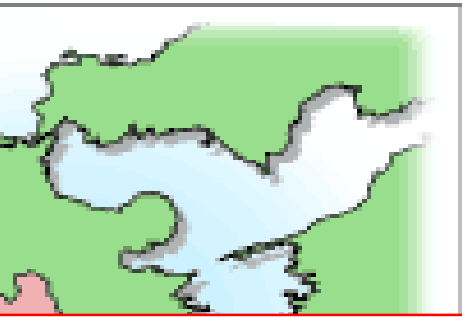


Multi-stakeholders' collaboration to conserve groundwater in Kumamoto City, Japan



Kumamoto City



Yumiko Asayama

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Stockholm World Water Week 2018 Asia Focus: Natural Alternative to Water Storage

Kumamoto City :

A World-Class Pure Groundwater City

- Water Supply for the 740,000 residents of Kumamoto city is 100% drawn from Groundwater
- Blessing the nature of Volcanic Mt. Aso



Kiyomasa Kato
Master of River Management



Flow of Groundwater in Kumamoto Region



Multi-Stakeholders' Collaboration beyond administrative district and positions have been awarded in Japan & global scale

- **June 2008: Grand Prix Award of the 10th Japan Water Prize**
- **March 2013: UN Water for Life : Water Best Practices Award**
- **Outcomes of the achievement by systems making and these implementations for more than 40 years**



Examples of the Multi-stakeholders' Collaboration with innovative system makings

Kumamoto City	The Kumamoto Ground Water Foundation (a Public Interest Incorporated Foundation)	Higo Water and Greenery Protection Fund
<ul style="list-style-type: none"> - Plan, Implement and monitor varieties of measures in line with the Regulation for Groundwater conservation and Groundwater Protection Plan, Kumamoto City Nitrate-Nitrogen Reduction Plan, etc - Conduct flood paddy fields between interim period of crop conversion in summer 	<ul style="list-style-type: none"> - Established April 2012 by local residents, private sectors, ' area municipal governments - To protect wide areas of groundwater among 11 cities, town, and village through the survey of groundwater environment, conservation of groundwater quality, groundwater recharge, and encouragement for proper use - Supported by Kumamoto Clear Water Alliance (voluntary Body which bridge citizen, public & private sectors) - Conduct rice fields flooding using vacant fields in winter 	<ul style="list-style-type: none"> - Established September, 1992 - Leadership by Higo Bank (local bank) & Multi-stakeholders' participation - Endorsement: 210 million yen (donated by Higo Bank and its group companies) - Engage in awareness building and award program to encourage the practical actions, forest conservation, rice fields flooding for recharge to conserve groundwater in Aso and environment

Regulation to protect Groundwater



Encouraged by local residents to protect the areas of groundwater source

- 1976: “Declaration of the Groundwater Preservation City”
- **1977 : Regulation was entered into force**
- 2007: Revise and update the regulation to **protects both the quality and volumes of its water sources**

➤ Basic concept of the regulation

- 1. Groundwater is public common property for all citizens**
- 2. Sound Water Cycle**
- 3. Collaboration among multi-stakeholders**
- 4. Integrated measures**

- Describe the role of various stakeholders from private sectors to citizens

Regulation to protect Groundwater

1) Conserve water quality:

- Private company has to control the chemical materials
- Farmers have to control chemical fertilizer and spray

2) Create groundwater through recharge:

- Developers & Constructors has to install the facilities for groundwater infiltration
- Groundwater extractor more than 30 thousands m³ little per year has to conduct the efforts for groundwater recharge and report it to Mayer.

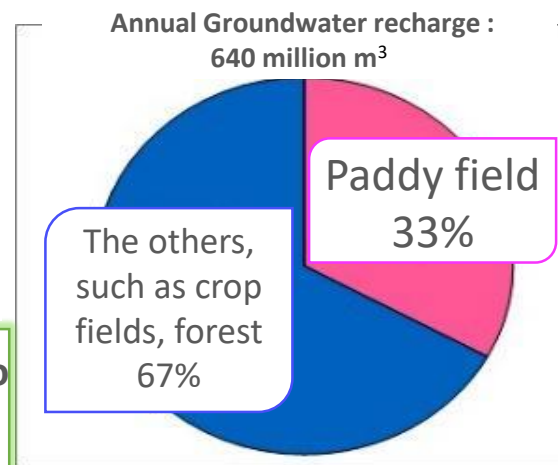
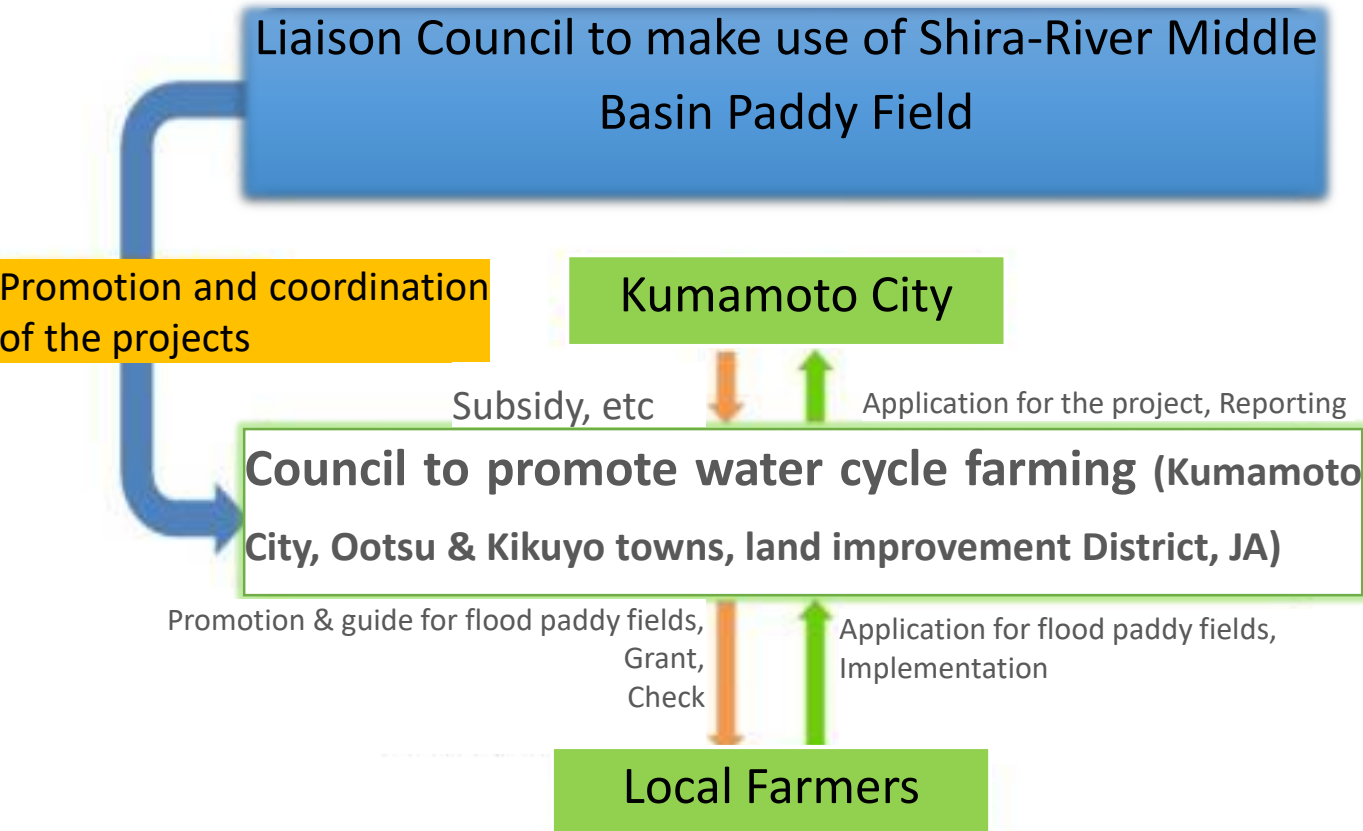
3) Water saving activities

- Constructors has to install water-saving water supply facilities
- Constructors and residents who develop new buildings and houses have to install rainwater infiltration facilities
- Groundwater extractor more than 30 thousands m³ little per year has to submit the plan for water saving and the outcomes to Mayer.

Creating Groundwater through recharge



- **Project to flood in the converted paddy fields since 2004** (first attempt in Japan)
- **Area Coverage:** the middle area of Shira-River watershed
- **Period:** May to October
- **Co-benefits with pest control and nitrogen reduction in the field crops**



Used Water Off-set Program

(correspond to 41,120m³ groundwater recharge in 2017)

Provide agricultural and livestock products grew up in the recharge area



Groundwater recharged areas

Groundwater users

By buying and eating such local agricultural and livestock products, compensate for groundwater use and support agriculture



Payment for Eco-system service

Flood Paddy Fields

Days	Payment to partner producers
1 month	11,000 Yen /1000m ³
2 month	16,500 Yen/1000m ³
3 month	22,000 Yen/1000m ³

1USD: 112 yen as of 28 Aug

Retail Price of Premium Rice

- Conventionally-grown rice: 1850 yen /5 kg
- **Eco-Rice: 1950 yen/5 kg**
- **Make 5 kg of rice will create 100t groundwater**
- **Create 1500 litter water per a cup of rice cup**



A cup of rice

Kumamoto Prefecture Regulation stipulates the registered groundwater extractors can contribute to groundwater recharge by donation to the Kumamoto Groundwater Foundation

Donation by registered groundwater extractors at the focus area:

- 0.3 yen/ m³ of extraction
- 50,000m³×0.3 yen = 15,000yen (amount of donation)
- 1 yen corresponds to 0.333m³ groundwater recharge



Forest Conservation and Groundwater recharge through rice paddy fields

Aso Program

- **Tree planning, undergrowth mowing at a 52-hectare area of forest in the Mt. Aso area (since the areas' purchase in Feb 2006)**
 - Over 10,000 tree-planting volunteers, plant over 120,000 trees
- **Rice Paddy Flooding Program**
 - Partnered with Aso City to begin it to reduce the abandoned rice paddies and recharge groundwater



Award and certification programs to promote groundwater conservation



Example by Higo Water and Greenery Protection Fund Charitable Foundation

Higo Water and Greenery Protection Award (subsidy program)

- Implemented annually since 1987 by Higo Bank by teaming up with Prefecture government and newspaper company
- Support organizations, voluntary groups, and individuals in municipality, who have been consistently and actively engaged in groundwater conservation with environment

Example by Kumamoto City

Kumamoto Mizumori

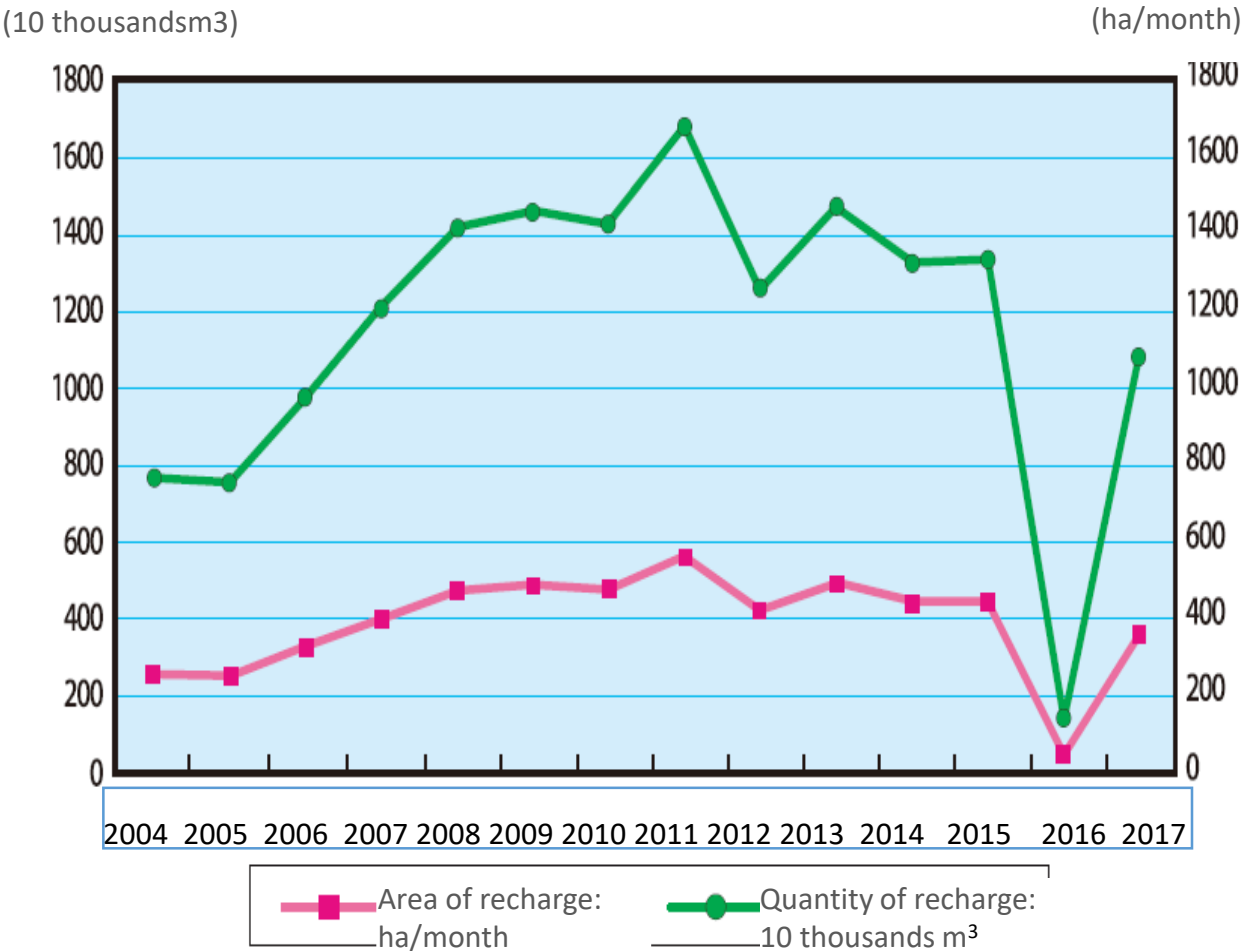
Those who work to promote and protect Kumamoto's water and water culture are registered and given the title "Kumamoto Water Protector". They then carry out human resources training and information sharing activities

Examples by Kumamoto Groundwater Foundation

Award for Groundwater conservation

Award the private companies and groups who conduct groundwater conservation activities. Submit report by scoring the activities

Achievement for 14 years about the flood paddy fields and quantity of groundwater recharge



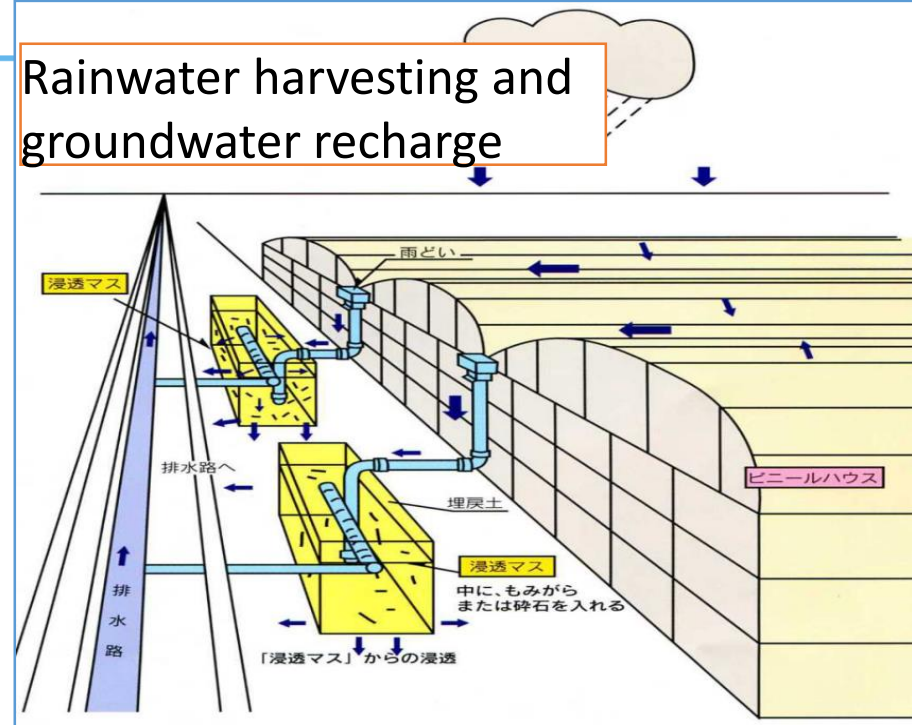
*** The areas and quantity of recharge was reduced due to the tremendous impacts of disasters of heavy rain in July 2012 and M7 earthquake in April 2016**



Capability of resilience from the disaster has been developed as the outcomes of long-term collaboration between city, residents, and private sectors



Rainwater harvesting and groundwater recharge



- Wells for disaster periods for residents were made in various places with the agreements between city and private sectors.
- Hand pumping assists during blackout

Lessons & Key Messages



- The understanding of groundwater based on science and values for local topography, history & socio-culture facilitate the implementation for nature-based solution and certain budget support for that
- Importance to seek the pathways for solutions by sharing the issues both from quality and quantity of groundwater among the overall basin area.
- The roles of the facilitating organizations are the key in covering the activities in the wide areas, particularly the areas where an organization cannot implement due to their administrative barriers.
- Payment for eco-system service has worked for those who understand the values of groundwater and local environments as well as efforts by various stakeholders, and these will also contribute to local's economic revitalization. Innovation for awareness buildings are the key.

Thank You!

Acknowledgements

- Kumamoto City, Environment Department, Water Conservation Division
- The Foundation for the preservation of green and water resources of Higo