

River friends in Suwon, Korea

Aug, 2012

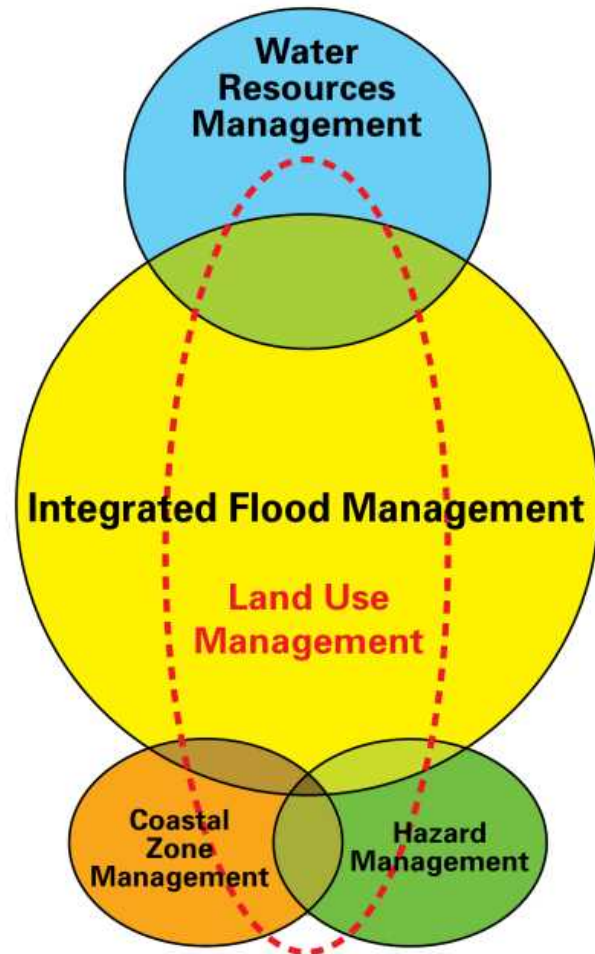


4 Questions about IWRM

1. How should we share the existing knowledge and database on IWRM?
2. How should we mobilize knowledge into practical work?
3. How should we echo with SDGs target on IWRM?
4. How should an international community contribute to make use of Knowledge on IWRM?

Shiga's challenge to Integrated Flood Management (IFM)

IFM and IWRM



Two keywords of Shiga's IFM:

1. Flood risk Assessment
2. Residents' viewpoints



4 topics

1. Overview of Shiga Prefecture
2. Flood record in recent years
3. Shiga's Integrated Flood Management
4. Practice

Fig.1) WMO, Integrated Flood Management Concept Paper, WMO-No.1047, 2009

Location of Shiga Prefecture



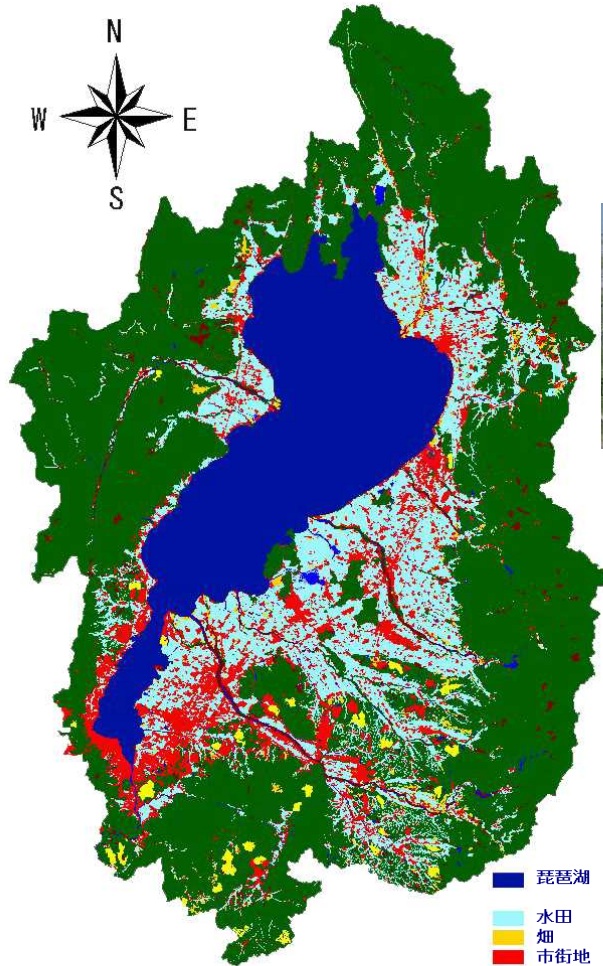
Location of Shiga Prefecture

Lake Biwa



Statistics of Shiga

■ Population 1,416,500
 ■ Area 4,017 km²

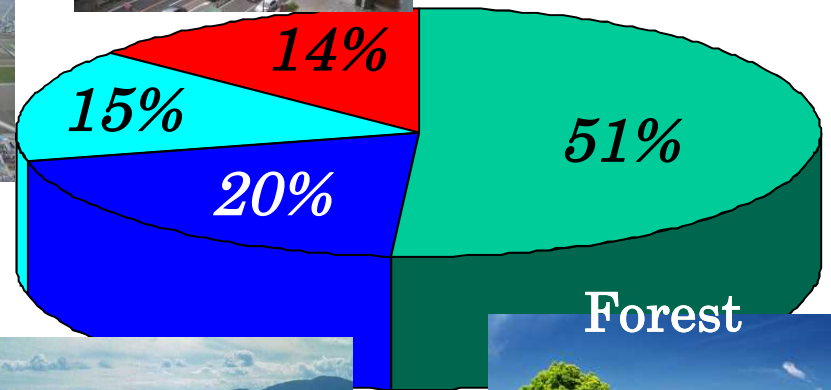


- | | |
|---------|-------------|
| ■ 琵琶湖 | Lake Biwa |
| ■ 水田 | Paddy Field |
| ■ 畑 | Field |
| ■ 市街地 | Urban Area |
| ■ 森林 | Forest |
| ■ ゴルフ場 | Golf Course |
| ■ 湿地・湿原 | Wet Land |
| ■ 開放水域 | Open Waters |
| ■ その他 | The Others |

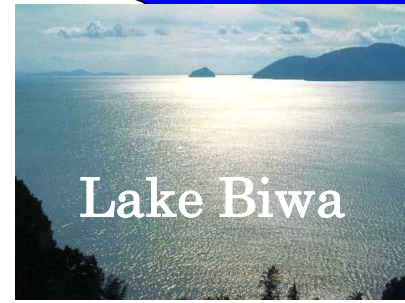
Farmland



Urban Area



Forest



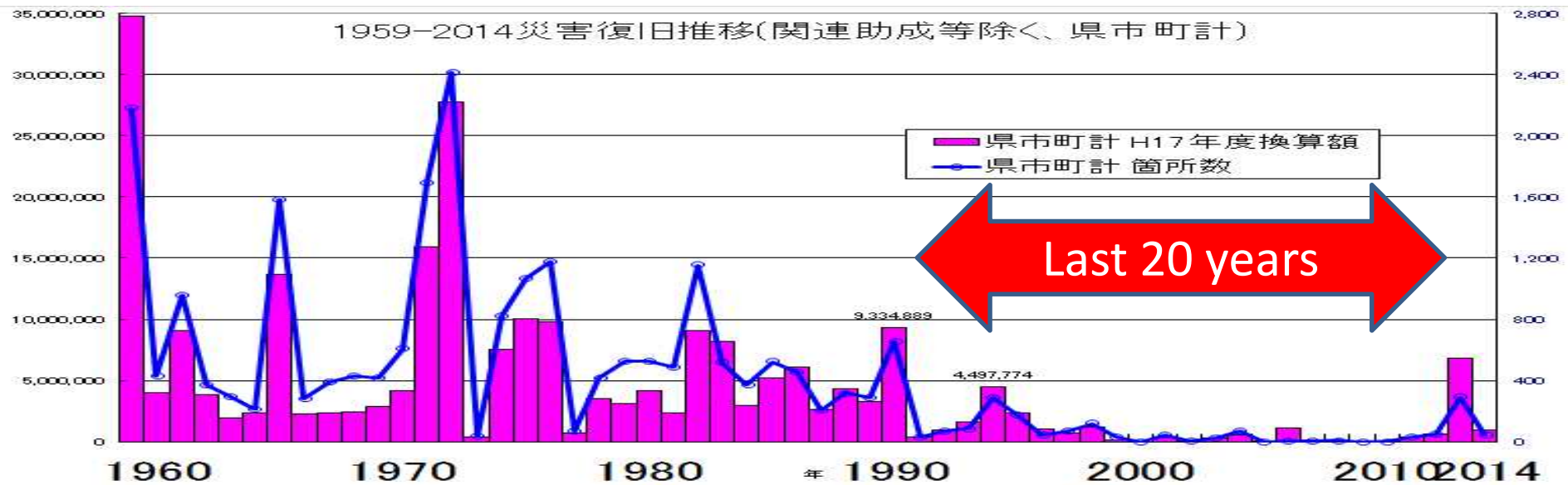
Lake Biwa



- Forest
- Open water (Lake & Rivers)
- Farmland
- Urban Area & The Others

滋賀県GISデータを用いて琵琶湖研究所山本研究員が作成したものである。
 Mapped by Dr. YAMAMOTO (Lake Biwa Research Institute) using SHIGA Pref. GIS DATA.

Floods in recent years : Background



Public works facility disaster restoration costs

- For the two decades between 1990-2010, people was able to forget flood disaster.
- On September 16th, 2013, a huge typhoon “Man-yi” hit Shiga prefecture.

Sep 16th, 2013, a huge typhoon “Man-yi” Shigaraki-city



Rainfall
41mm/hour

09/15	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00
60分雨量 (mm/h)	14	7	4	1	11	5	2	27	33	18	17	25
累加雨量 (mm)	38	45	49	50	61	66	68	95	128	146	163	188
09/16	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00
60分雨量 (mm/h)	6	14	13	13	41	34	15	9	9	2	0	0
累加雨量 (mm)	194	208	221	234	275	309	324	333	342	344	344	344

Takashima-city (Along the Ado river)

Normal

Sewage-treatment
plant

2 houses

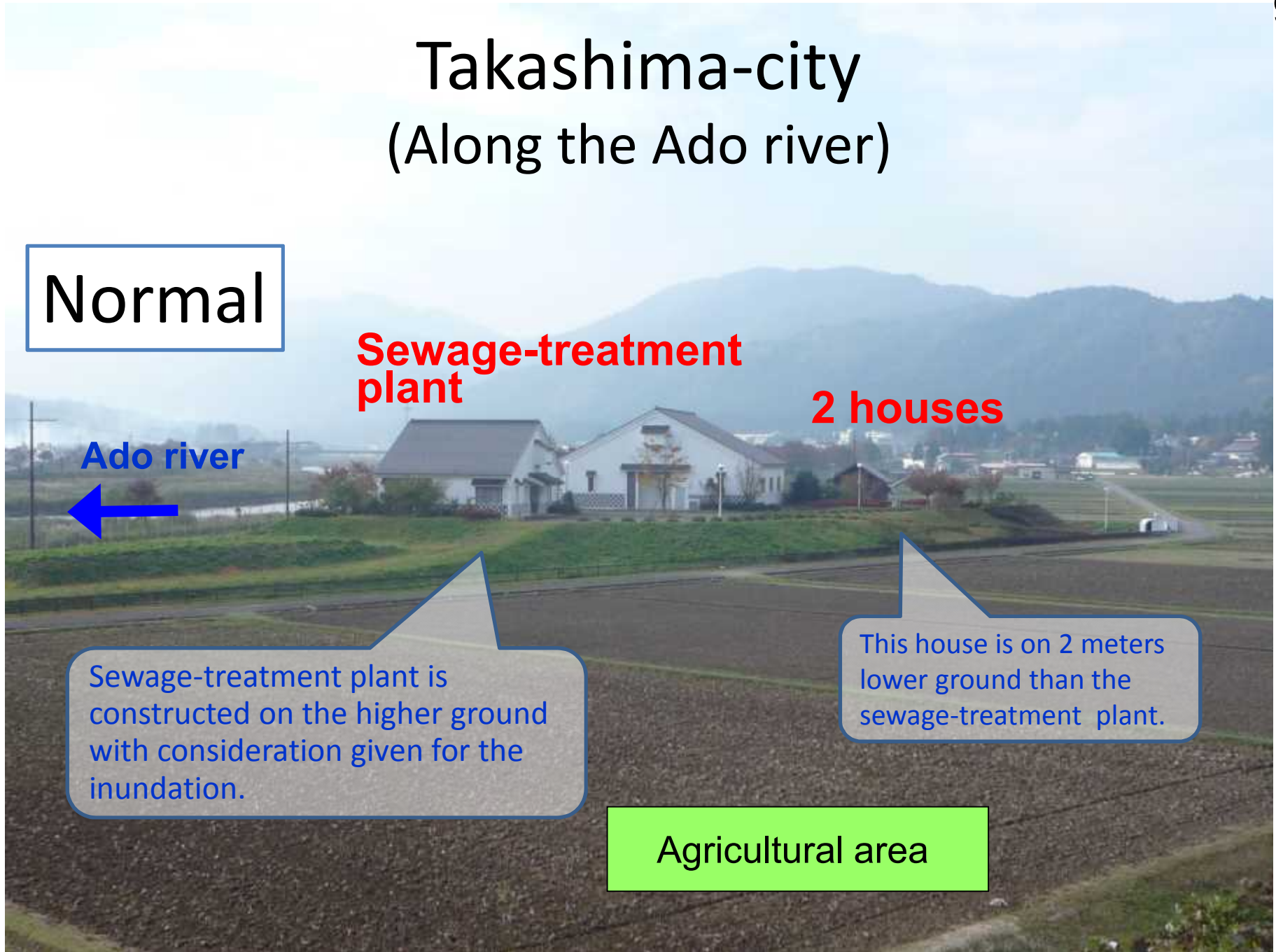
Ado river



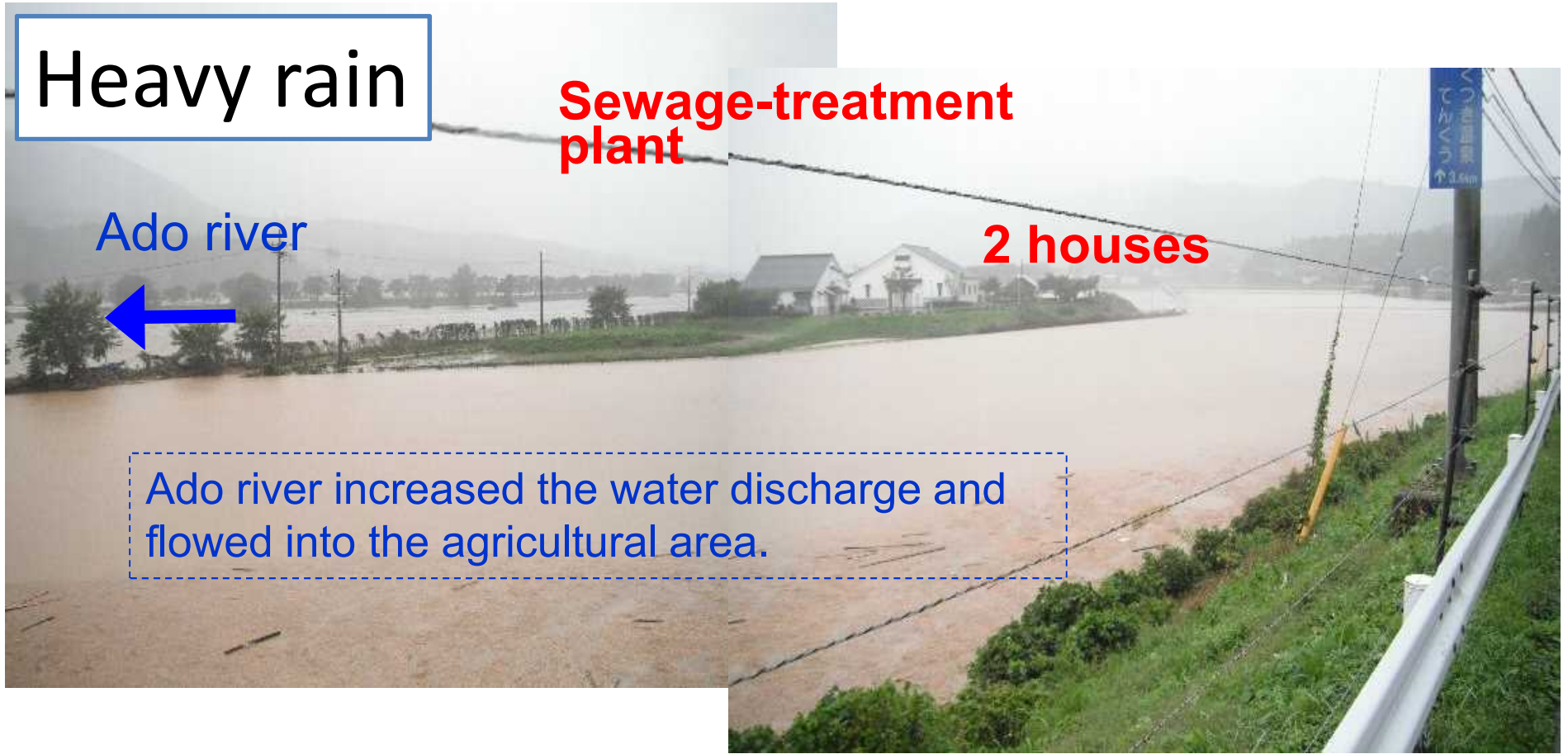
Sewage-treatment plant is constructed on the higher ground with consideration given for the inundation.

This house is on 2 meters lower ground than the sewage-treatment plant.

Agricultural area



Sep 16th, 2013, a huge typhoon “Man-yi” Takashima-city



Heavy rain

Sewage-treatment plant

Ado river
←

2 houses

Ado river increased the water discharge and flowed into the agricultural area.

**Rainfall
62mm/hour**

09/15	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	24:00
60分雨量(mm/h)	13	12	13	3	5	26	18	19	20	30	33	40
累加雨量(mm)	56	68	81	84	89	115	133	152	172	202	235	275
09/16	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00
60分雨量(mm/h)	40	53	54	54	62	48	23	8	5	4	4	5
累加雨量(mm)	315	368	422	476	538	586	609	617	622	626	630	635

2 houses

Ado river

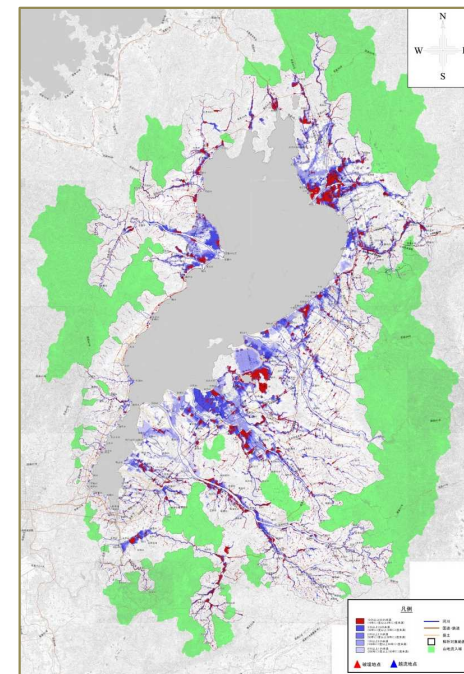


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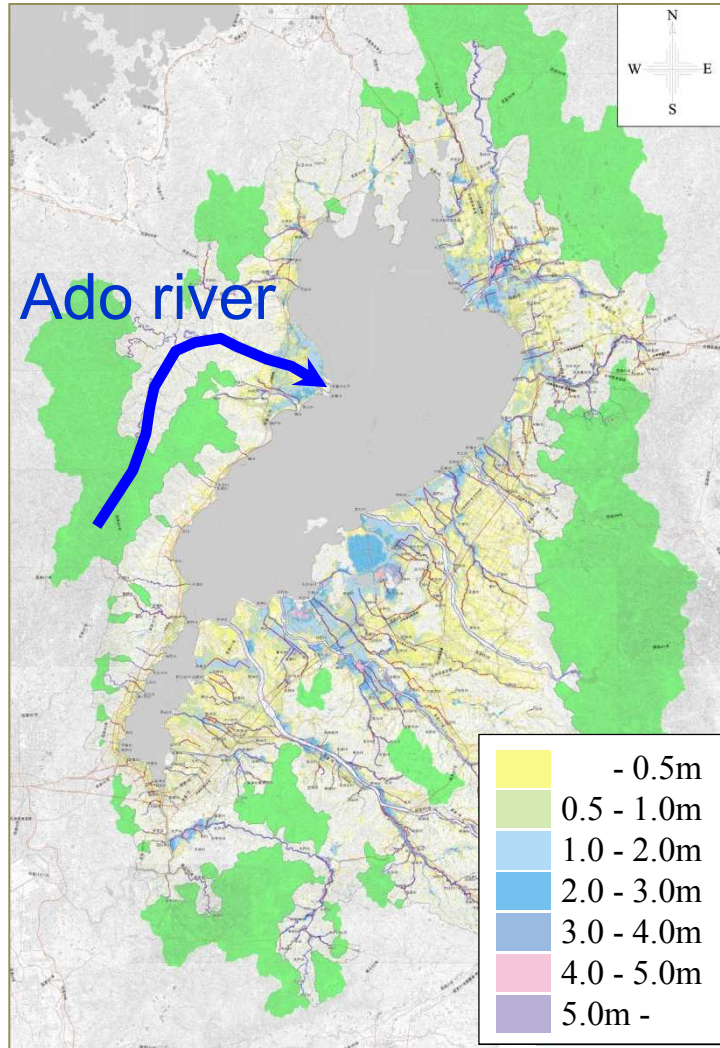


Shiga's Integrated Flood Management (IFM)

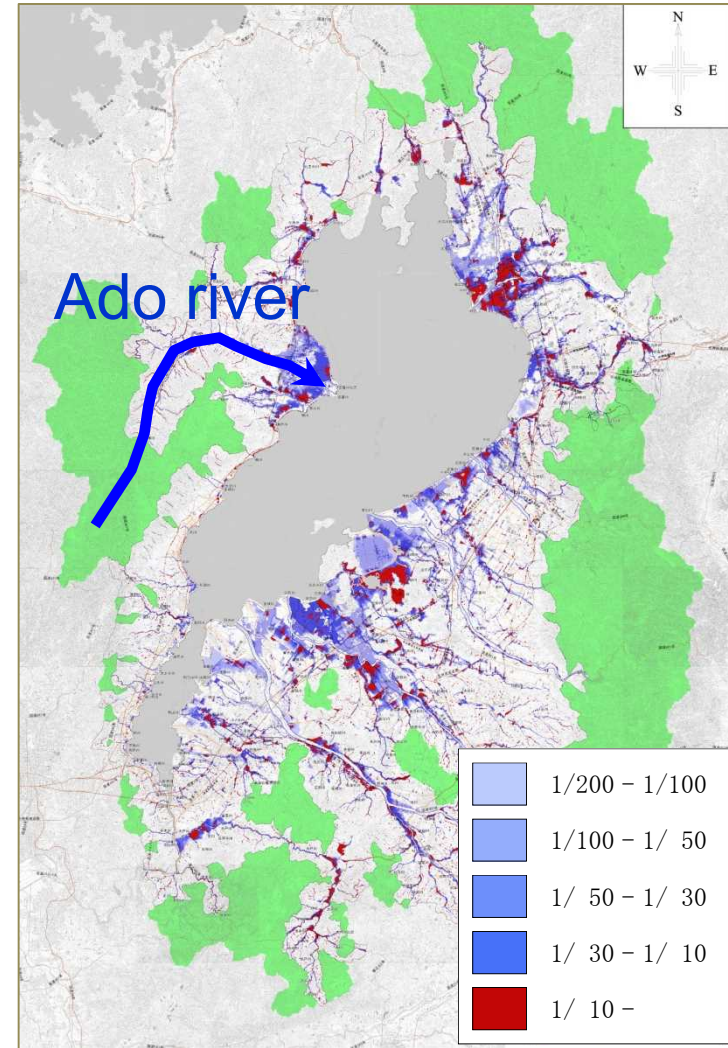
1. Shiga Prefectural Government (SPG) has proposed a new flood management policy to minimize flood disaster damage.
2. Points of Shiga's IFM
 1. Flood risk assessment
 2. Residents viewpoints



Evaluation results covered the entire area of Shiga Prefecture

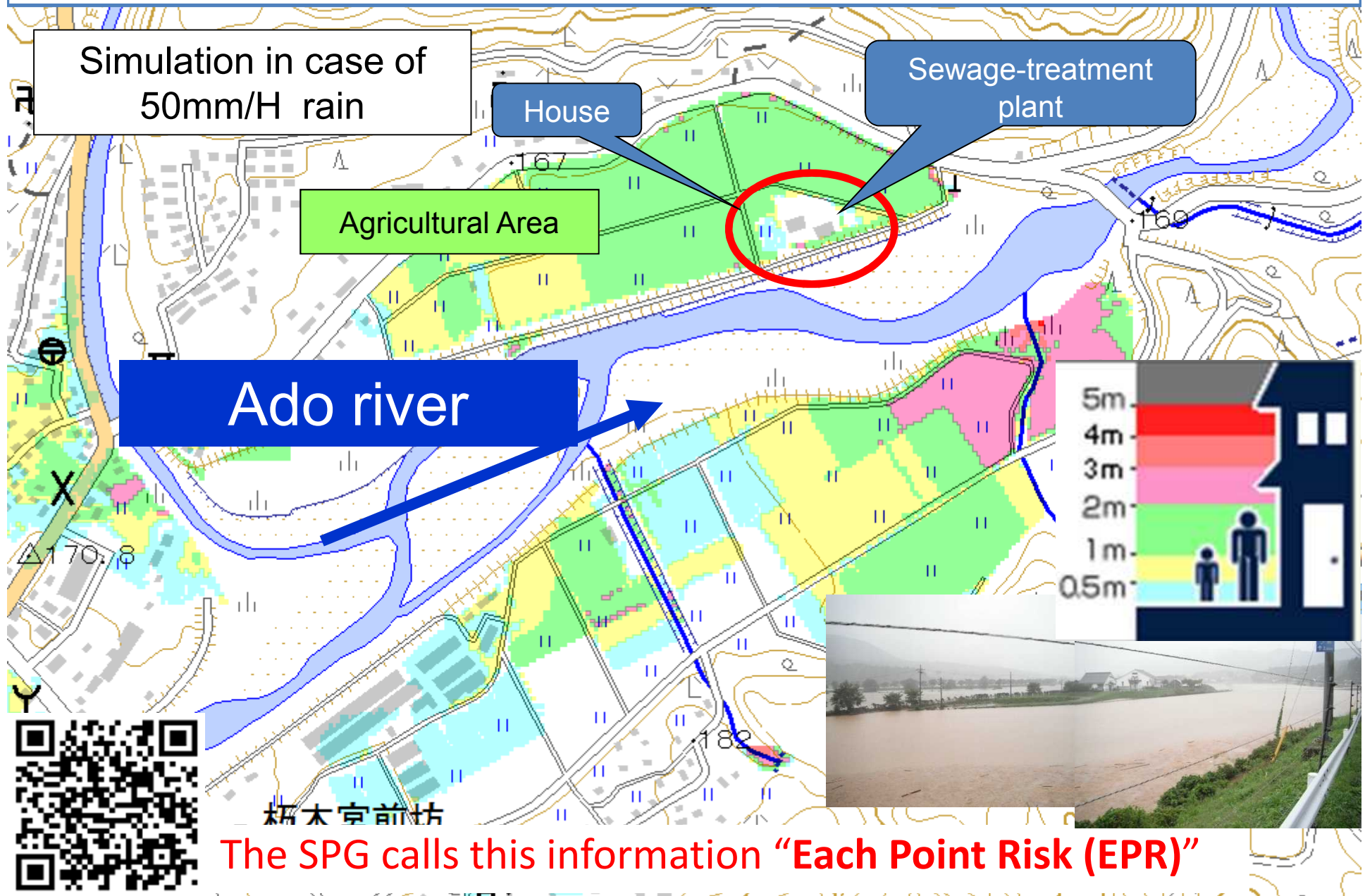


Inundation depth
200-year flood

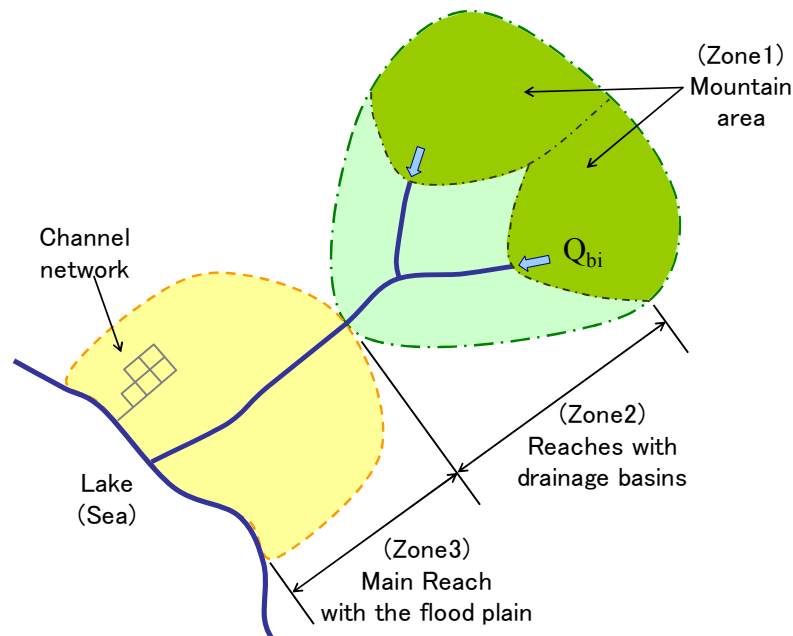
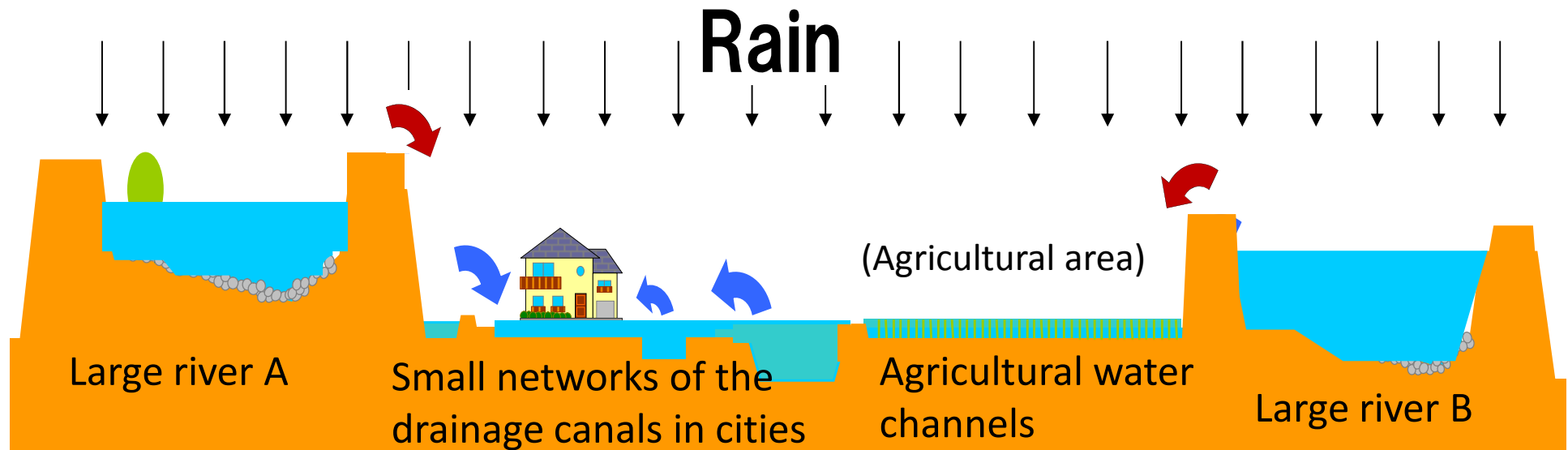


Event probability of
inundation above floor level ($h \leq 0.5m$)

Risk Mapping

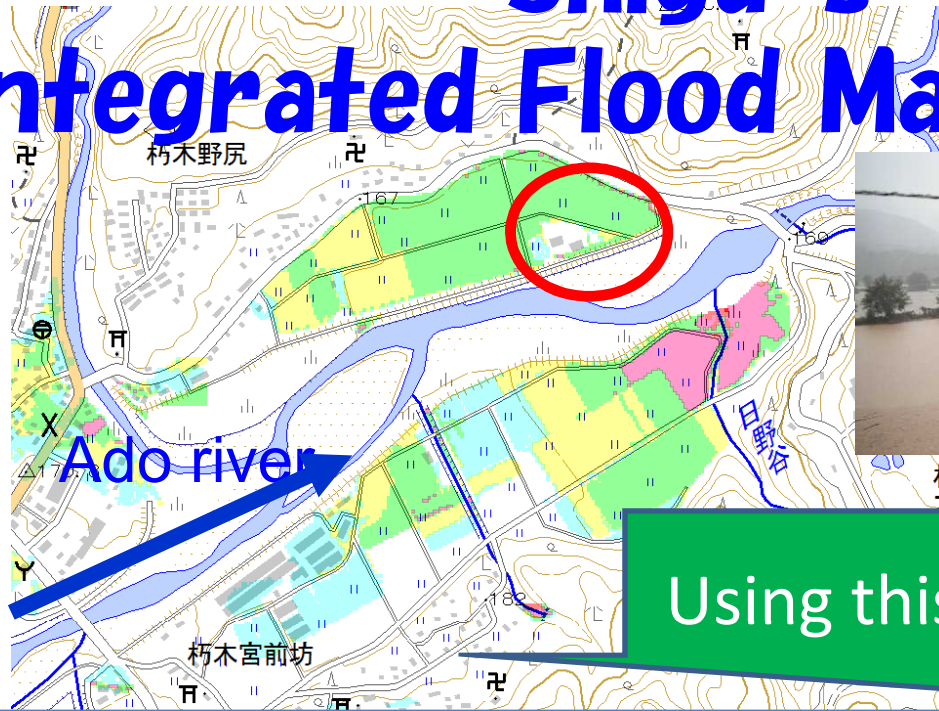


“Each Point Risk (EPR)”



The numerical model considers flood flow not only from large rivers but also from agricultural water channels and small networks of the drainage canals in cities.

Shiga's Integrated Flood Management



Using this risk map(EPR)

Protect our life from flood disaster with Multiple Defense.

① Drain water



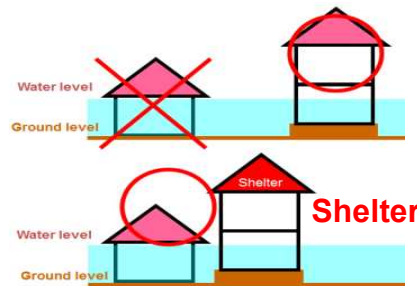
River widening,
Excavation

② Water storage



Artificial pool

③ Urban Planning



Land utilization
Nonflooded structure

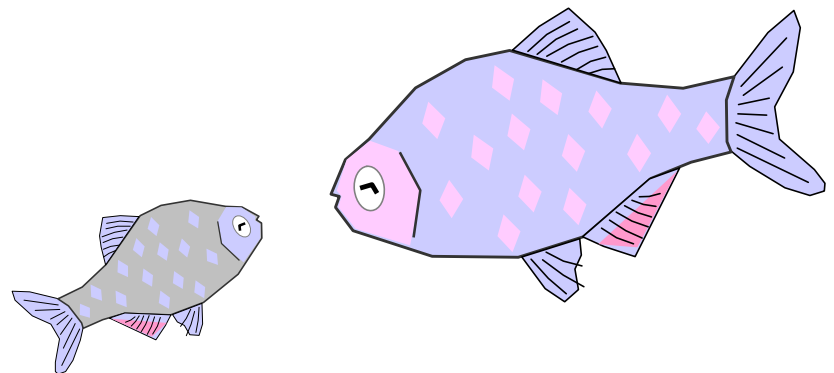
④ Evacuation Planning



Evacuation plan
Education and training

Practice: Shiga's Experience

- Based on the EPR, Shiga Prefecture, local government, the stakeholders at all levels, such as residents, have participated.
- Viewpoint of residents



Collecting flood disaster history

① Show flood risk map and photos



② Go to the field



③ Follow the memory



Revival of Wisdom rooted in the community.

④ Create a database, posting on a website



Wisdom rooted in the community to mitigate disaster

Criterion for non-structural measure

- Trigger of evacuation in each place
- Zoning for land use and building regulations
- Decision for buying a house and water damage insurance



Summary

- We showed the EPR throughout of Shiga, then we are developing community's disaster management plans.
- Two keywords of Shiga's Integrated Flood Management
 1. Flood risk assessment throughout Shiga
 2. Residents viewpoints
- By adding modern technology to traditional wisdoms, "Multi-level River Basin Governance" should be activated.

**Thank you very much for your
kind attention**

Lake Biwa



Mascot,
'Chissuikun