

# Biwa Lake-to-Land Integrated System



Shiga Council for Promoting Agriculture, Forestry and Fisheries that Coexist with Lake Biwa

## Lake Biwa

Lakeside line extension  
About 235km

The largest in Japan  
Area: 670.25 km<sup>2</sup>

Water storage:  
About 27.5 billion m<sup>3</sup>  
Drinking water for about  
14.5 million people

Japan's only ancient lake  
One of the third oldest  
lakes in the world with a  
history of 4.4 million years

## Area Information



Position

Population (March 1, 2021)

1,411,168 people

Annual average temperature

(2019)

15.8 degrees Celsius

Annual Precipitation

about 1,570mm

Life expectancy (male) (2015)

81.78years old ※No.1 in Japan

Participation Rate in Volunteer Activities(2016)

33.9% ※No.1 in Japan

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## Lake Biwa

## Ecosystem with abundant nature

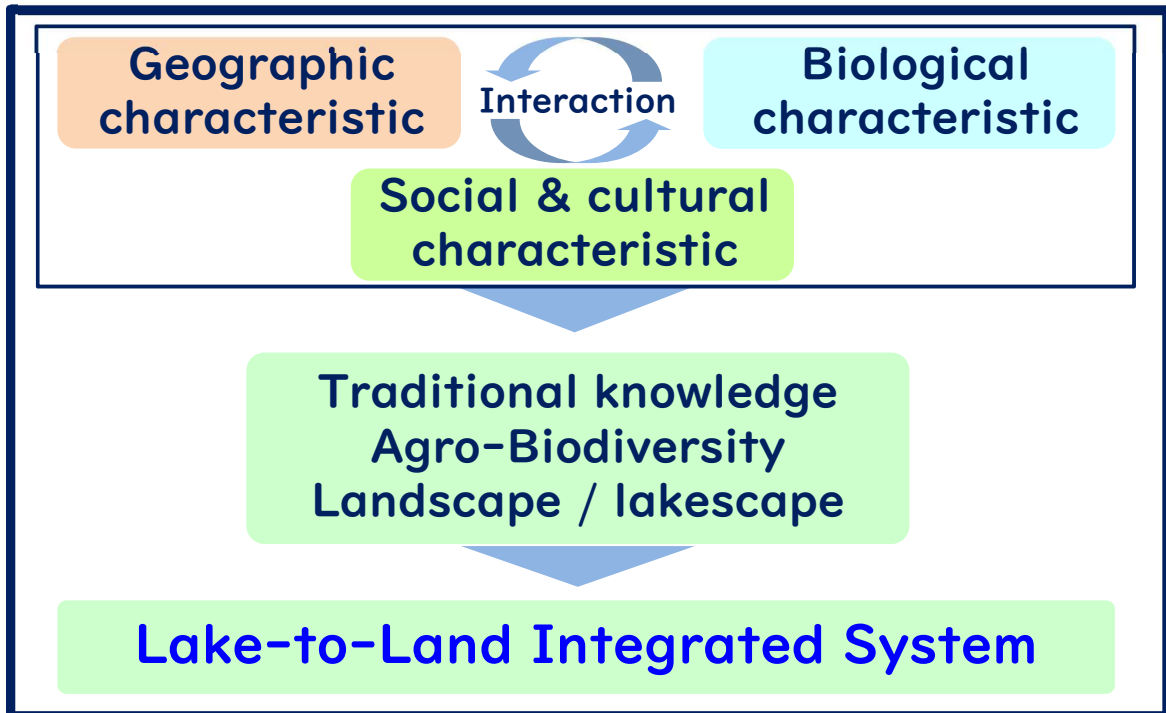
### 琵琶湖&川の魚



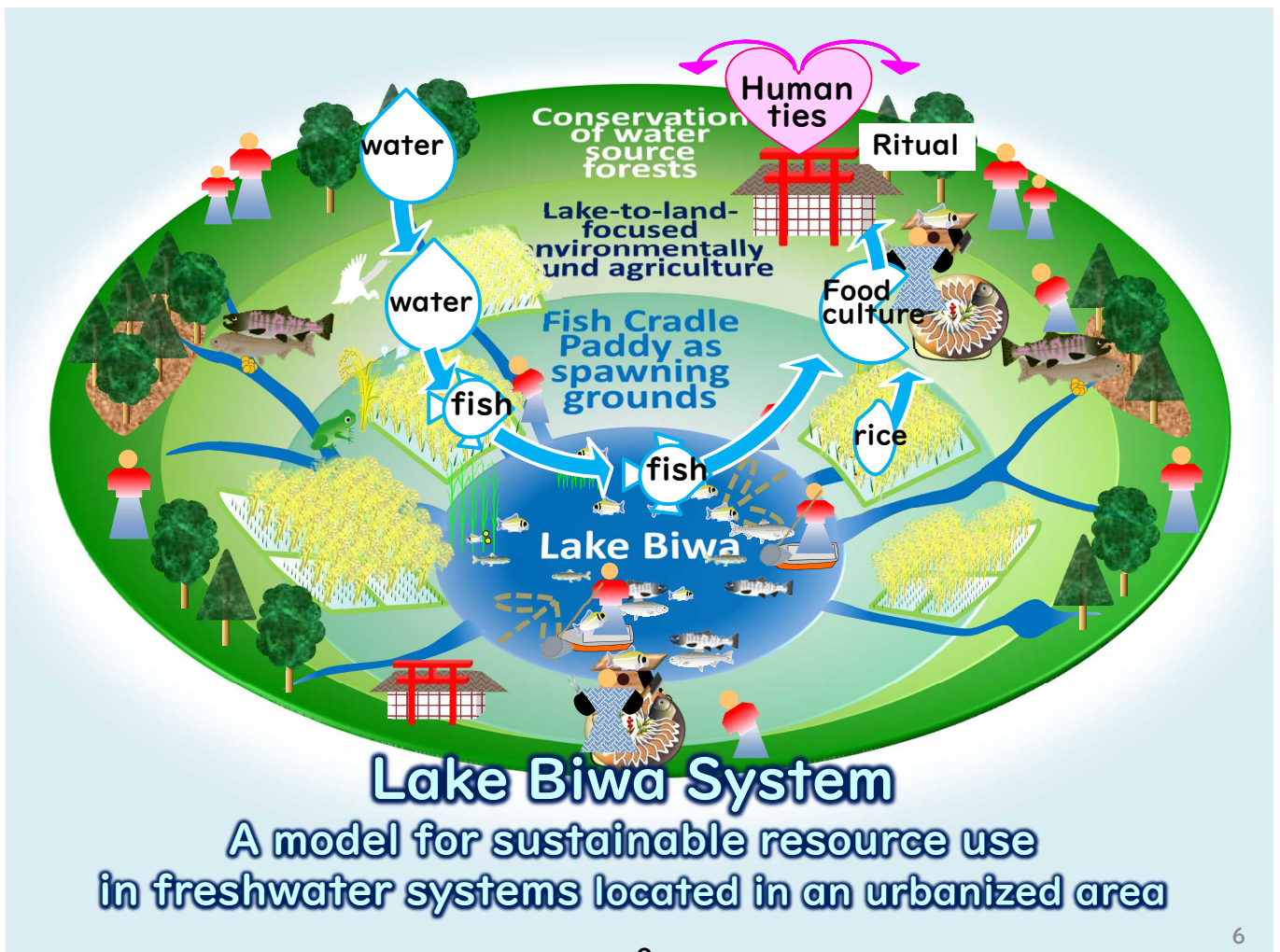
We are thoroughly exterminating invasive alien fish that threaten the ecosystem of Lake Biwa by strengthening the extermination by fishermen in 1999.

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# Interactions between Humans and Nature



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# Fish Cradle Paddy

Serving as Spawning Grounds for Lake Fish



Fish Cradle Paddy dates back to the Yayoi period (BC300-AD300). There is archeological evidence of paddy development around Lake Biwa.

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# Fish Cradle Paddy

Serving as Spawning Grounds for Lake Fish



Lake fish come to Fish Cradle Paddy to spawn

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# Traditional *Eri* Fishing

has been passed down along with social structures



琵琶湖の伝統漁法 エリ漁

This is *Eri*.

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## Traditional Lake-Fish Oriented Food Culture and Festival

**Nare-zushi, fermented fish for preservation**



**Funa-zushi**  
(round crucian carp)



**Hasu-zushi**  
(three lips)



**Kokera-zushi**  
(Biwa salmon)



**Moroko-zushi**  
(Honmoroko)

**Other traditional local cuisine**



**Ebi-mame**  
(shrimp with beans)



**Isaza Jun-jun**  
(Isaza with vegetables)

**Narezushi has been used as ambrosia**



**Sushi-cutting festival**  
Shimo-niikawa shrine

# Traditional Lake-Fish Oriented Food Culture and Festival

滋賀県の郷土料理 鮒ずし

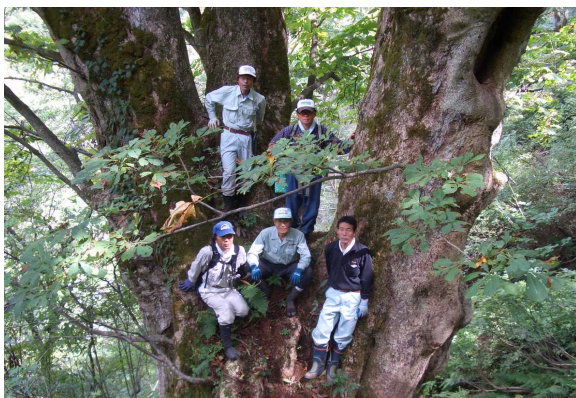
Funazushi, a preserved food made by pickling lake fish in rice for fermentation.



Funazushi has been associated with festivities around Lake Biwa. The most exemplary of these is the Sushikiri-matsuri.

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# Water Source Forests Conservation



Traditional Lake Biwa fisheries have been supported by water source forest conservation efforts led by various actors.

Proposed designated forests are limited to areas that meet both conditions:

- ① Located in the areas of rivers where lake fish migrate upstream
- ② Site for forest building efforts with local participation

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# The Outbreak of Freshwater red tide



During the 1970s, fishermen who come in contact with the waters of the lake daily, reported freshwater red tide, this drew attention to eutrophication issues.

Eutrophication is a condition where bodies of water such as lakes are inundated with high levels of nutrients containing nitrogen and phosphorous. Excessive eutrophication causes abnormal increases in phytoplankton which results in outbreaks of freshwater red tide or blue-green algae.

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# The Historic “ Soap Movement ”



Public campaigns to use soap instead of synthetic phosphorus detergents led to the enactment of the Ordinance Concerning the Prevention of Eutrophication of Lake Biwa in 1979, based on which **reduced fertilizer use and measures to treat agricultural wastewater were promoted** in the agricultural area surrounding Lake Biwa.

# Biodiversity and Food Web Fostered by Rice Farming



# Landscape Conservation



Designating a Special District for Lake Biwa Landscape Development to conserve the landscape along the coast of Lake Biwa



# Characteristics of the Proposed System



1. Food and Livelihood Security



2. Agro-biodiversity



3. Local and Traditional Knowledge Systems



4. Cultures, Value Systems and Social Structures



5. Landscapes and Lakescapes Features

Promoting the designation of the agriculture, forestry and fisheries that have co-existed with Biwa Lake as GIAHS

Participation Rate in Volunteer Activities(2016)

33.9% ※No.1 in Japan

Number of Rural Communities by Frequency of Holding Meetings(2010)

No.1 in Japan

# Promoting the designation of the agriculture, forestry and fisheries that have co-existed with Biwa Lake as GIAHS



**Thank you for your attention**

**Please enjoy fully interaction with local people and historic profundity of Lake Biwa region. We hope that today will be an amazing day for us and Dr. Bustamante!**



# Action Plan for Dynamic Conservation of the Biwa Lake-to-Land Integrated System



## Contents

- Threats and Challenges
- Responses and Efforts
- Future Prospects
- Our Mission and Responsibility

# Threats & Challenges



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## Threats to the Proposed System

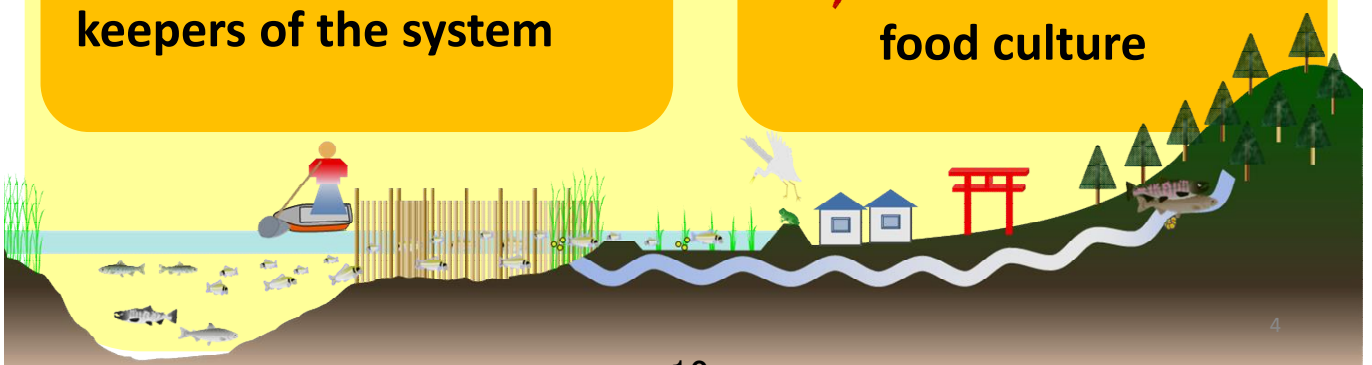
**Threat 1**  
Changes in the spawning and breeding environment of lake fish

**Threat 4**  
Weakening of social structures

**Threat 2**  
Decreasing number of keepers of the system

**Threat 3**  
Deterioration of food culture

Vicious cycle (minimize)



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# Threat 1

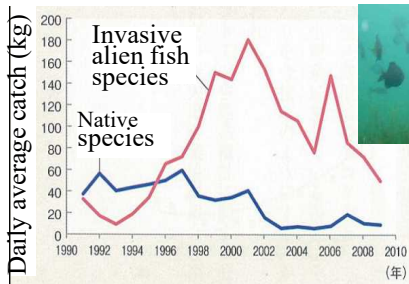
## Changes in the spawning and breeding environment of lake fish

1970s-  
Red tide outbreak



- Found by fishermen
- Citizen-led campaigns
- Ordinance for prevention of eutrophication

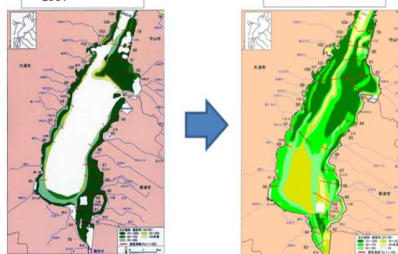
1990s- Extraordinary increase of invasive species and aquatic plants



Bluegill

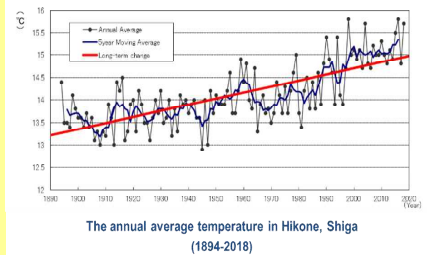
Fisheries catch using *eri* off the coast of Hieitsuji, Otsu (yearly changes in average daily catch(kg)).

Expansion of area covered with underwater weeds (southern part of Lake Biwa)



Climate change

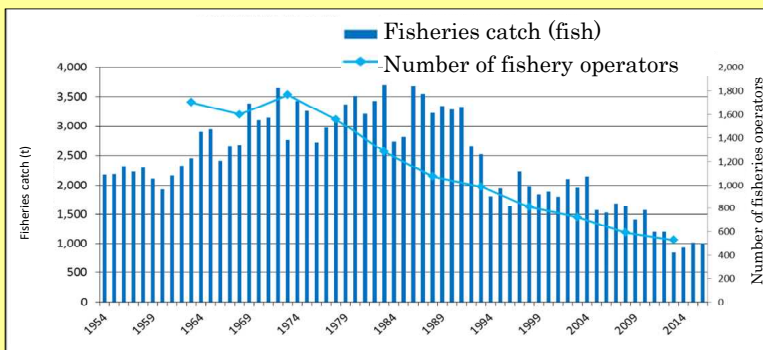
Trend in the average temperature: +1.3°C in 100 years



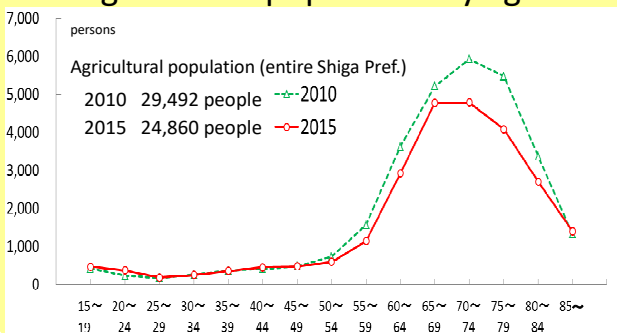
# Threat 2

## Decreasing number of keepers of the system

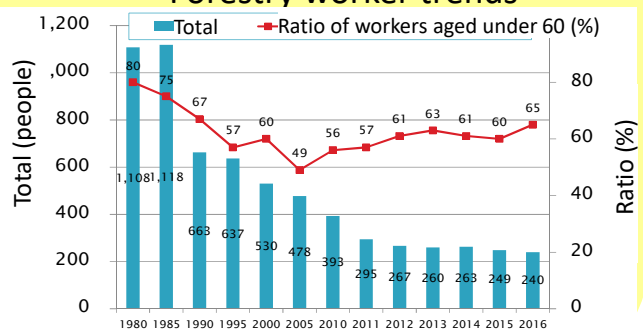
Lake Biwa fisheries catch (fish) and the number of fishery operators



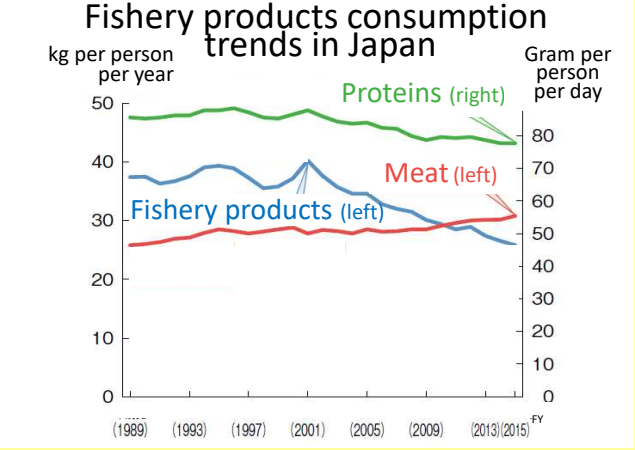
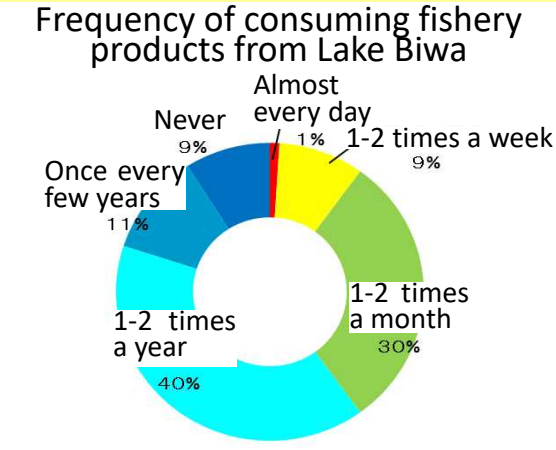
Agricultural population by age



Forestry worker trends



## Threat 3 Deterioration of food culture

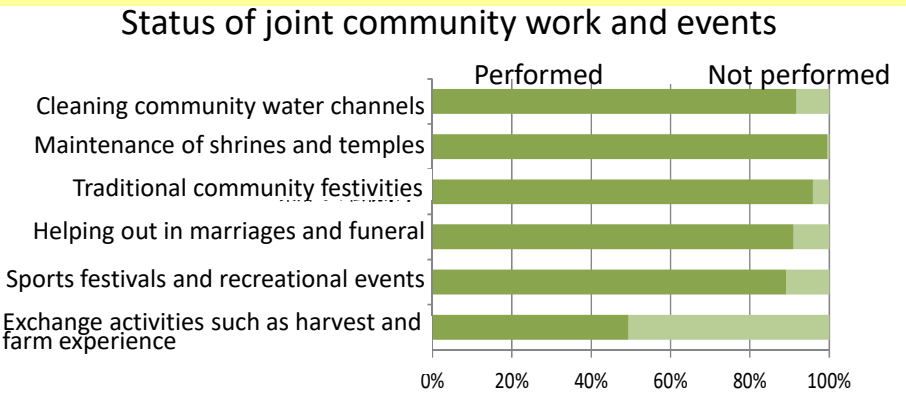


Cooking class to use lake fish



Children trying to make *funazushi*, traditional fermented fish

## Threat 4 Weakening of social structures



Women's group from the village-operated agricultural association sorting vegetables

### Challenges in carrying out community events and joint work

Challenge	(%)
No challenges currently faced	52.1
Few people are willing to hold events, so some are difficult to keep	13.5
With the aging population and depopulation, few people are available for preparations	13.1
Few people attend events, which are therefore less exciting	7.9
Other	10.4
No response	3.0



Local activity for reed conservation

# Responses & Efforts

## Four pillars to enhance sustainability

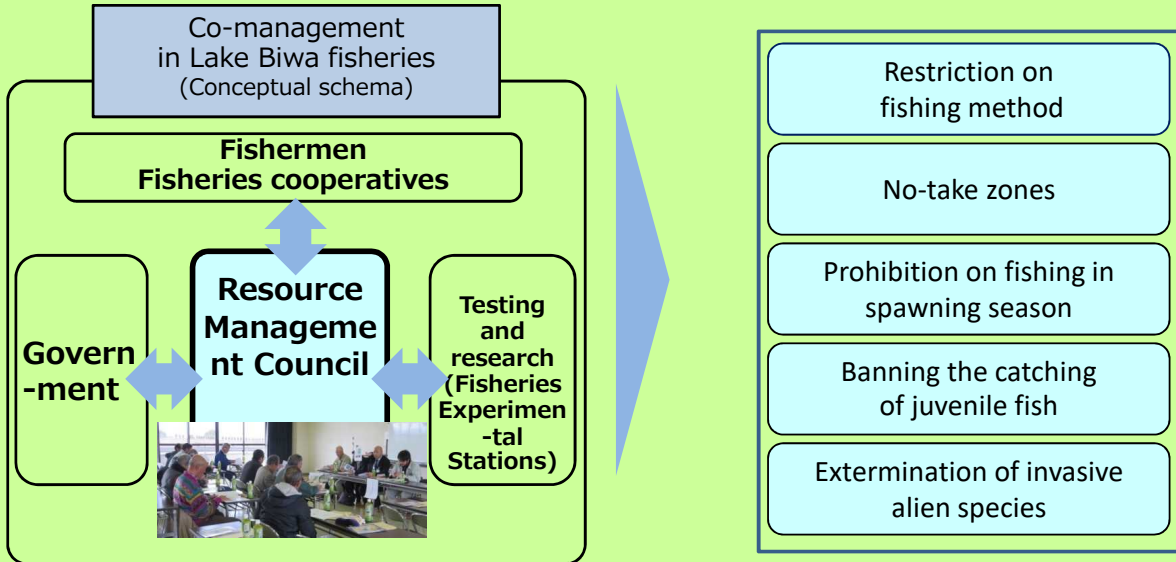
- ① Utilizing and passing down the traditional knowledge that has fostered the sustainable system
- ② High environmental concern, participation of various actors, incl. farmers, forestry workers, researchers and consumers



## Response 1 - 1 (Resource Management Fisheries) (Threat 1 [Changes in the spawning and breeding environment of lake fish]-related)

### ➤ Conserving and managing fisheries resources

Resource management-oriented fisheries, juvenile fish releases, research and studies



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## Response 1 - 2 (Conservation of Water Quality) (Threat 1 [Changes in the spawning and breeding environment of lake fish]-related)

### ➤ Increasing production and further pursuit of Lake to Land-Focused Agriculture-certified produce



### ➤ Conserving and utilizing reed bed

Promoting reed bed conservation efforts, utilization of reed



### ➤ Conserving water source forest

Proper forest management, collaborative forestation



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## Response 1 - 3 (Conservation of Ecosystem) (Threat 1 [Changes in the spawning and breeding environment of lake fish]-related)

### ➤ Promoting the removal of harmful organ

Invasive alien fish species, cormorants, aquatic plants



### ➤ Conserving spawning grounds

Promoting Fish Cradle Rice Paddy and reed bed conservation efforts



### ➤ Conservation of biodiversity led by various actors

Environmental education, promoting environmental conservation efforts



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## Response 1 - 4 (Addressing Climate Change) (Threat 1 [Changes in the spawning and breeding environment of lake fish]-related)

### ➤ Research studies on the environment of Lake Biwa

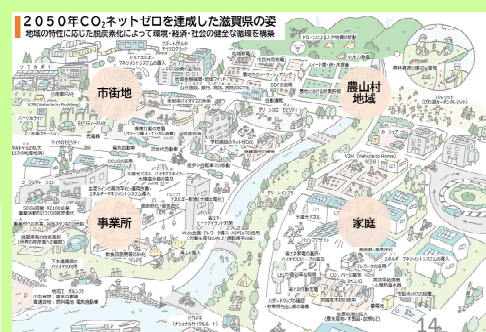
Research and monitor the impacts of climate change



Lake Biwa Environmental Research Institute

### ➤ Shiga CO<sub>2</sub> Net Zero Movement

Fighting to reduce CO<sub>2</sub> emissions in Shiga Prefecture to net zero by 2050



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## Response 2

(Threat 2 [Decreasing number of keepers of the system]-related)

### ➤ Securing and fostering new bearers

- Fisheries training program
- Agriculture workshop



### ➤ Inheritance of traditional knowledge

- Fishing tour to experience eri fishing and witness the diversity of lake fish
- Learning program for water source forest conservation



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## Response 3

(Threat 3 [Deterioration of food culture]-related)

### ➤ Preserving and passing down food culture and traditional culture



Funazushi - making workshop



“Biwa salmon Oyako-don,” an entry by the Young Fishermen’s Association, wins the Grand Prize at the Fish-1 Grand Prix in Tokyo



Culinary education using lake fish

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# Response 4

(Threat 4 [Weakening of social structures]-related)

## ➤ Promoting community-based partnerships

- Women's group from the village-operated agricultural association sorting vegetables



## ➤ International Cooperation



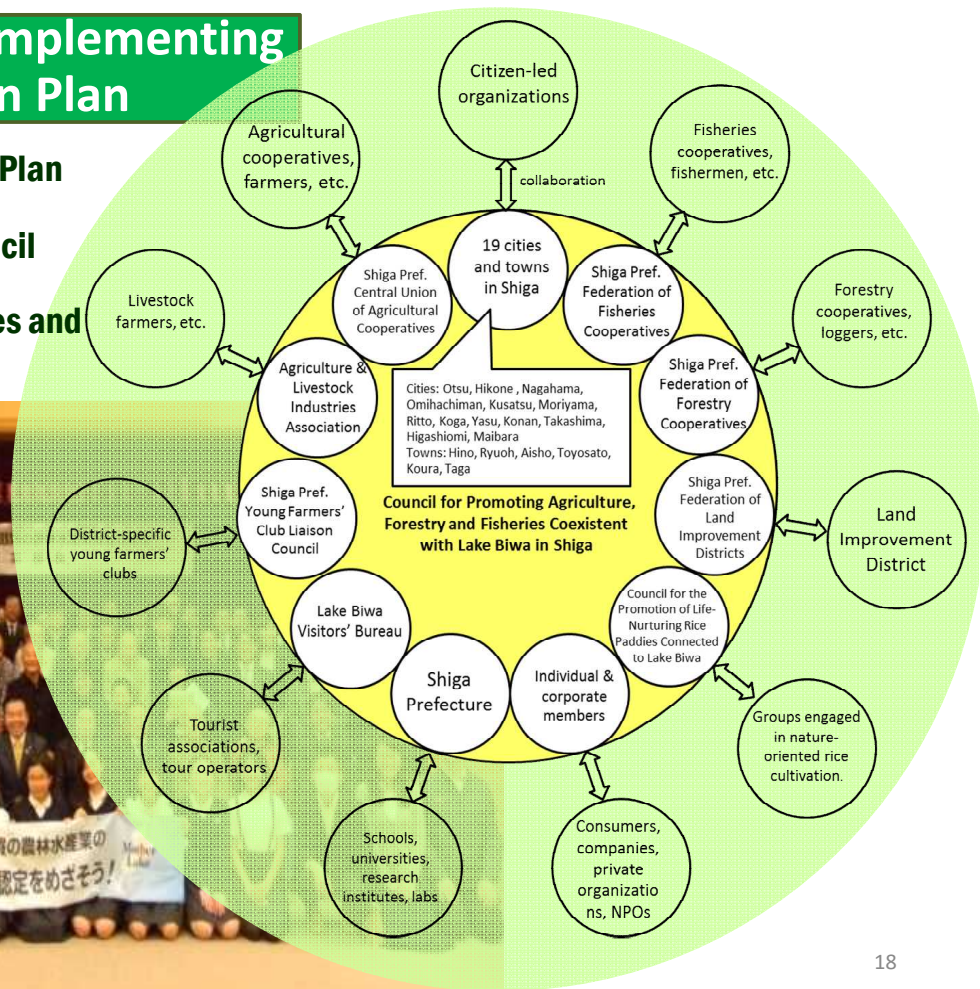
World Lake Conference—  
Shiga proposed and hosted  
the 1st conference in 1984



International Lake Environment Committee  
established in 1986 based on a partnership  
with UN Environment Program

## Framework for Implementing the Action Plan

- The budget of the Action Plan will be comprised mainly monies provided by Council members, such as the Prefecture, municipalities and other organizations.



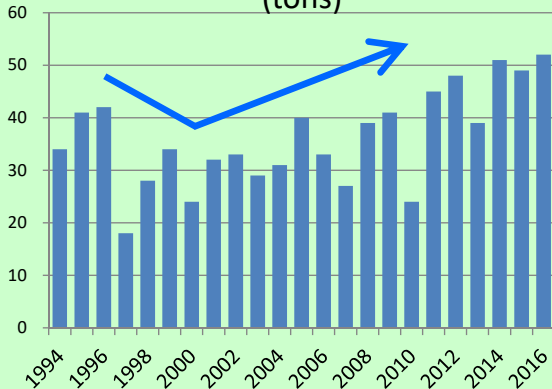
Consumers, incl. children, and other actors participate in collaboration



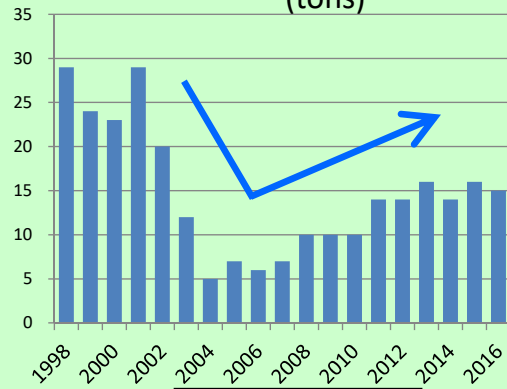
# Current Outcomes

## Recovery of Catch

Round crucian carp catch (tons)



Honmoroko catch (tons)



Posters on resource management of round crucian carp stocks and Honmoroko stocks

## Expected outcomes: Future prospects

- ① Increased participation by various actors
- ② Balanced achievement of both inland fisheries and agriculture through water quality and ecosystem conservation
- ③ Communicating the value of lake-to-land-focused practices and further global partnerships

### "Six-way benefits"



Producers

Consumers

Children

Living Creatures



Lake Biwa



Global Inland Fisheries

# Inland Fisheries around the World

Inland fisheries play an important role in providing food and employment, and in supporting culture throughout the world.

However, amid rapid population growth and urbanization, **the demand for inland fisheries and the environmental burden attributable to the agricultural sector are increasing, particularly in Asia and Africa, thus posing a risk of freshwater resource depletion.**

**FAO is concerned about** threats to the sustainability of inland fisheries around the world.

World capture fisheries production



World Capture Fisheries Production (Inland Waters) (The State of World Fisheries and Aquaculture, FAO, 2014)

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## We will pass down the Lake Biwa System

by communicating the value of lake-to-land-focused environmentally-sound practices, and inviting consumers and other actors to participate in collaborations with people around the world



Water & Fish



Water & Fish



Fishery products



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