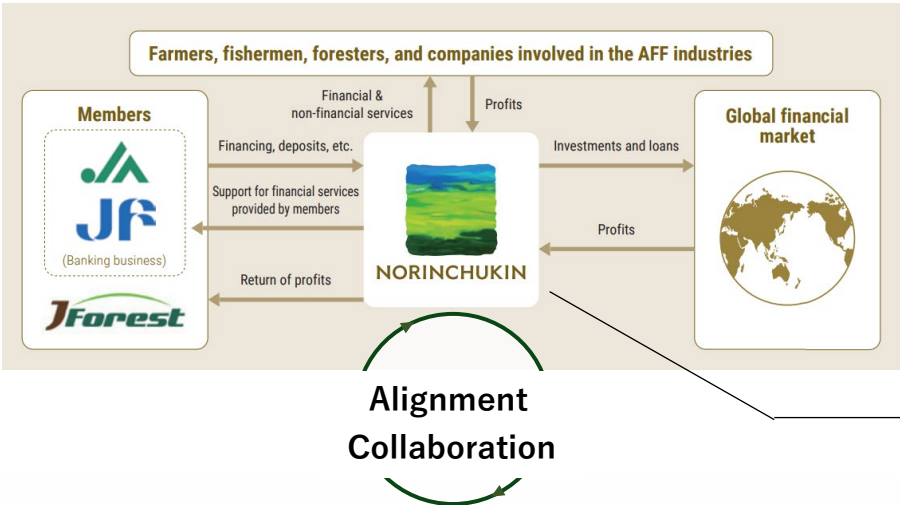


The Use of Sewage Sludge as Fertilizer in Japan and Farmers' Perception

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The Central Co-operative Bank of Japan for Agriculture, Forestry and Fishery

Norinchukin Research Institute Co., Ltd.

- ✓ A think tank specialized in the primary industry sector (agriculture, forestry and fisheries), the food related industry and economy
- ✓ Wholly-owned subsidiary of The Norinchukin Bank

External communications Webner/Reports (Food security, Agricultural policy, Economy) etc.	Sustainability Blue/Biodiversity Credits, TNFD, Circular economy etc.
Commissioned research from companies/government Food-tech, Marketing research of plant factory etc.	Consulting for agriculture companies Process improvement, Marketing, Data managements etc.
Assistance to Cooperative (JA, JF and JForest) Environmental Conservation Farming, Management of organization etc.	Public Sector Policy deliberation committee member etc.

Before Post war economic growth

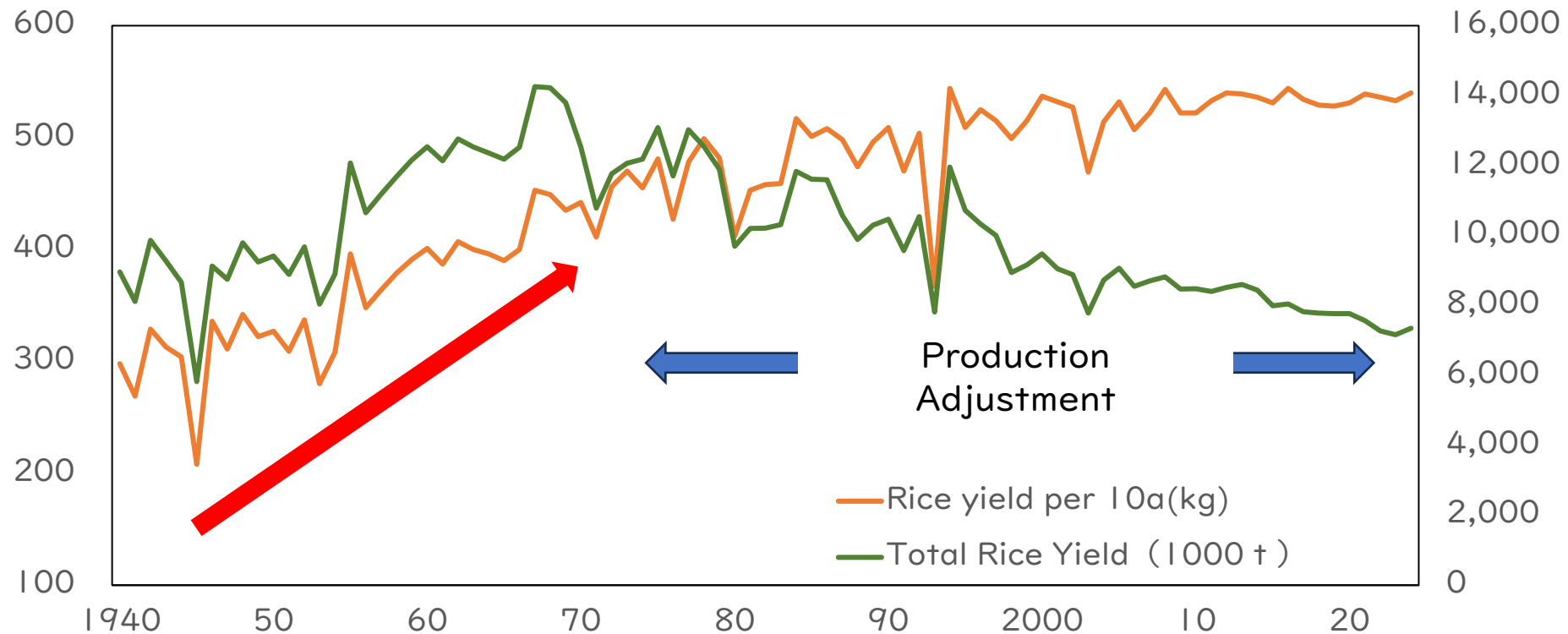


Labor-saving and productivity improvement

■ Background: Decline in rural population under Post war economic growth

- Increased use of Chemical Fertilizers and Pesticides
- The advancement of agricultural mechanization

Long-Term Trends in Rice Production in Japan



The advancement of agricultural mechanization

■ Machinery development based on chemical fertilizer



Major Underutilized resources for fertilizer

Livestock manure



Wood



Sewage



Compost



Digestives



Woody Biomass Ash

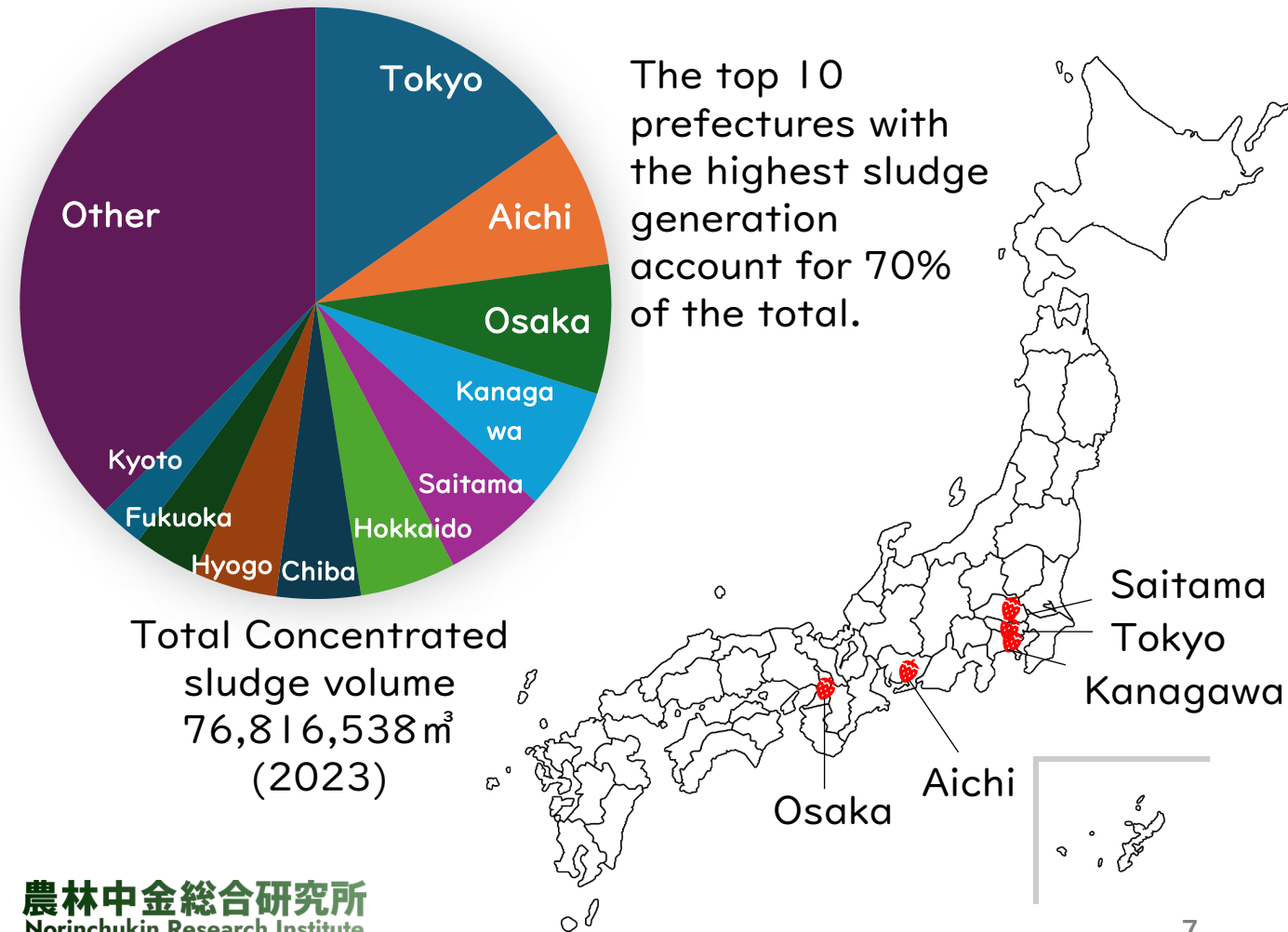


Compost

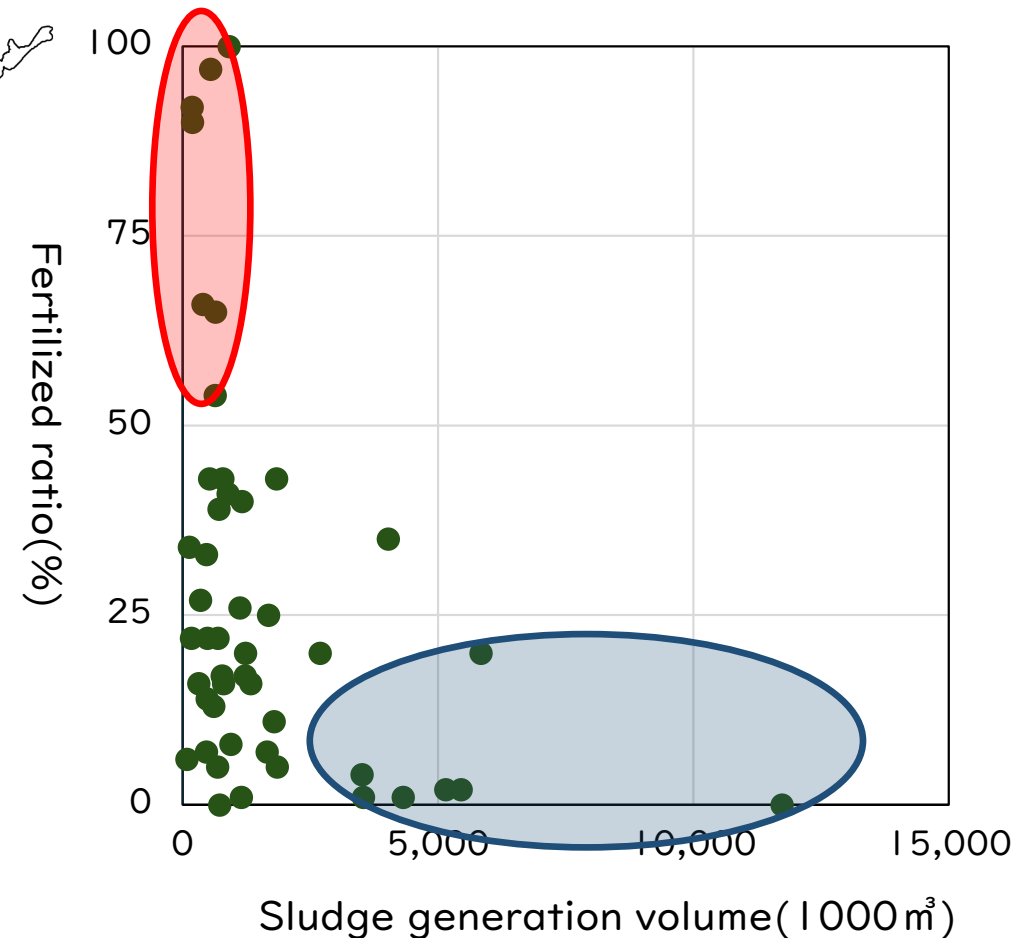


The rate of sewage sludge being utilized as fertilizer

Percentage of Sewage Sludge Generation by Prefectures

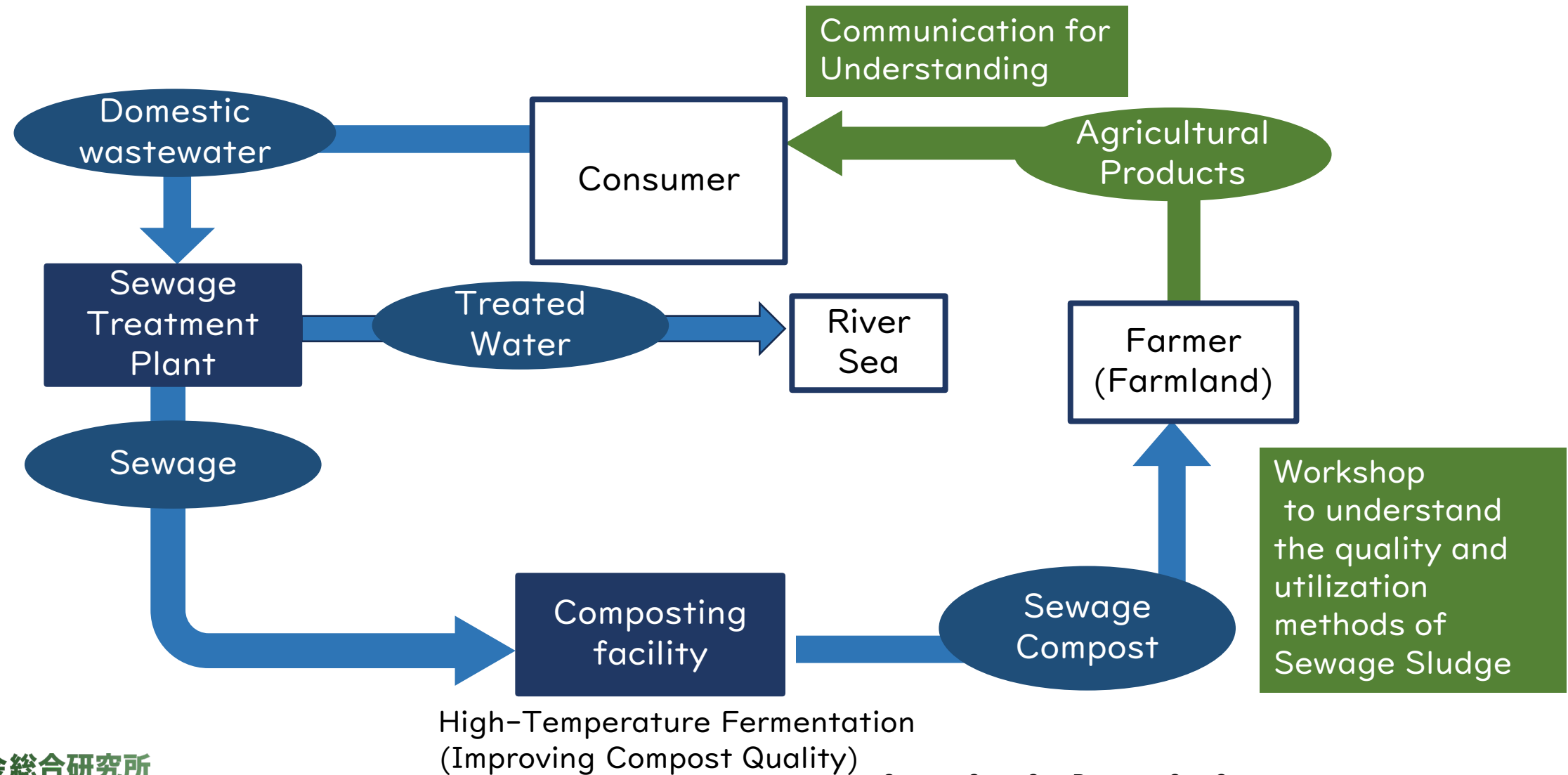


Fertilized ratio and Sludge generation volume by Prefectures



Source: MLIT 's DATA

Sewage sludge compost utilized example in rural area

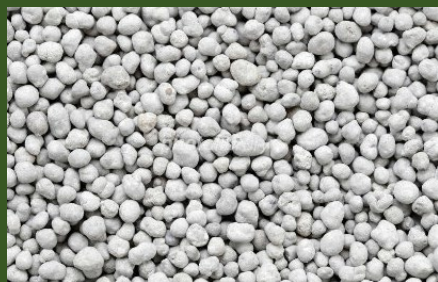


What prevents the usage of Sewage Sludge Compost?

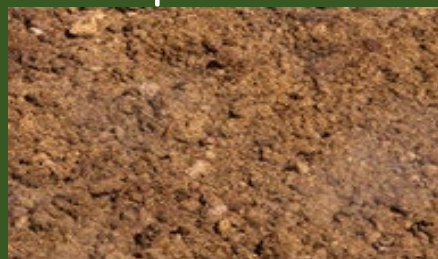
- Difficult to handle compared to chemical fertilizer

Fertilizer Type

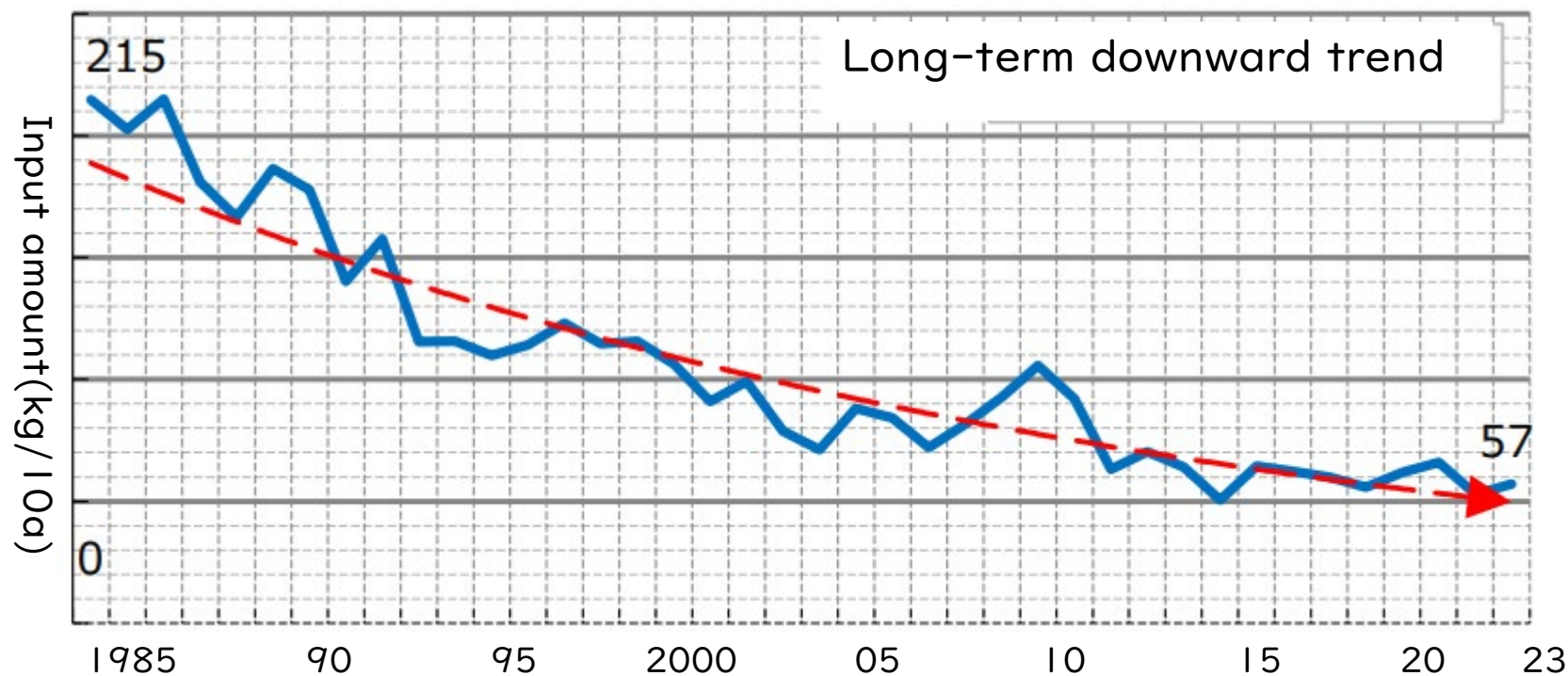
Chemical



Manure Compost



Amount of compost added to rice paddies in Japan



Source; MAFF Survey

What prevents the usage of Sewage Sludge Compost?

■ Concern over safety

The Difference Between Sludge Fertilizer and Microbial Phosphate Fertilizer

	Sludge fertilizer	Microbial Phosphate Fertilizer
Manufacturing Method	Sludge that has been dewatered, dried, composted, or incinerated	
Hazardous substances	Heavy metals (arsenic, cadmium, mercury, nickel, chromium, lead) must be below the standard values.	
	No damage observed in the planting damage test	
Guaranteed Fertilizer Nutrients	—	Phosphoric acid: 1 % or more
Quality control	—	Approval of the Quality Management Plan analysis of fertilizer components and harmful substances at least four times per year
Mixing with other fertilizer	×	○

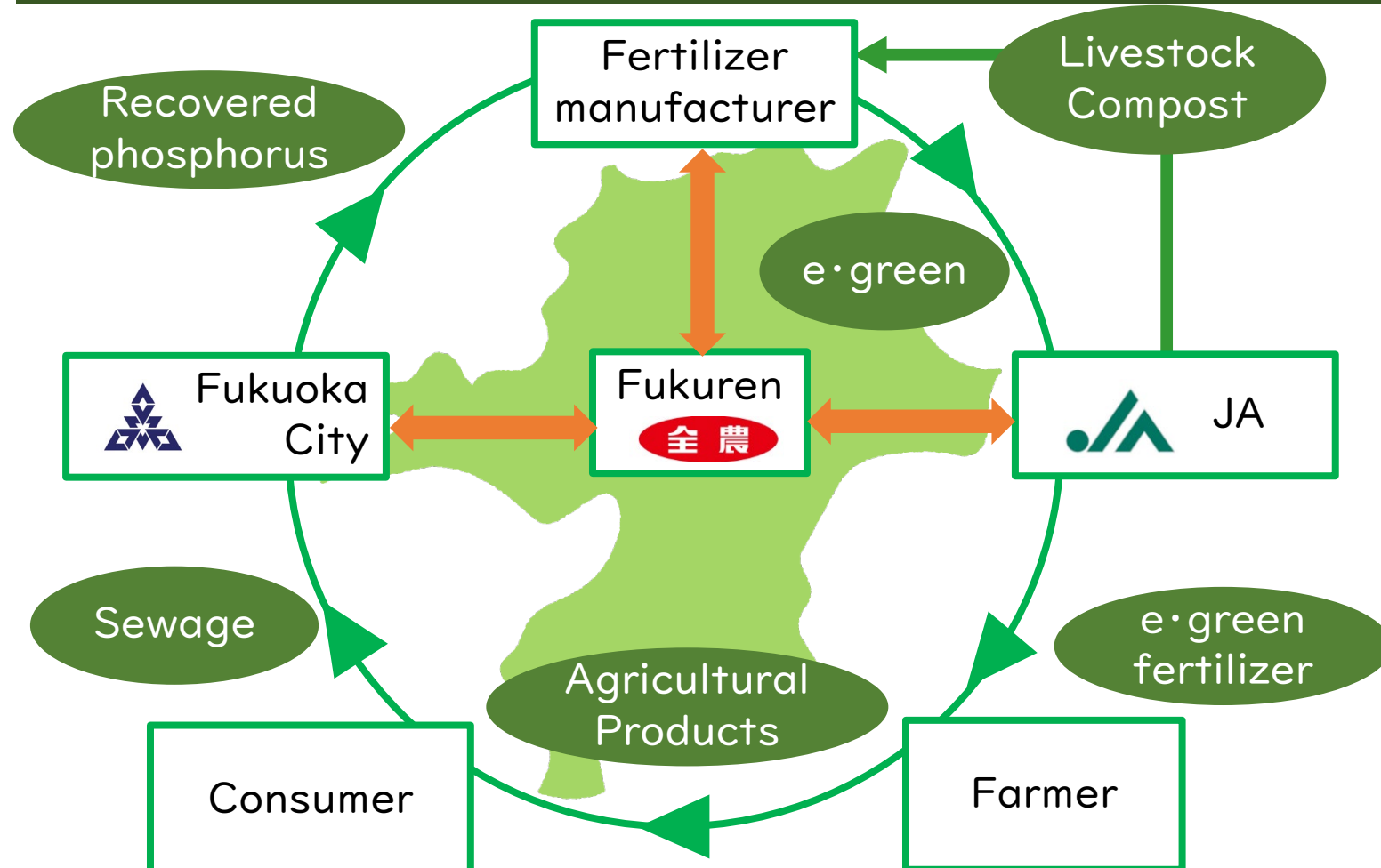
Resource Circulation Utilizing Recovered Phosphorus

e·green series
(New Fertilizer)



【Fertilizer made from raw materials including phosphorus recovered from Fukuoka City sewage and compost from within Fukuoka Prefecture】

Circular Model



To expand the usage of Underutilized resources

■ Flexible Strategies to implement

- Tailored to the Unique Circumstances of Each Region

■ Safe and Secure to Use

- Transparency and communication
- Ensure the Quality of material

■ Improved usability

- Cultivation method utilizing underutilized resources