

未来のストックが見える。  
**OPOSSUM**  
オポッサム

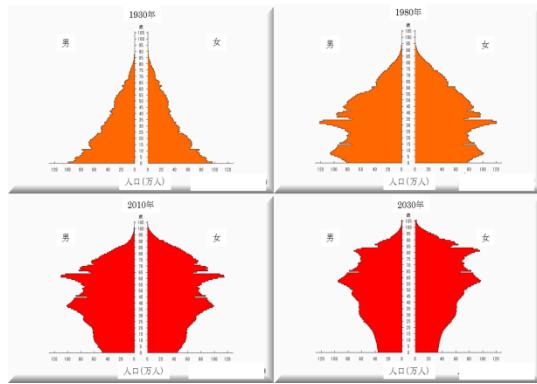
Open Project on Stock Sustainability Management

Principal Investigator: Professor Hidefumi Kurasaka, Graduate School of Humanities and Social Sciences, Chiba University

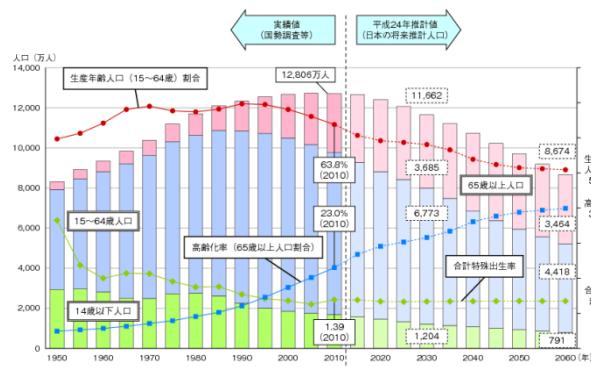
Implementation: Chiba University, Shibaura Institute of Technology, National Institute for Environmental Studies

Collaborating Local Authorities: Yachiyo City, Ichihara City, Tateyama City, Chiba Prefecture

# Population decline and ageing

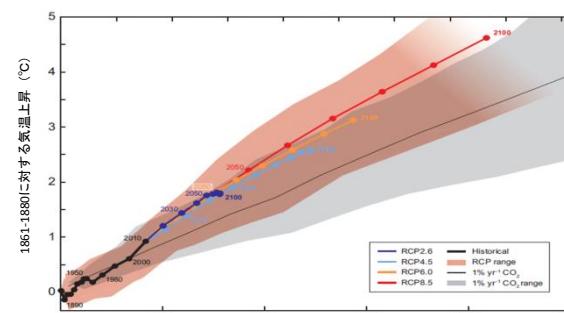


Long term projection by the National Institute of Population and Social Security Research  
At the same time, ageing continues. As a result, the decrease in working-age population exceeds the general decline in population.



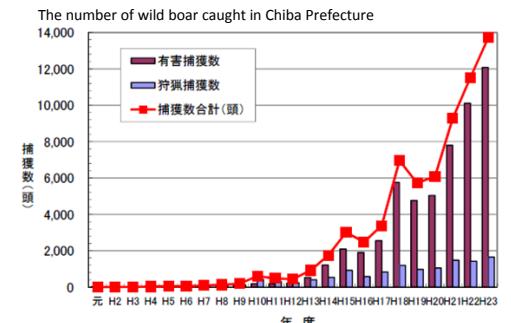
Changes in the population of Japan (Sources) *White Paper: Information and Communications in Japan, 2012*, *Census and Population Estimate*, Ministry of Internal Affairs and Communication; 'Trend of the Births, Deaths and their Rates (as of October 1 each year)' in 'Population Projection for Japan' (January 2012), the National Institute of Population and Social Security Research; Population Trends Statistics, Ministry of Health, Labour and Welfare.  
The population of Japan has been declining since 2008, when it peaked at 128,080,000. According to the National Institute of Population and Social Security Research, it is estimated to go below 100 million around 2050 and to be in the 80 millions in 2060. Due to WWII, the population declined by about 2.3 million from 1944 to 45, but it began to recover in the following year. The prediction is that from now on, on average more than 0.8 million people would be lost every year until 2060.

# Global warming and environmental degradation



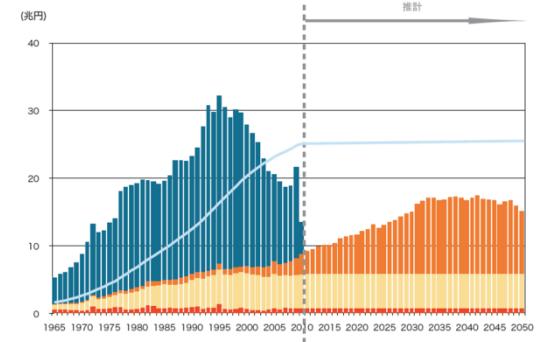
Accumulation of man-made CO<sub>2</sub> emissions since 1879 (converted to greenhouse gases)  
(Source) Summary for policy makers, IPCC Fifth Evaluation Report from the First Working Group.

The Paris Agreement was adopted at COP21 in December 2015. This has set the framework for anti-global warming measures from 2020. 196 countries have agreed that the average rise of global temperatures compared to the Industrial Revolution phase should be kept under 1.5°C, if possible, and that the revised objectives will be stricter than the pre-revision ones. It has been reported that in order to keep the rise of average global temperature within 2°C, greenhouse gas emissions should cease or be in the negative within this century. We have to change the way we supply energy from our dependence on fossil fuel.

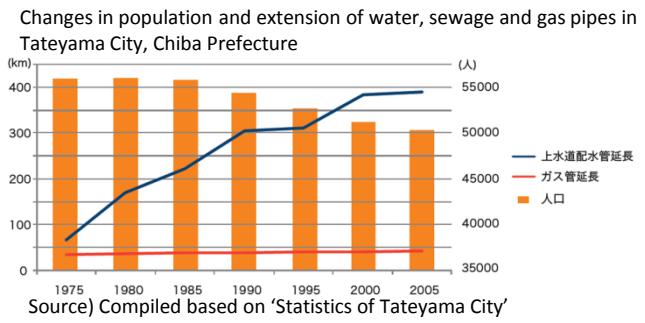


The number of wild boar caught in Chiba Prefecture  
(Source) 'Wild Boar Policy, Chiba Prefecture', 2013  
Domestically, environmental degradation is a problem caused by the lack of management by human beings due to population decline. An increasing number of regions are facing problems of wildlife overpopulation, such as wild boar and deer.

# Japan at a crossroads: Various challenges due to the decline in population

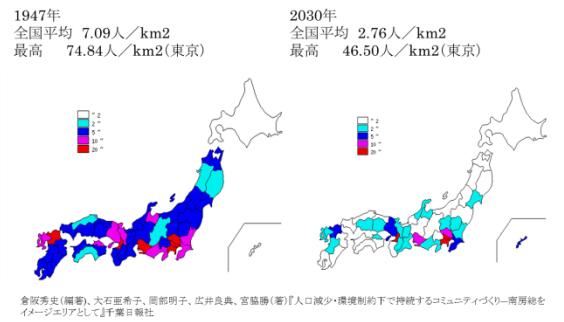


The total cost for developing infrastructure, including maintenance, was about 5 trillion yen in 1965, but it exceeded 30 trillion yen in 1995 and now has stabilized at just below 20 trillion yen. All of the roads and ports that were developed at the same time are coming to the end of their durable life. If they were updated at the same pace, the cost for updates and maintenance would jump to about 15 trillion yen in 2030, double the figure today. It is estimated that the cost will stay at the same level for the following twenty years or more.

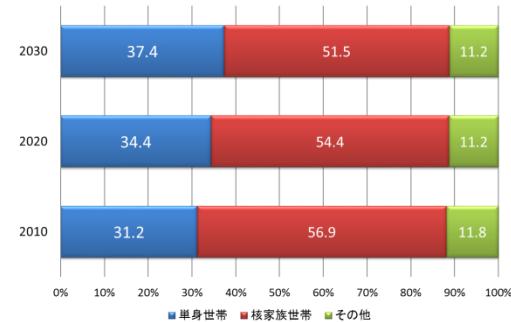


Changes in population and extension of water, sewage and gas pipes in Tateyama City, Chiba Prefecture  
Source) Compiled based on 'Statistics of Tateyama City'  
Even if the population declines, cities do not automatically shrink. The cities may continue to expand, which could lead to thinning of the infrastructure.

With the decline of population, it is feared that people become more autonomous. For instance, the index 'number of newborn babies in a 1 km<sup>2</sup> area' shows that while the national average was about 7 in 1947, it will be about 2.8 in 2030 and will be below 2 in 21 prefectures. A society in which one does not have any childhood friends within walking distance is approaching. The proportion of single-person households will increase from 31.2% in 2010 to 37.4% in 2030, with about 40% of the population living alone.



As the relationship among people thins out, problems such as death alone and an autonomous society will intensify. Some local authorities might disappear altogether.

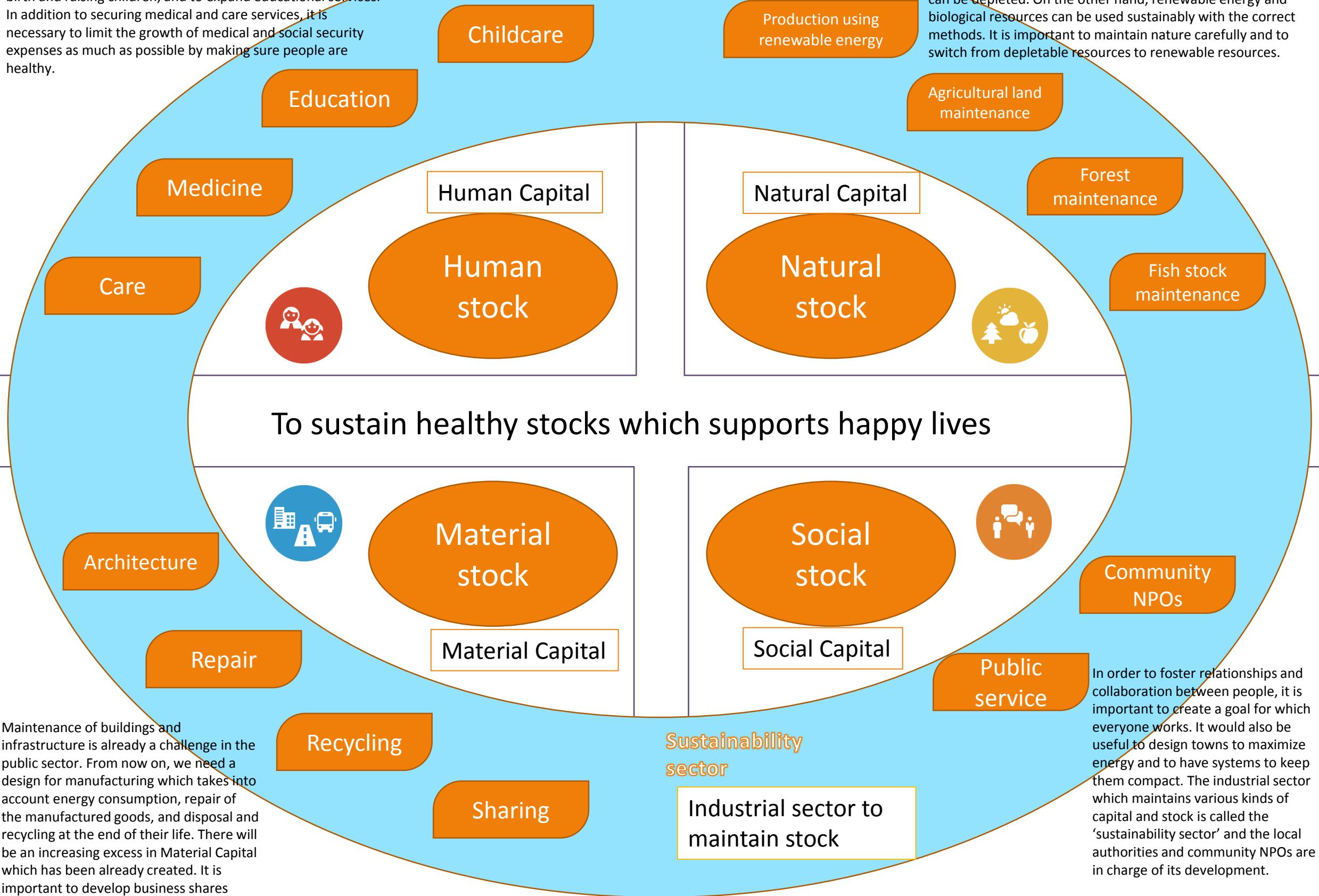


(Source) Compiled from 'Household projection for Japan (national projection), March 2008 by the National Institute of Population and Social Security Research

# Disappearance of communities, autonomous society

The foundation for the sustainability of society is people. Society exists when individuals are healthy. It is therefore necessary to develop a supportive environment for giving birth and raising children, and to expand educational services. In addition to securing medical and care services, it is necessary to limit the growth of medical and social security expenses as much as possible by making sure people are healthy.

When nature is left unattended, its function declines and ecological services weaken. Artificially maintained nature, such as manmade forests and paddy fields, requires continuous care. Fossil fuels and mining resources are natural resource stocks that can be depleted. On the other hand, renewable energy and biological resources can be used sustainably with the correct methods. It is important to maintain nature carefully and to switch from depletable resources to renewable resources.



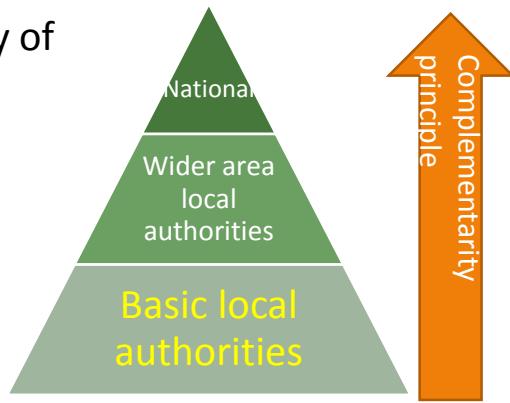
Maintenance of buildings and infrastructure is already a challenge in the public sector. From now on, we need a design for manufacturing which takes into account energy consumption, repair of the manufactured goods, and disposal and recycling at the end of their life. There will be an increasing excess in Material Capital which has been already created. It is important to develop business shares which make use of it.

In order to foster relationships and collaboration between people, it is important to create a goal for which everyone works. It would also be useful to design towns to maximize energy and to have systems to keep them compact. The industrial sector which maintains various kinds of capital and stock is called the 'sustainability sector' and the local authorities and community NPOs are in charge of its development.

# In order to secure the sustainability of stock

The challenges and responses to them should be considered in a particular context

Who should secure the sustainability of stock?



**Complementarity principle:** What can be dealt with by the basic administrative unit should be left to that unit, and a wider administrative unit should deal with other issues.

The smaller the local authority, the more they lack talent and information.

Having said that....



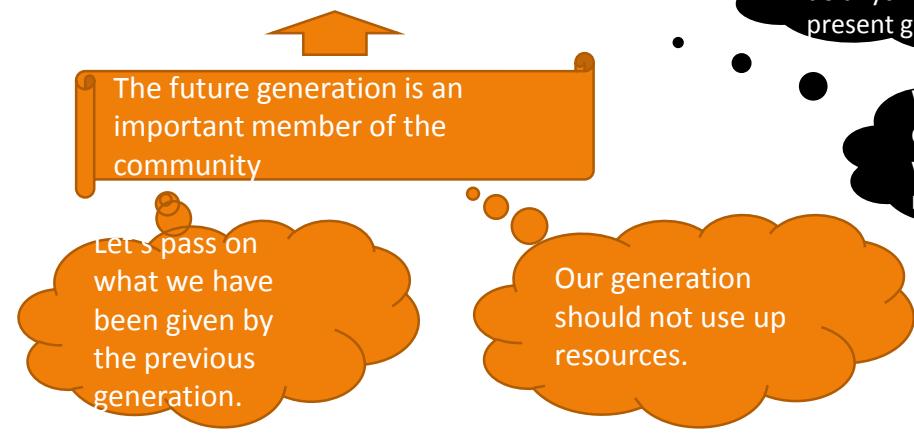
Our research project will support these

It is called **OPoSSuM, Open Project on Stock Sustainability Management.**

The project obtained funding from the Japan Science and Technology Agency (JST) and the Research Institute of Science and Technology for Society (RISTEX) in 2014 under the 'designing sustainable multi-generational, co-creational society' research and development area. The participants of the project are: Chiba University, Shibaura Institute of Technology, National Institute for Environmental Studies, Ichihara City, Yachiyo City, Tateyama City, and Chiba Prefecture. Principal Investigator: Professor Hidefumi Kurasaka, Chiba University.

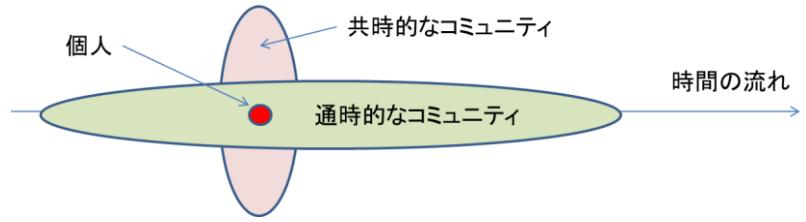
Increased awareness of hand-over from one generation to another

Why do we have to sustain society?



But the future generation does not do anything for the present generation.

Why can't we do what we want to do now?



**A sense of a diachronic community:** Awareness that there is a 'community' which started in the past and goes through the present into the future.

'Individual's welfare is connected to the community which spreads from the past to the future'  
Kenneth Boudling, 'Economics of the Spaceship Earth'

In order to raise this awareness, we need a device to capture the past generation's hopes and to hand them down to the future generation.

Future workshop

Is it OK for only the senior generation to decide?

How can we get young people to participate?



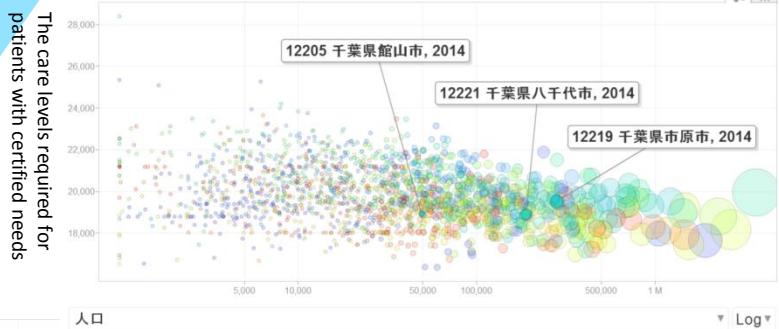
# We help you understand the current situation of community stock.

**Stock taking of community stock**

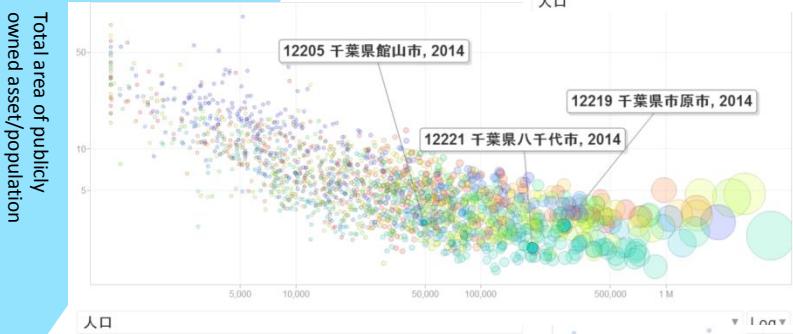
We process existing statistics to enable you to carry out comparison among local authorities. A range of information is accessible on our web site (<http://opossum.chiba-u.jp/>).

## Distribution

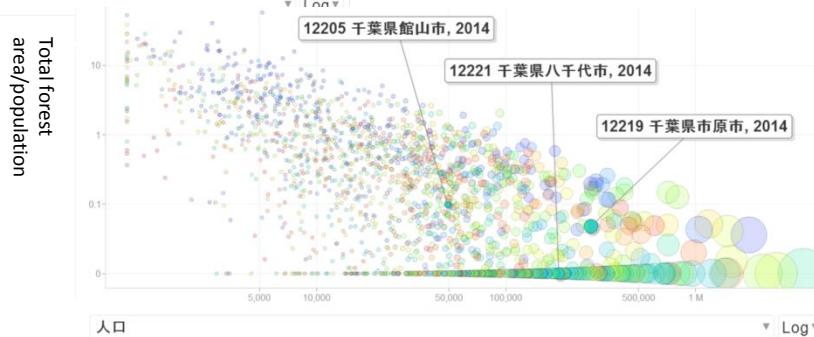
<http://opossum.chiba-u.jp/stock.html>



You can compare local authorities with any axis regarding various items.



Visual comparison among local authorities of the same size can be carried out.

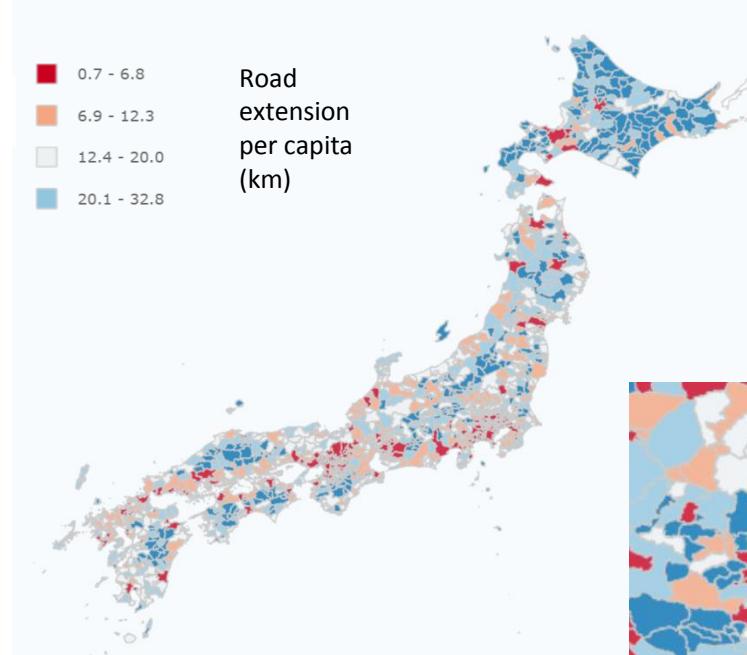


Available comparative items

- |                                       |  |
|---------------------------------------|--|
| 【指標 1-1】 15-64 歳人口 / 全人口              | 【指標 4-3】 実質公債比率                          |
| 【指標 1-2】 市区町村で働いている就業者数 / 15-64 歳人口   | 【指標 5-1】 公有財産建物総面積 / 人口                  |
| 【指標 2-1-1】 幼稚園・保育所在籍者数 / 0-5 歳人口      | 【指標 5-2】 住宅総数 / 人口                       |
| 【指標 2-1-2】 小学校児童数 / 6-11 歳人口          | 【指標 5-3】 平均住宅年齢                          |
| 【指標 2-1-3】 中学校生徒数 / 12-14 歳人口         | 【指標 5-4】 道路延長 / 人口                       |
| 【指標 2-2-1】 小学校児童数 / 小学校教員数            | 【指標 5-5-1】 一般廃棄物最終処分場残余容量 / 一般廃棄物最終処分量   |
| 【指標 2-2-2】 中学校生徒数 / 中学校教員数            | 【指標 5-5-2】 一般廃棄物自治体最終処分場埋立量 / 一般廃棄物最終処分量 |
| 【指標 3-1-1】 国民健康保険被保険者 1 人当たり診療費       | 【指標 6-1】 再生可能エネルギー生産量 / 地域的エネルギー需要量      |
| 【指標 3-1-2】 病院・一般診療所病床数合計 / 人口         | 【指標 6-2-1】 耕地面積 / 人口                     |
| 【指標 3-1-3】 医療施設医師数 / 人口               | 【指標 6-2-2】 耕作放棄地面積 / (耕地面積 + 耕作放棄地面積)    |
| 【指標 3-2-1】 要介護認定者数 / 65 歳以上人口         | 【指標 6-3】 地域的食糧自給率                        |
| 【指標 3-2-2】 要介護認定者の必要介護レベル             | 【指標 6-4】 林野面積 / 人口                       |
| 【指標 3-2-3】 養護・介護老人ホーム等定員数合計 / 要介護認定者数 | 【指標 6-5】 可住地面積 / 人口                      |
| 【指標 4-1】 課税対象所得 / 人口                  |  |
| 【指標 4-2】 財政力指数 【指標 4-3】 経常収支比率        |  |

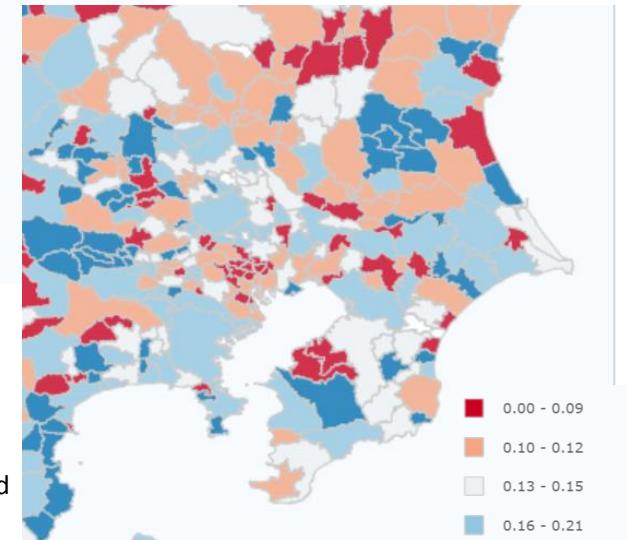
## Maps

<http://opossum.chiba-u.jp/atlas/atlas.html>



A number of items can be mapped. You can also zoom into a region.

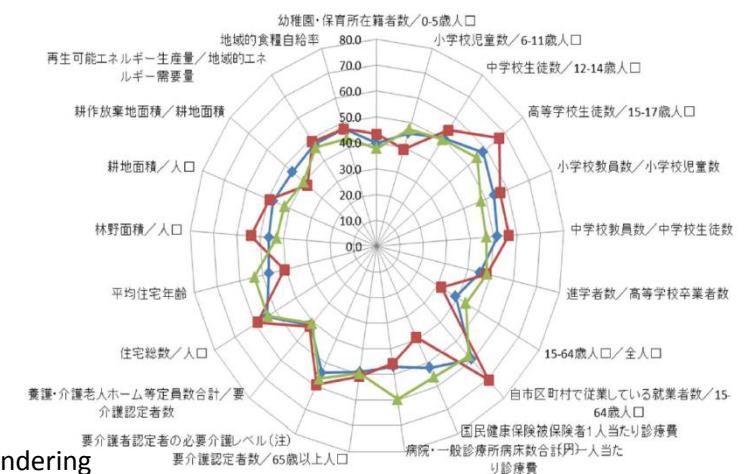
This shows the availability of medical and care services in nearby local authorities.



The capacity of special and ordinary care homes/the number of long-term patients with certified needs.

## Deviation

We are also developing a way to display deviation to facilitate comparison in the same area or among local authorities of the same size on a range of items.



Artist's rendering



# We are developing **future simulators** in order to identify challenges to community stock in 25 years' time.

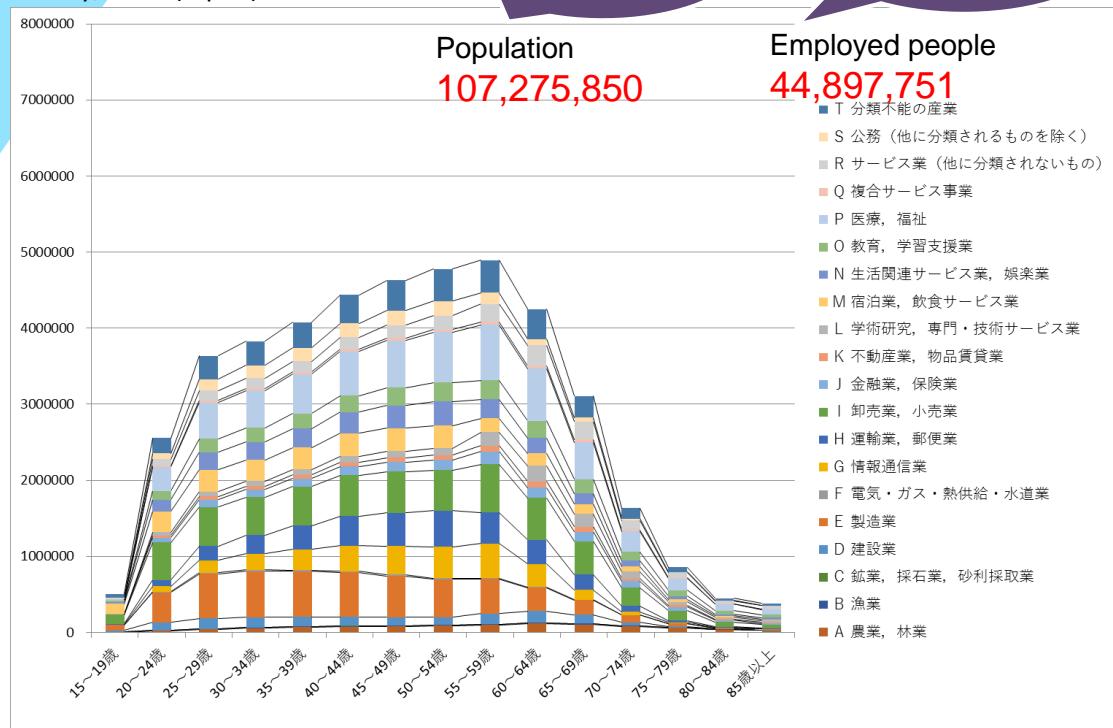
## Future simulators

We are developing future simulators in order to predict the ways in which the gap between demand and supply for maintaining human capital (childcare, education, medicine and care), the gap between demand and supply of housing, the cultivation gap in agricultural lands, and the gap between revenue and expenditure in finance emerge as the trends continue by local authority.

### Industrial structure simulator

Drawing from the long term population projection, we predict the industrial structure of 2040 on the assumption that the trends in the number of people employed by industry and by age since 2000 will continue.

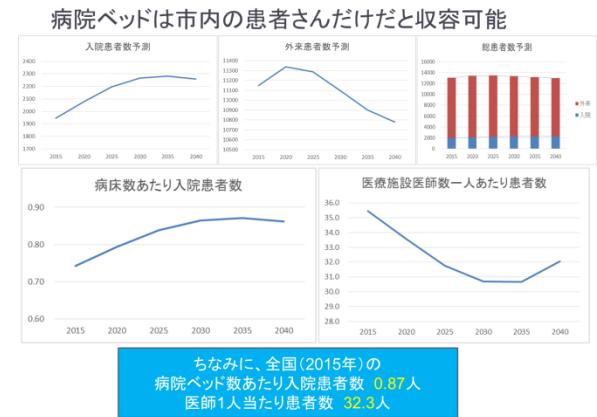
The number of people in work by industry, 2040 (Japan)



It is estimated that the Japanese population will shrink by about 15% in 2040 compared to 2015; the number of people employed is predicted to decrease by 20%. In particular, ageing in primary and secondary industries will be significant and there is a huge reduction in the number of people employed.

### Human capital simulator

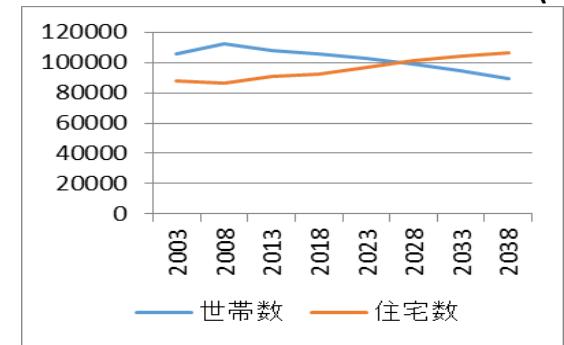
We predict supply and demand in childcare, educational, medical and care services according to changes in population and industrial structure.



### Natural capital simulator

We work out the amount of labor necessary to maintain the current level of cultivation based on the numbers of agricultural workers and effects of job creation, while making the most of natural capital such as artificial forests.

The number of households and houses (Ichihara City)



### Housing simulator

We predict the amount of housing based on when the existing stock was built and compare it with household projections.

### Finance simulator

We predict future revenue and expenditure, taking into account population, the number of people employed by the industry, and the cost of infrastructure upgrades.

Our project is working to produce a **'future card'** which summarizes results of future simulations by the local authority or the region.



# We research the relationships between people according to the local context.

Research into relationships

We have developed a 'resource generator survey' tailored to the local conditions in order to comprehend the situation of social capital by age group and ward in each local authority. In this method, we gather diverse residents of the area and carry out a discussion on the 'ties' among the residents. This is followed by a questionnaire.

## Discussion on 'ties'

**Resource generator:** A method to ask about relationships with acquaintances from whom help can be sought, using a prepared list of about 30 reasons for asking for help.

A group discussion on positive experiences of relationships among people and which ties to maintain is carried out with five participants of different generations and genders (University student, 20s, 30s-40s, 50s-60s, and 70 or older).



八千代市民会館  
これからの「きずな」について話そう  
～人と人とのつながりを考える～  
参加者募集

◎近所や友人、知人とのつながりに注目しています。日常の生活で、ちょっとしたお礼や感謝の気持ちを伝えること、頼り合う関係性を築くこと、新しい世代や年代の交流、世代間の交流など、人と人とのつながりが私たちの生活を豊かにしています。ぜひ、ご自身と人とのつながりを、ぜひ話し合ってください。

◎この「きずな」について、みんなで話し合いませんか？

開催日時：平成 27 年 8 月 23 日(日) 第 1 回 10:00-12:00  
第 2 回 14:00-16:00  
(どちらか可能な時間帯に参加)

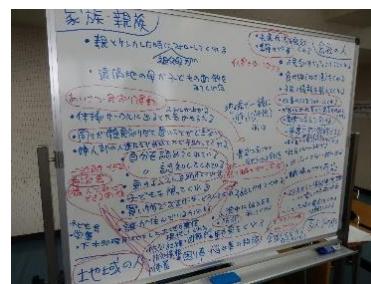
会場：八千代市福祉センター  
(八千代市大和田駅前 312-5 市役所南)

主催：千葉大学 経済工学部 国立環境研究所  
協力：八千代市総合企画課

募集締切：8 月 10 日(月)  
募集人数：各回 10 名程度  
(応募を多数の場合は抽選)  
応募資格：市内在住の 18 歳以上の方  
謝礼：あり

お問い合わせ・ご応募：  
経済工学部准教授 葉島 菜穂  
URL: <http://tsuqa.jp/academic>  
Mail: [kurakurita@tsuqa.ac.jp](mailto:kurakurita@tsuqa.ac.jp)  
☎ 03-5859-5072

- ・【野菜、そば、おみやげなどの]おすそ分け
- ・一時的に子どもを預かってもらった
- ・子どもの保育園の送迎をお願いした
- ・子育ての相談に乗ってもらった
- ・地域の情報[お店、病院など]を教えてもらった
- ・不在時に犬の散歩や植木の水やりを頼んだ
- ・自分や家族の仕事を紹介してもらった
- ・目的地[病院、駅など]まで車で送ってもらった
- ・仕事でミスをしたときフォローしてもらった
- ・遠く離れた場所で暮らす祖母の見守り
- ・趣味[ペット]の情報を交換している
- ・お見合い相手[異性の知人]を紹介してもらった
- ・悩みや愚痴を聞いてもらった
- ・一緒に楽しい時間[趣味の時間]を共有した
- ・早朝[深夜]に助けを求めた
- ・震災の時に水や電池を送ってもらった
- ・多様な知識や価値観に触れることができた
- ・やる気もらった。励まされた。活力もらった。
- ・悪いことは悪いと言ってくれた。叱ってくれた。



A group discussion on ties in Yachiyo City

## Compilation of the resource list

An example of the resource list

分野	リソース	分野	リソース
生活満足度	おいしいお店(レストラン等)を教えてもらう	経済的安定	近所の安売りの店や特売品の情報を教えてくれる
	パソコンや家電製品のトラブルが起こった時に頼りになる		就職したり、転職したりする際に推薦状を書いてもらえる
	壊れた家具や自転車の修理を頼める		困った時に少額のお金を貸してくれる
	病気の時などに自分の代わりにちょっとした買い物が頼める		保証人になることを頼める
	自分で運転できない時(免許がない場合)に、自動車を目的地まで乗せていってもらえる		自分や家族の就職先(パート、アルバイトを含む)を斡旋してくれる
安心安全	お互いの家族構成を把握している	健康福祉	親の介護や子育てについて相談できる
	お互いに近況を確認し合う		自分(や家族)の健康や病気について相談できる
	災害時の避難場所や安否確認方法の情報を共有している		(一時的に)親の介護や子どもの世話を頼める
	旅行・帰省等で家を長期に留守にする際に、留守中をお願いできる		評判の良い病院、介護施設、保育所、支援組織・制度などの情報を教えてくれる
ガバナンス・コミュニティ	地域の歴史や文化についてよく知っている	専門知識・技術	英語の通訳や翻訳をしてもらう
	一緒に趣味を楽しんだり、体を動かしたりする		お金に関するアドバイス(保険や投資、借金など)をしてもらえる
	議員や行政(自治体)に対するつながりがある(もしくは直接的な知り合いが議員・行政関係者)		大学や研究機関につながらない(もしくは直接的な知り合いが大学・研究機関の関係者)
	地域の自然や環境について一緒に話をする		法律や公的な制度についての専門的な知識を持っている
	地元メディア(テレビ局、ラジオ局、新聞社、出版社など)につながらない(もしくは直接的な知り合いがメディア関係者)		医療に関する専門的な知識・技術を持っている(医師・薬剤師)

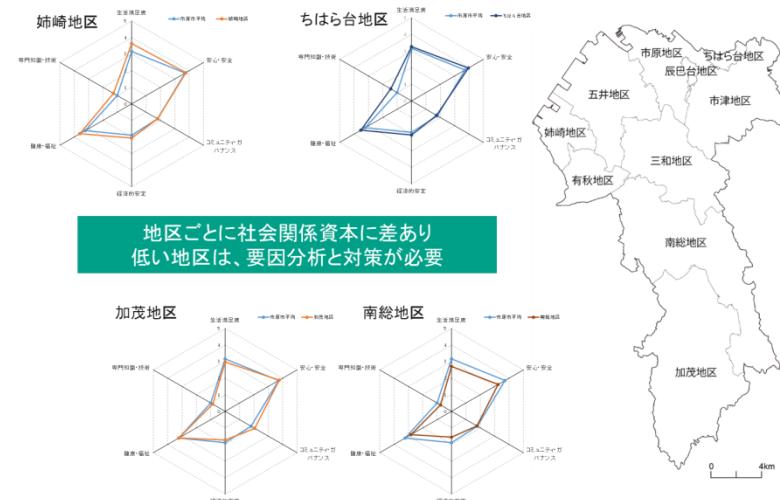
Desirable ties identified in the group discussion are summarized in a resource list (reasons to ask for other's help).

(Source) Report on 'The development of evaluation criteria and measurement method of the environment, economy and society taking into account influences inside and outside the area', a policy study on environmental economics, commissioned by the Ministry of Environment, 2014

## Implementation of resource generator survey

The questionnaire asks whether the respondent has anyone to turn to for each item in the resource list (family members, relatives, friends, neighbours).

An example of analysis of questionnaire by ward



The analysis shows the relationships among residents by age group and by ward. This helps predict the future of social capital by combining the future population projection.

(Source) Report on 'The development of evaluation criteria and measurement method of the environment, economy, and society taking into account influences inside and outside the area', a policy study on environmental economics, commissioned by the Ministry of Environment, 2014



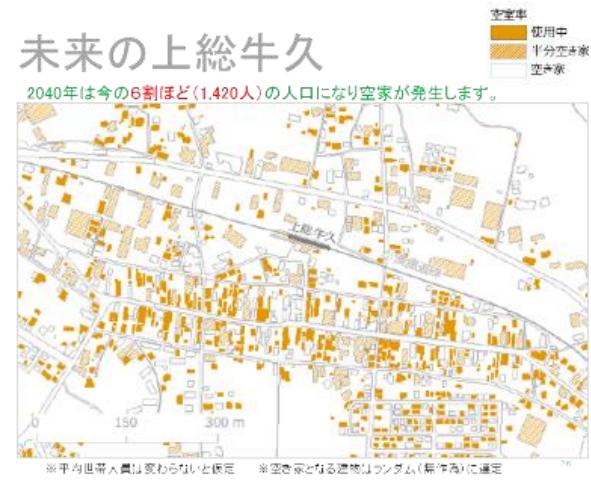
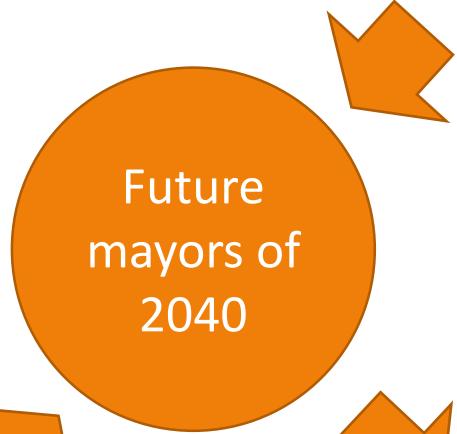
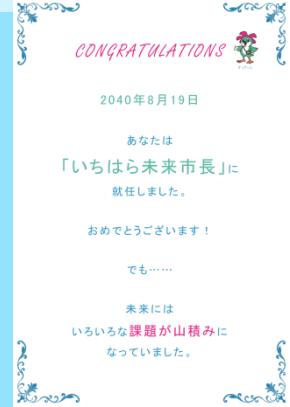
# A future workshop in which secondary school children, as future mayors of 2040, give advice to current mayors

Future workshop

A workshop with secondary school children, our future, in the driver's seat. At the workshop, results of future simulations and research into relationships are communicated and their understanding of the local area is enhanced by a walk around town. They then make policy recommendations, as the future mayors of 2040, to the current mayor.

## Walk around town

Walk around the town with a future map of the local population of 2040.

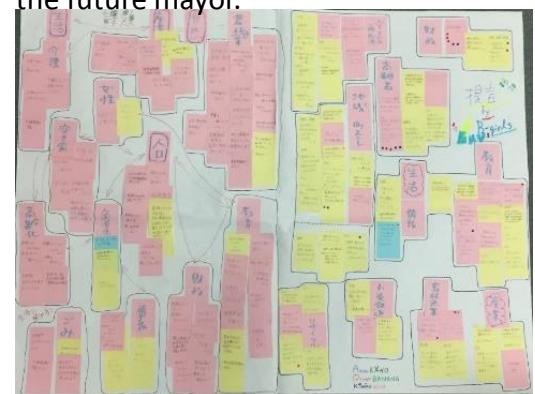
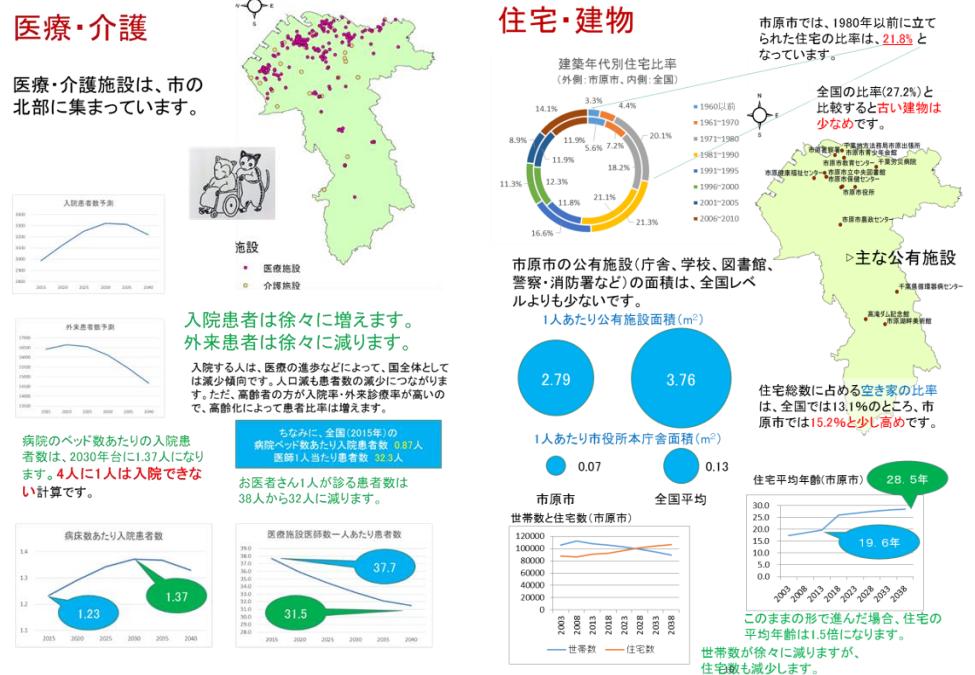


## Examination of policy recommendation

The participants write down the challenges of 2040 and make policy recommendations to the current mayor as the future mayor.

## Various research findings

The results of future simulations (Future Card) and results of research into relationships are communicated to secondary school children in an accessible manner.



Results of the junior high school year 3 group



The current mayor and future mayors together



The progress of this research project is reported on its web site: <http://opossum.chiba-u.jp>

Also, the journal, *Public Affairs* (Association for Public Affairs, Chiba University), has a special section on a related topic. <http://mitizane.ll.chiba-u.jp/curator/bulletin/kokyo.html>



### OPoSSuM

The research and development is named 'OPoSSuM,' an abbreviation of 'Open Project on Stock Sustainability and Management,' which sounds like the animal, 'opossum.' Our aim is to make the project accessible to all.

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