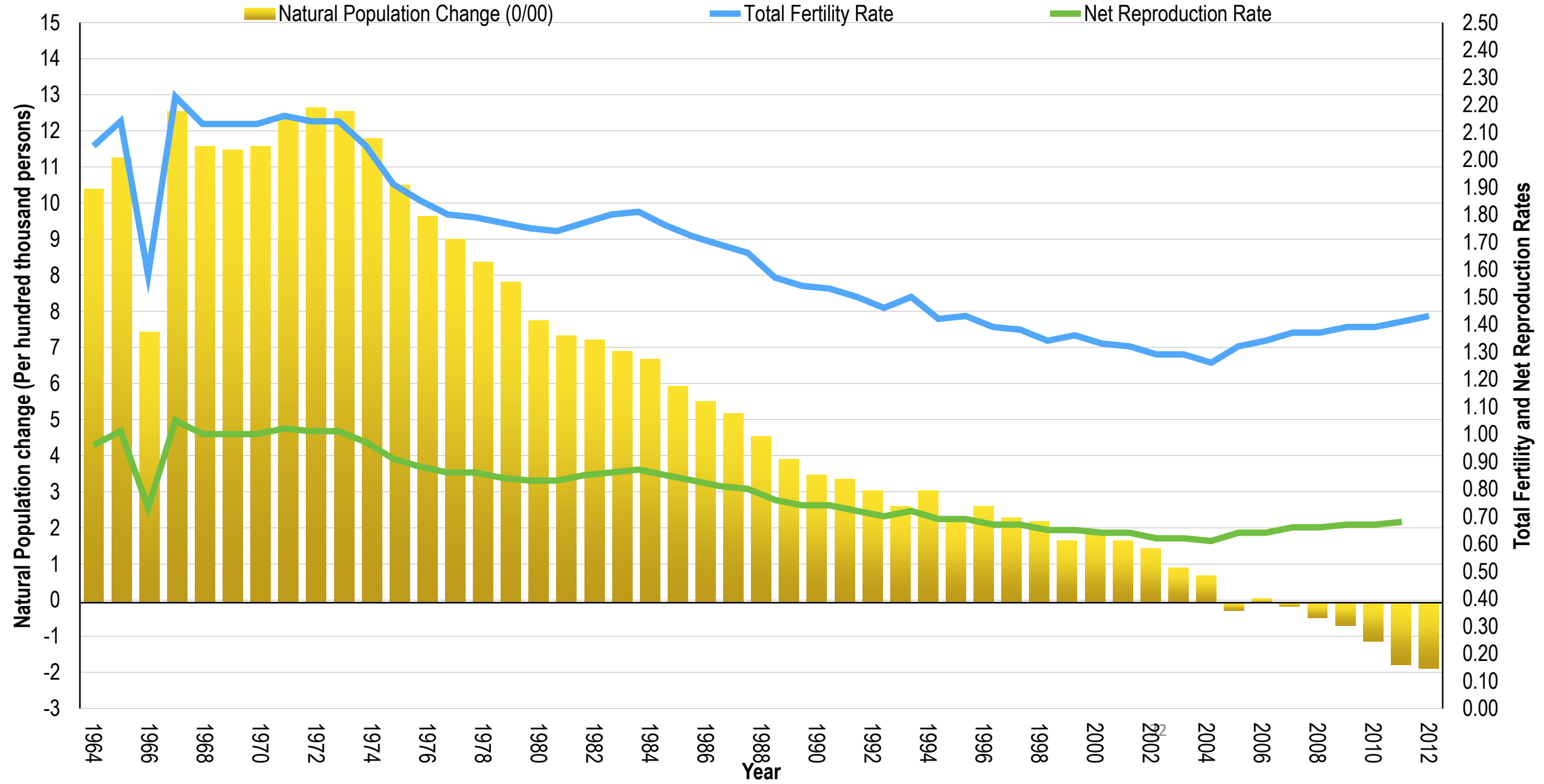
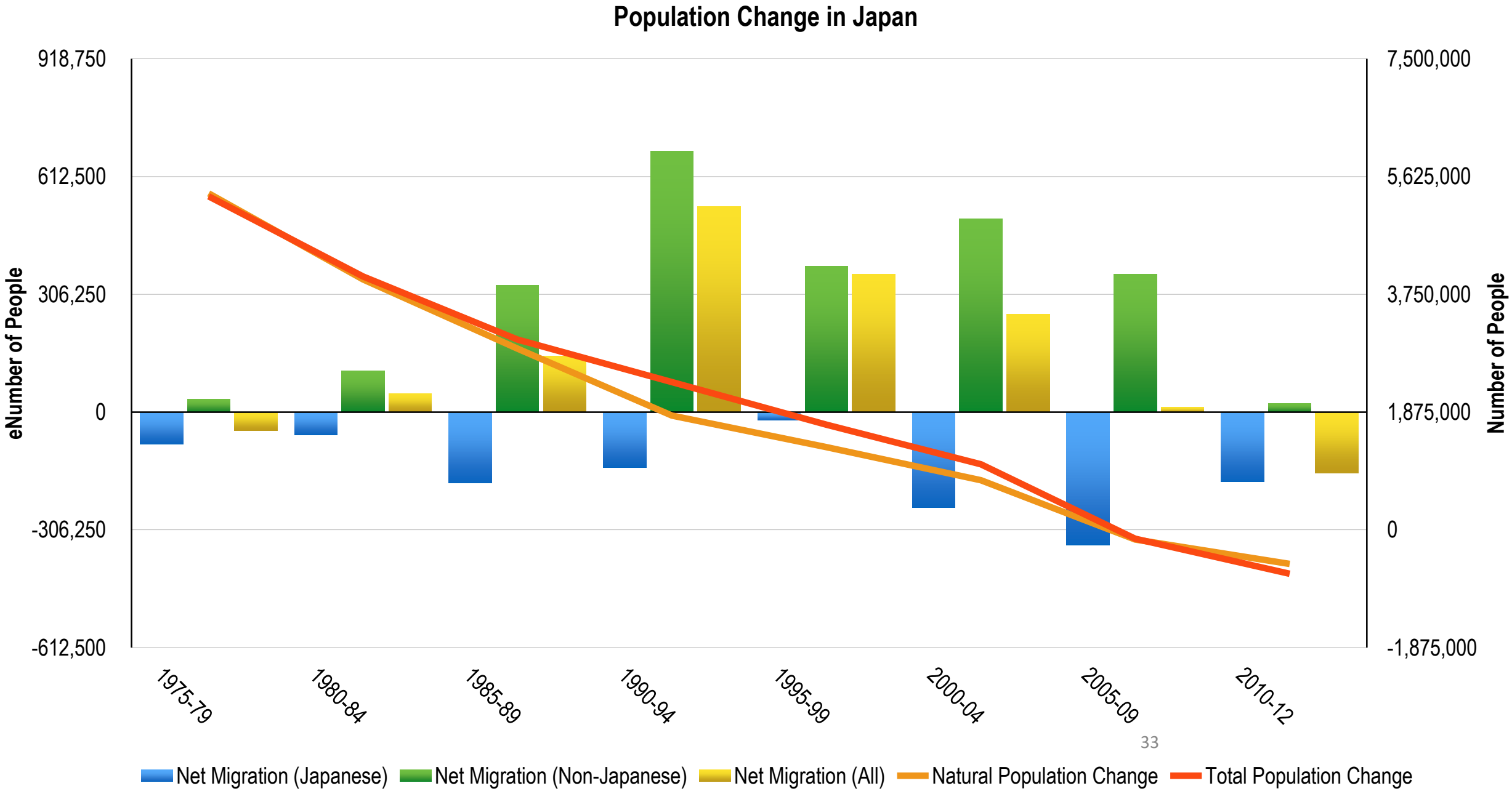
https://sheffield.academia.edu/PeterMatanle

Is immigration a solution?



Is immigration a solution?



Is immigration a solution?

2. The numbers required would be impossible to accept.

(d) Scenario III

- Medium variant projection of UN 1998 Revision
- Population maintained at 2005/10 level of 127.5 million.
- Need 17 million net immigrants to 2050 (381,000 annually).
- 2050 = 22.5 million immigrants and descendants.
- 17.7% of total population.

(e) Scenario IV

- Maintain working-age population constant at 87.2 million (1995).
- Need 33.5 million immigrants from 1995 through to 2050 (609,000 annually).
- Total population 150.7 million by 2050.
- Immigrants and their descendants 46 million (30% of total population in 2050).

Is immigration a solution?

1. Japan is historically shy of contact with outsiders.
2. The numbers required would probably be politically impossible.
3. Or achieve; because China also will be shrinking soon.
4. Migrants may not settle in the regions which need them most.
5. Too many Japanese are leaving.

Immigration is unlikely to provide anything other than a soft landing.

Energy Consumption and Carbon Output in Growing and Shrinking Prefectures in Japan (1990-2008).

		Growing Prefectures				Shrinking Prefectures			
		1990	2008	Actual Change	% Change 1990-2008	1990	2008	Actual Change	% Change 1990-2008
Population		89,335,902	94,779,000	5,443,098	6.1	34,275,265	32,910,000	-1,365,265	-4.0
Energy Consumption (TJ)	Final Energy Consumption	11,533,078	12,560,020	1,026,941	8.9	4,202,657	4,830,705	628,048	14.9
	Agric. and Construction	454,761	335,900	-118,860	-26.1	350,412	280,432	-69,980	-20.0
	Manufacturing	6,056,931	5,031,327	-1,025,605	-16.9	2,066,108	2,131,879	65,772	3.2
	Commerce	2,461,695	3,655,092	1,193,397	48.5	766,764	1,032,095	265,331	34.6
	Residential	2,061,175	2,730,541	669,367	32.5	795,232	1,029,360	234,128	29.4
	Household Passenger Cars	498,517	807,159	308,642	61.9	224,141	356,938	132,797	59.2
Carbon Output from Energy Consumption (10^3tC)	Final Carbon Output	171,045	182,794	11,748	6.9	65,808	71,744	5,936	9.0
	Agric. and Construction	6,898	5,402	-1,496	-21.7	6,005	4,718	-1,286	-21.4
	Manufacturing	97,738	79,009	-18,728	-19.2	33,694	32,300	-1,394	-4.1
	Commerce	32,295	49,050	16,756	51.9	10,869	14,239	3,370	31.0
	Residential	24,998	34,569	9,571	38.3	11,140	13,959	2,818	25.3
	Household Passenger Cars	9,118	14,763	5,645	61.9	4,100	6,528	2,429	59.2

Source: Statistics Bureau (2011b); METI (2011).
Notes.
•Growing prefectures are: Miyagi, Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo, Kanagawa, Ishikawa, Yamanashi, Nagano, Gifu, Shizuoka, Aichi, Mie, Shiga, Kyoto, Osaka, Hyogo, Nara, Okayama, Hiroshima, Fukuoka, Okinawa.
•Shrinking prefectures are: Hokkaido, Aomori, Iwate, Akita, Yamagata, Fukushima, Niigata, Toyama, Fukui, Wakayama, Tottori, Shimane, Yamaguchi, Tokushima, Kagawa, Ehime, Kochi, Saga, Nagasaki, Kumamoto, Oita, Miyazaki, Kagoshima.
•Manufacturing includes: Chemical, Chemical textiles, Pulp & Paper, Iron & Steel, Non-ferrous metals, Cement & Ceramics, Machinery, Duplication Adjustment, Other Industries & SMEs.
•Commerce includes: Water supply, Sewage & Waste Disposal, Trade & Financial Services, Public Services, Commercial Services, Retail Services, Others & Miscellaneous Services.