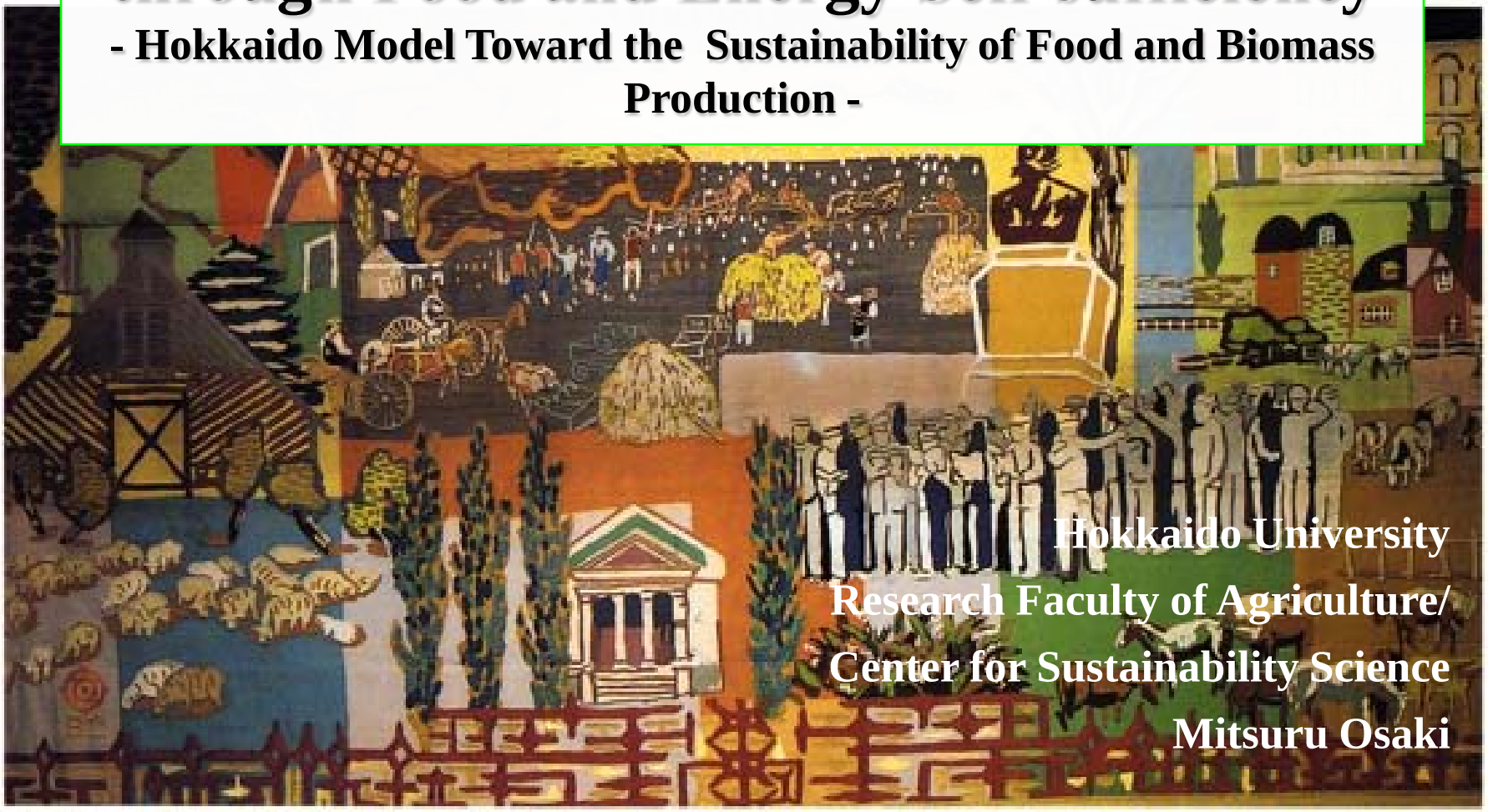
Sustainability Week 2009 Opening Symposium in 02 November 2009 at Sapporo

Independency of Japan's Agriculture through Food and Energy Self-sufficiency

- Hokkaido Model Toward the Sustainability of Food and Biomass Production -



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Contents

- **Food Crisis**
- **Concept of the Hokkaido Model**
- **Model of Food and Energy Self-sufficiency**
- **New Agricultural Design**

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- **Food Crisis**
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What is Agriculture in 20th century ？

- Fossil fuel depend type-Agriculture
  - Fertilizer & Chemicals Use

Fossil fuel depend type-Agriculture

- Large consume of fossil fuel (shortage, global warning)
- Big machinery（soil compaction）
- Chemicals (high impact on environment)
- Mono-cropping（soil erosion, disease)

Success

Large Scale Production/Transportation

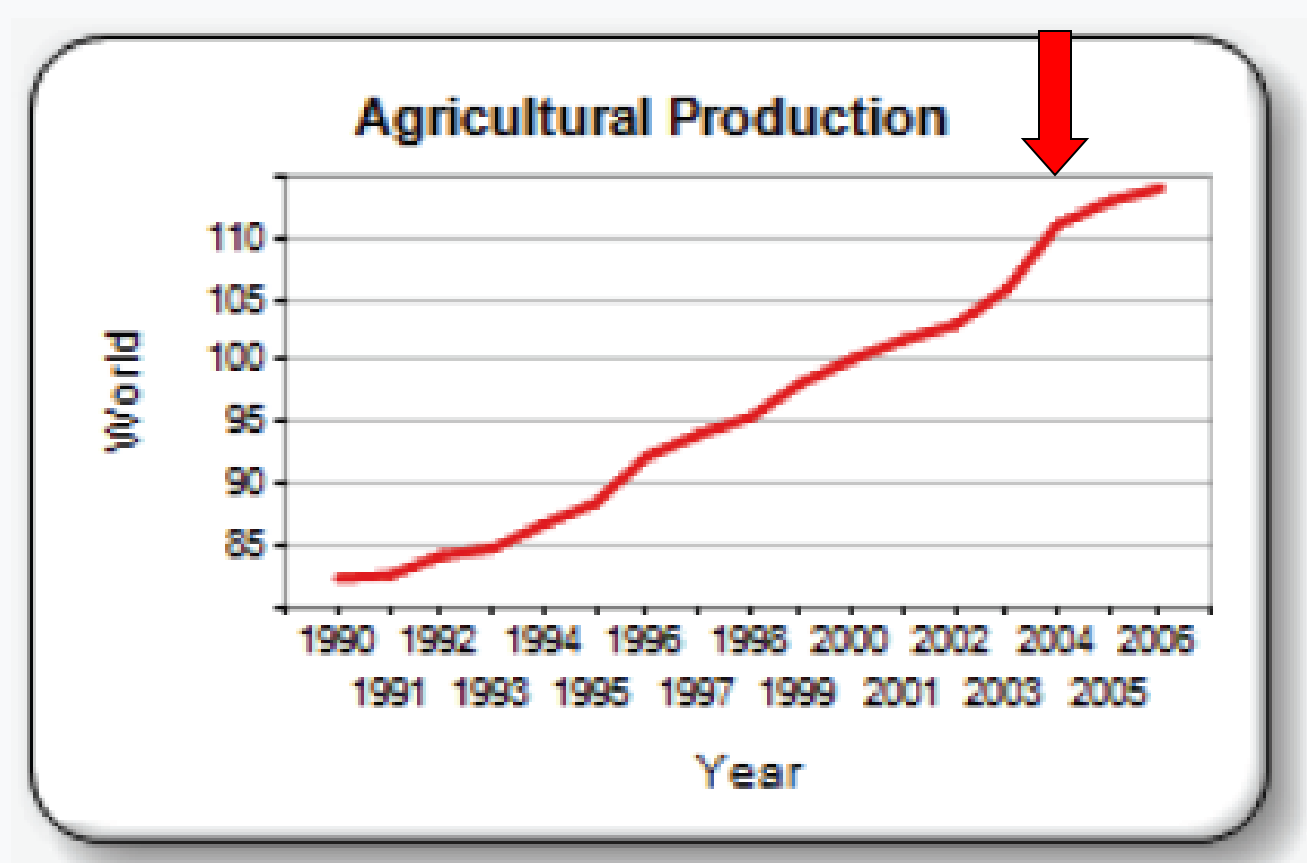
Cause

- Flooding Cheap Foods in the World Market
- Decreasing Agriculture Status/Values
- Degradation Land/Environment

Total Agricultural Production in the World

FAOSTAT

Getting Slow Down



http://faostat.fao.org/site/339/default.aspx

What is main Function on World Cereals Production?

Cereals Production =

Area X Unit productivity

(Forest) (Fertilizer, Chemicals)

Climate Chang and Global Warming

affect already seriously on Agriculture

Dry up Iguaçu Fall in 2006

2006

As of July 24, 2006 a severe drought in South America had caused the river feeding the falls to become parched, reducing the amount of water flowing over the falls to 300 m^3 (80,000 gallons) per second, down from the normal flow of 1,300 m^3/s to 1,500 m^3/s (350,000 to 400,000 ga/s). By early December, the flow was spectacular again, according to visiting tourists. This was unusual, as normally dry periods last only a few weeks.

From Iguazu FallsFrom Wikipedia, the free encyclopedia

Climate Chang and Global Warming

affect already seriously on Agriculture

Dry up at Australia in 2006

Australia suffers worst drought in 1,000 years -Depleted reservoirs, failed crops and arid farmland spark global warming tussle-

- David Dreverman, head of the Murray-Darling river basin commission, said: "This is more typical of a one in a 1,000-year drought, or possibly even drier, than it is of a one in 100-year event." He added that the Murray-Darling river system, which receives 4% of Australia's water, but provides three-quarters of the water consumed nationally, was already 54% below the previous record minimum. Last month it recorded its lowest ever October flows. Inflow this year was just 5% of the average.
- It is also expected to have a serious impact on crops. Last week, the government forecast its lowest wheat crop for 12 years, a 62% decrease on last year.

(from John Vidal, environment editor The Guardian, Wednesday 8 November 2006)

Climate Chang and Global Warming

affect already seriously on Agriculture

Excessive heat wave (44.5℃) at Chongqing in 2006

Chinese drought affects millions This is the worst drought in 50 years, Xinhua says**At least 18 million people have been affected by China's worst drought in 50 years, according to the state news agency Xinhua.** The south-western region of Chongqing has been worst hit, but areas of Sichuan and Liaoning are also affected.In Chongqing there has been no rain for more than 70 days, and two-thirds of the rivers have dried up, Xinhua said.Residents in some mountain villages are having to walk up to 2km (1.25 miles) to get water. At least one person is said to have died from heatstroke, and Xinhua estimates the drought has caused economic losses of 11.74bn yuan ($1.24bn).

BBC news: Friday, 18 August 2006, 04:13 GMT 05:13 UK

World Cereals Production in 21st Century? If continue 20th Century Agriculture

Negative factors (Crisis):

1） Limiting of cheap energy (fossil fuel limiting as amount and low Energy Profit Ratio)

2) Unbalance of water resources, causing from global warming and wrong land management

3） Low soil fertility by soil erosion and in poor nutrient soil

4） Saturation of high-yielding technology

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Hokkaido Prefecture

- food self-sufficiency rate: about 200%
- energy self-sufficiency rate: about 8%

- The northernmost prefecture in Japan (43° N)
- Area: 83,456 km^2
- Population: 5.6 million (4% of Japan)
- Forested area: 55,424 km^2 (70% of total area)
- Agricultural area: 9,675 km^2 (12% of total area)

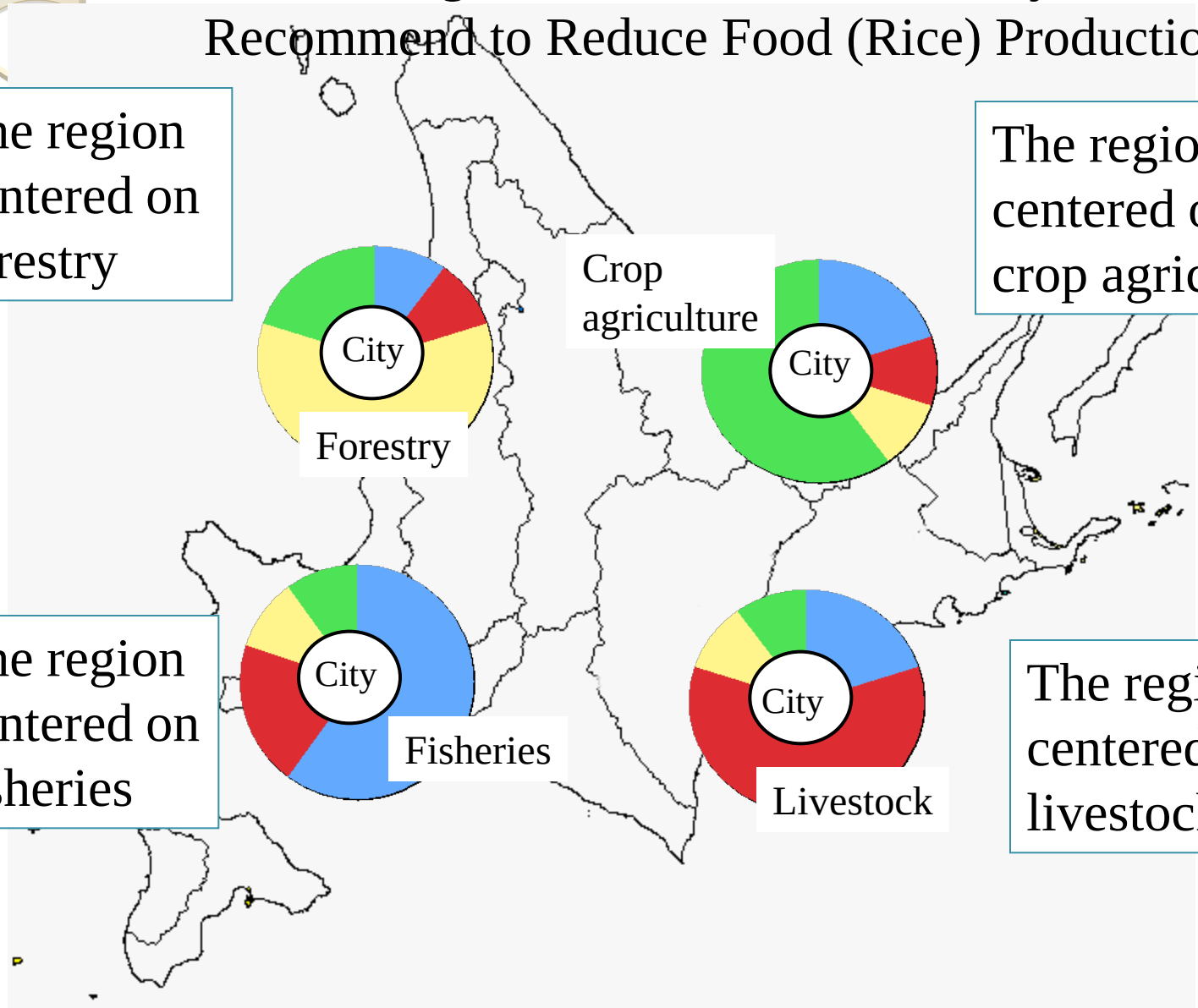
Fossil fuel depend type-Agriculture

What was/is policy of the Hokkaido Agriculture

Large scale/Isolation/Efficiency/
Recommend to Reduce Food (Rice) Production

The region centered on forestry

The region centered on crop agriculture



The region centered on fisheries

The region centered on livestock farming

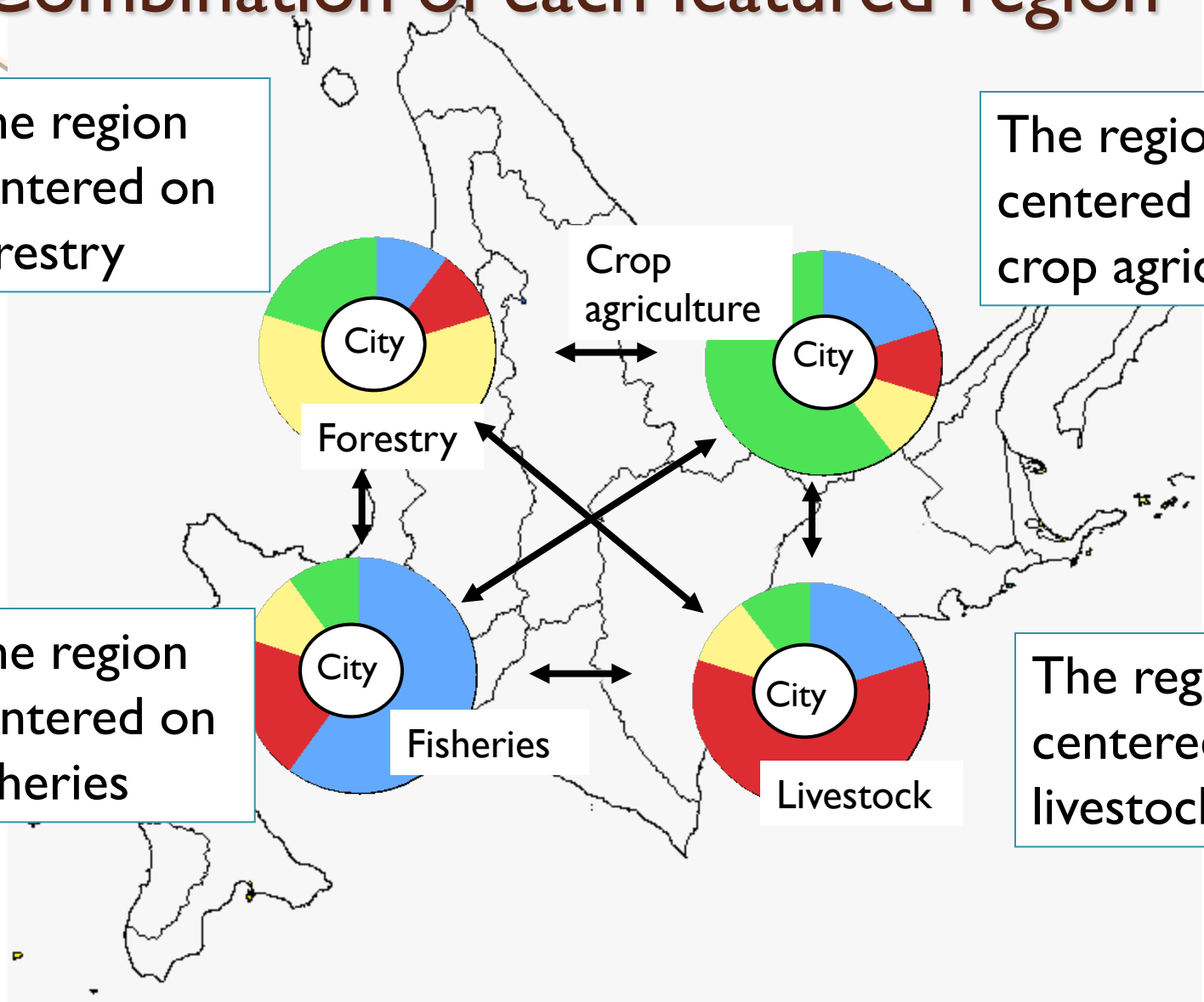
Jühnde Village

Bio-gas plant

Concept of the Hokkaido Model: Combination of each featured region

The region centered on forestry

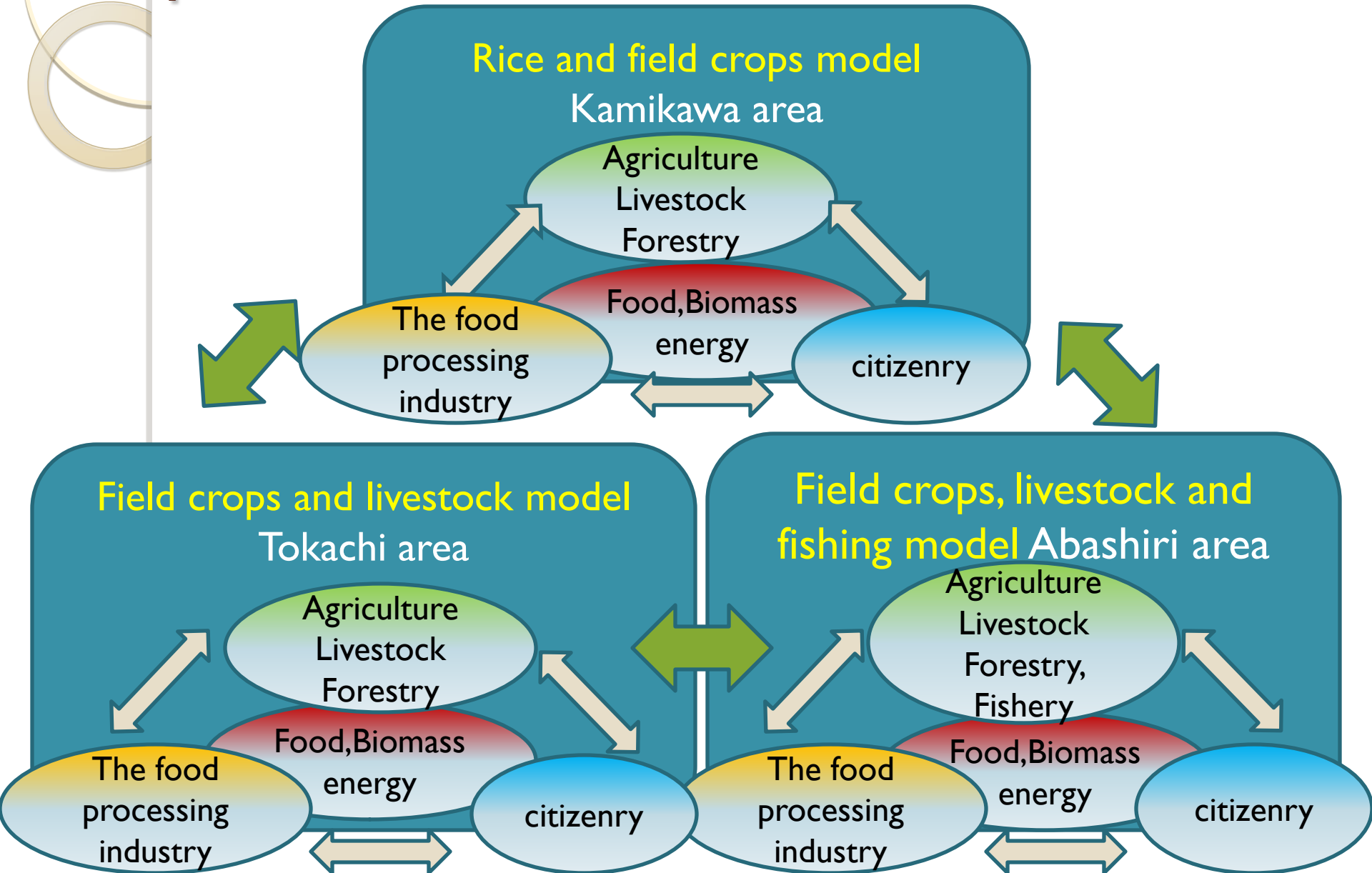
The region centered on crop agriculture



The region centered on fisheries

The region centered on livestock farming

Concept of Hokkaido Model: Complementarities between each area



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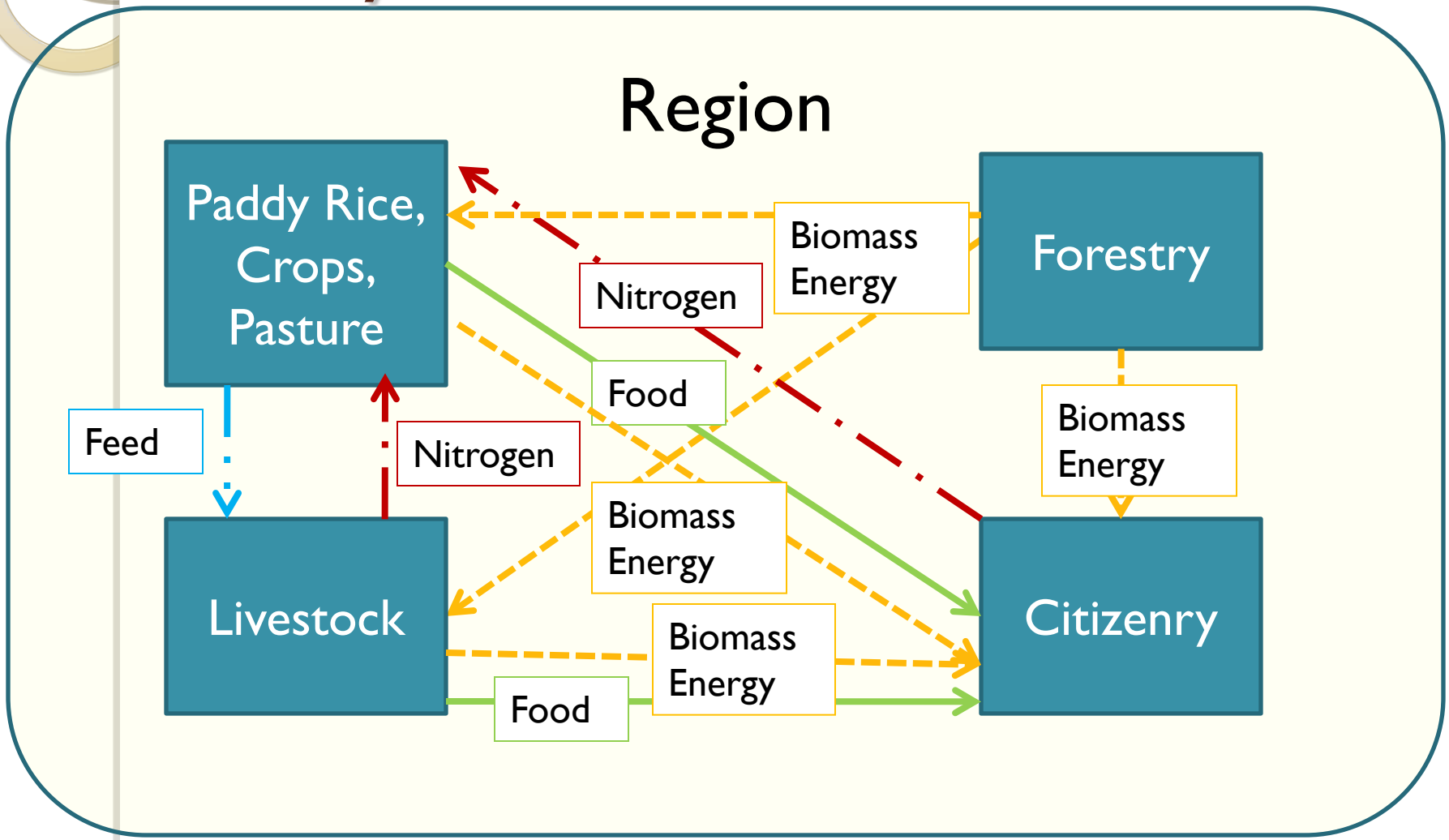
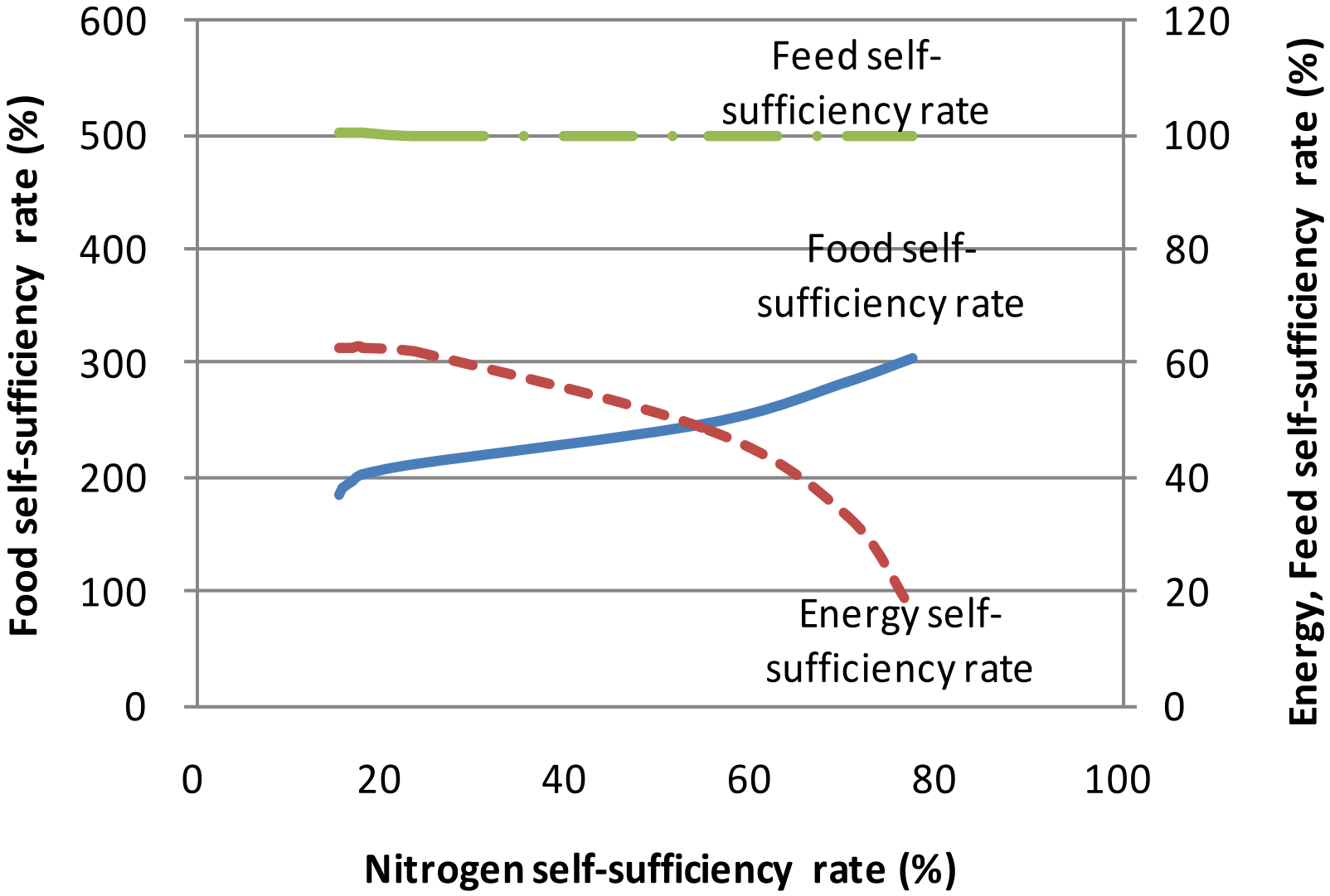
Conceptof material recycling and energy flow among agriculture, livestock, forestry, and citizenry



Results of analysis
Food and energy self-sufficiency rates



Results of analysis

	Current situation	Land use scenario 1	Land use scenario 2	Land use scenario 3
Food self-sufficiency	349%	303%	248%	200%
Energy self-sufficiency	0%	17%	48%	60%
Feed self-sufficiency	88%	100%	100%	100%
Nitrogen self-sufficiency	46%	77%	55%	20%

Conclusion

For the study of food and energy self-sufficiency:

1. Utilization of biomass fitting regional features is important.
2. not only food and energy but also feed and fertilizer have to be considered comprehensively.
3. Concept of organic material recycling among agriculture, livestock, forestry and citizenry is important

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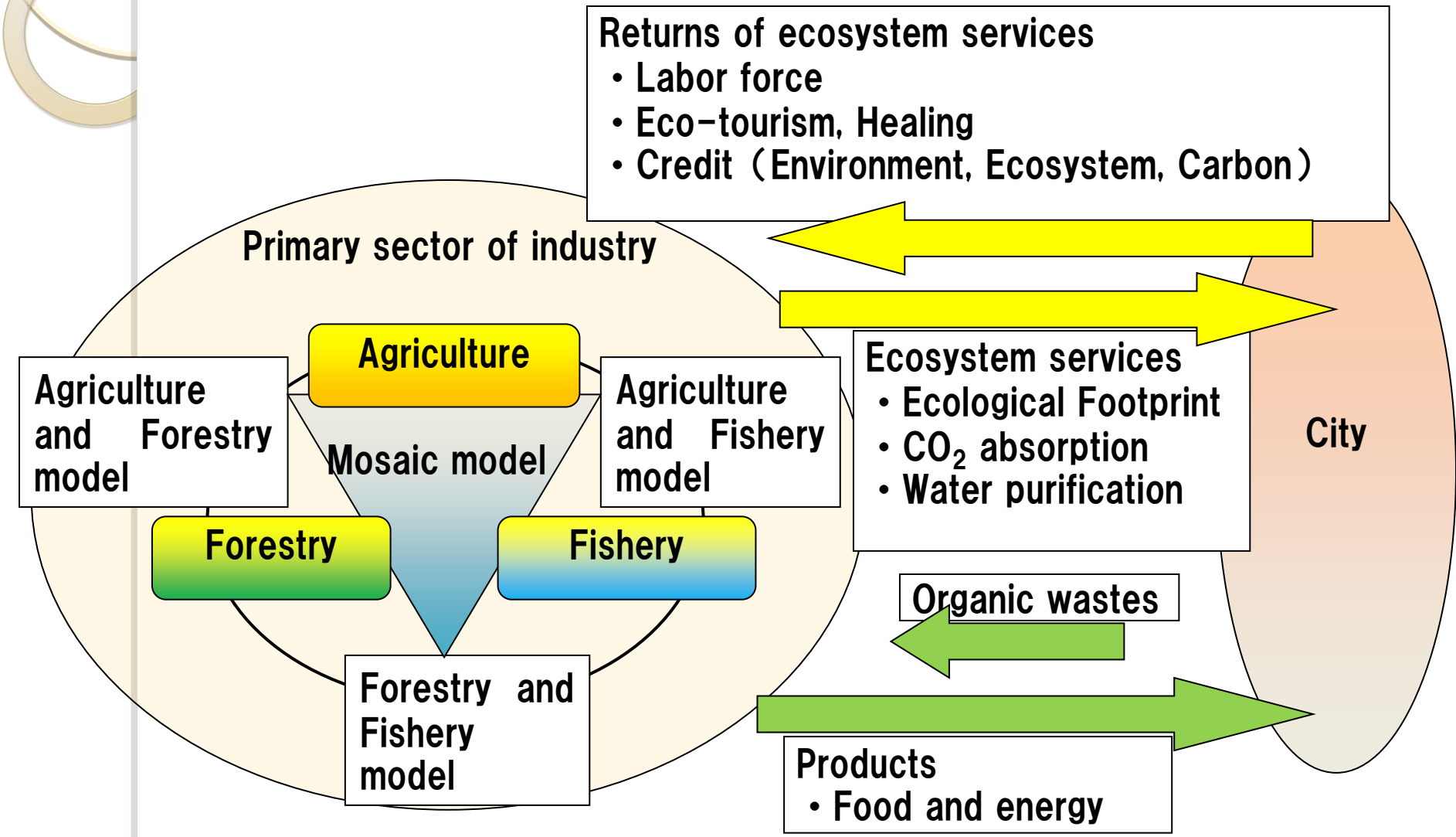
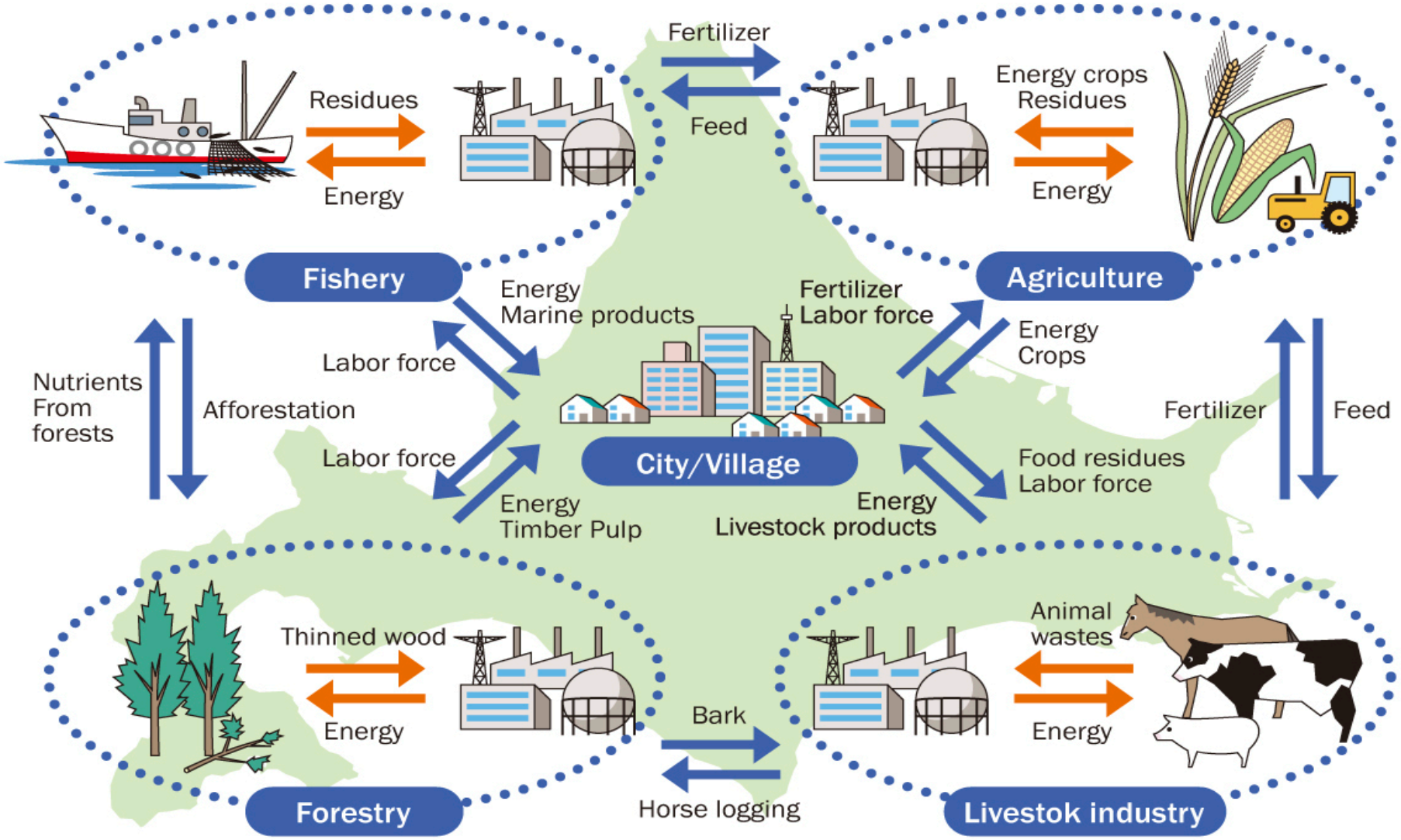
Energy Farming in Germany

1 Thermal and Power unit (Biomass, Wind, Solar) 2 Pelleting, Oil mill, Ethanol unit
3 Animal husbandry 4 Biogas unit 5 Administration

Mosaic model



New agricultural communities



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THANK YOU FOR YOUR ATTENTION!

クラーク会館　講堂　絹幅