Economic Impacts and Effective Measures against Harmful Algal Blooms in the NOWPAP region

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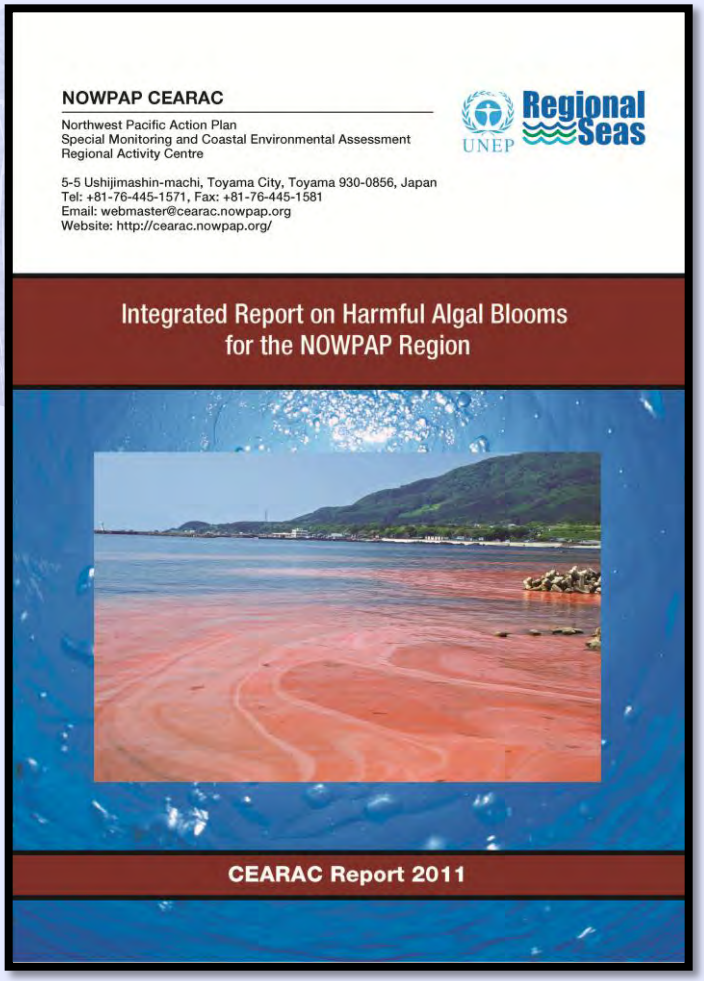
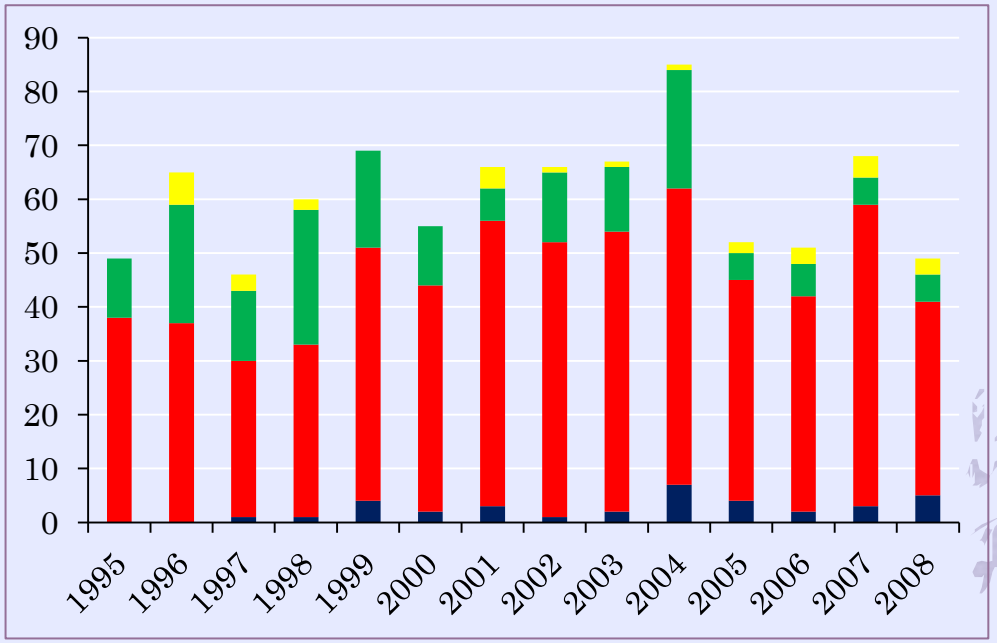
Integrated Report on Harmful Algal Blooms for the NOWPAP Region



Published in 2011
- Information on HAB monitoring
- Number of HAB occurrences

HAB occurrence in the NOWPAP member states



Negative impacts of HABs

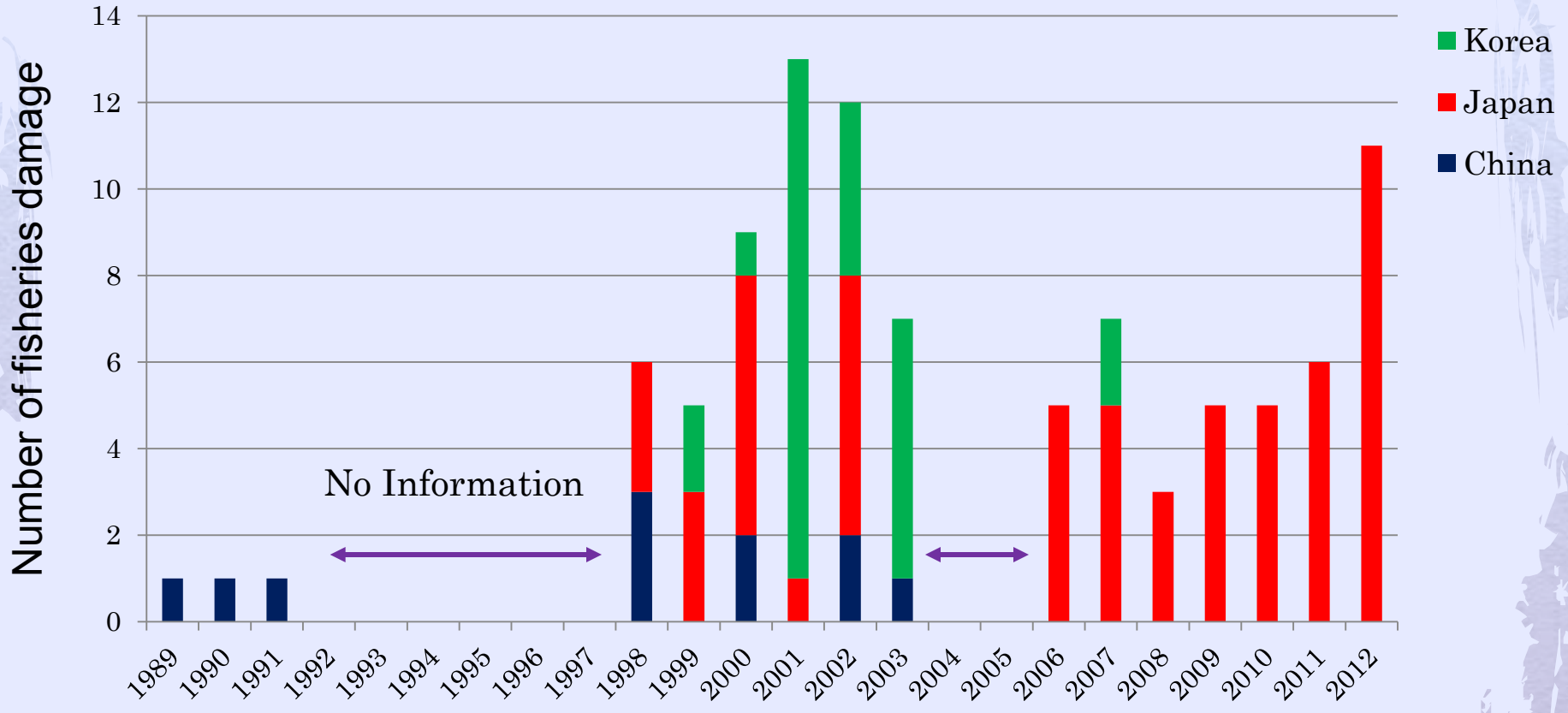
Damage

Fisheries/ Aquaculture

Human health

Tourism

Economic loss in fisheries by red tide in the NOWPAP member states



* From 2006, the number in Japan includes events in the Ariake Sea.

Total economic loss in fisheries from 2006 to 2012: US$ 94 million

Huge economic losses in fisheries in recent years

Japan

Yatsushiro Sea in 2009 and 2010

Economic loss by *Chattonella antiqua:*

- US$3.3 billion in 2009
- US$5.4 billion in 2010

(*Source: Bull. Kagoshima Pref. Fish. Tech. Dev. Cen., No. 3, 37-44, 2012*)

Korea

South Gyeongsang Province in 2013

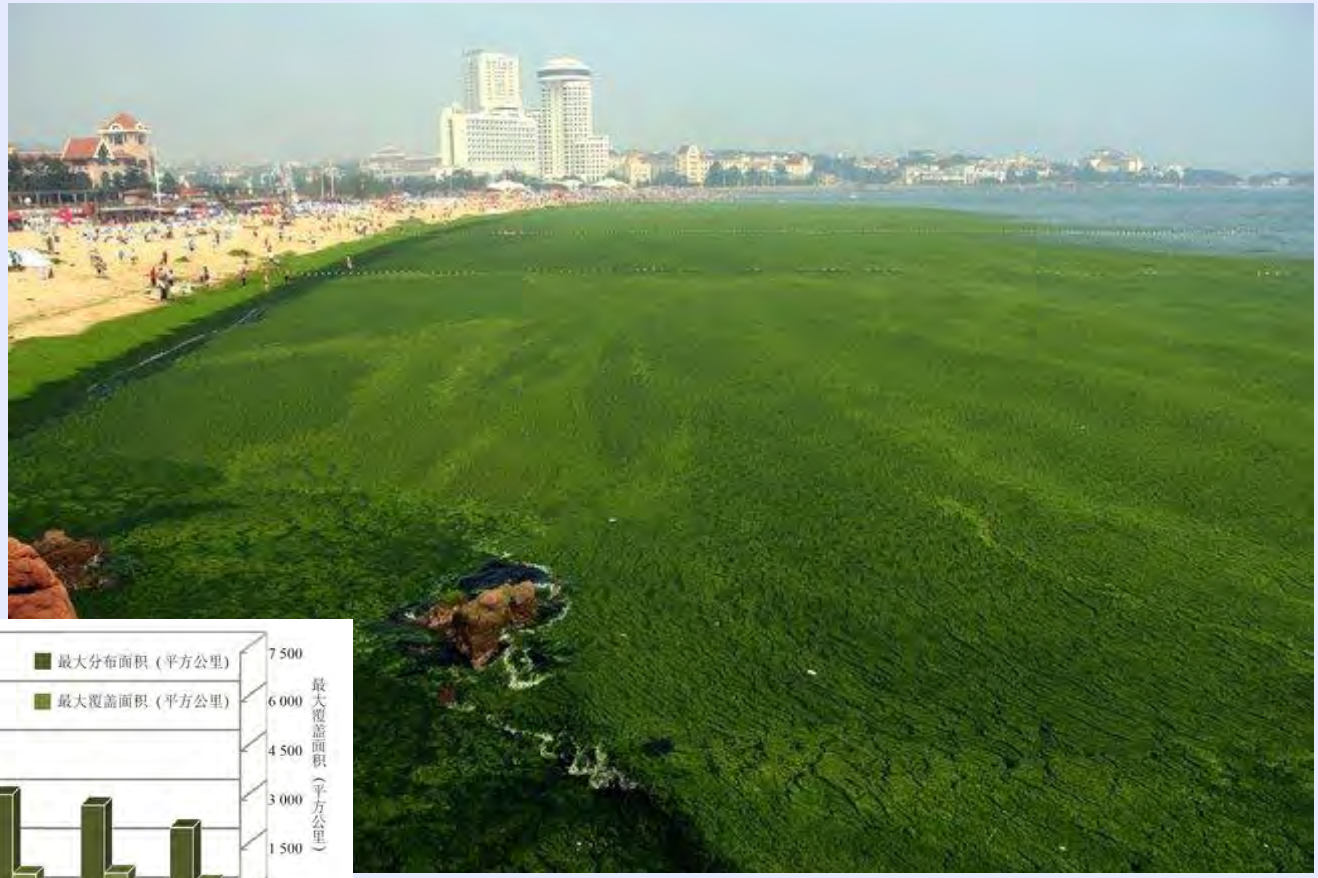
Economic loss:

- US$10 million by Aug.
- US$28 million by Oct.?

(*Source: The Korean Times, 5 and 10-11 Aug. 2013*)

Damage to tourism

Massive blooms of green macroalgae in China



2008~2012 年我国沿岸海域绿潮最大分布面积和最大覆盖面积

New York Times, 6 July 2013

US$ 30 million for cleanup cost and US$ 100 million in fisheries losses

Mitigation against negative impacts of red tide

Damage

Fisheries

Human health

Tourism

Countermeasures

Good practices for reduction of economic loss in fisheries

Regular monitoring and warning system in China

Best Practice 1: Regular monitoring in coastal area

(Fujian Province and Zhejiang Province in China)

Regular monitoring (2001) → **Forecasting system Early detection** → **Reducing economic loss in coastal area**

90 million Chinese Yen (US$14.7 million) in 2002

J.people.com

Prediction/early detection of red tide in Japan 1

Best Practice 2: Local Information and Communication Technology

(Ainan Town, Ehime Prefecture, Japan)

Fisheries cooperative
Fishermen

University

Local Fishery agency

Developed by Ehime Univ.

Portal website on coastal environment
(Temp., Salinity, DO, HAB occurrence)

- System development: US$47,000
- Operational cost: US$4,500/year

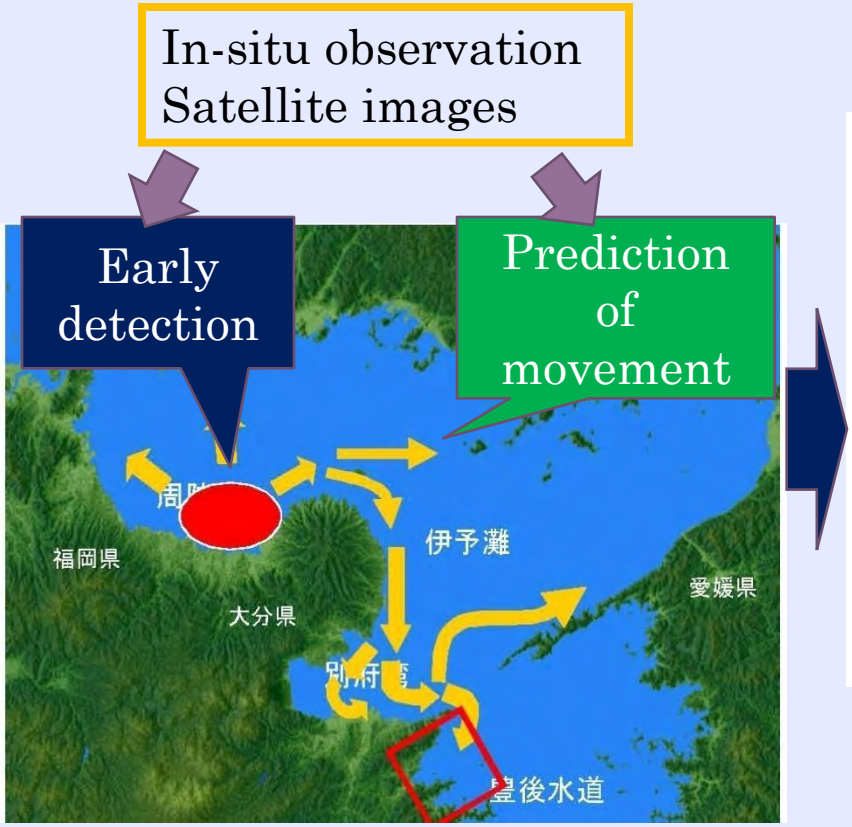
Cost-effectiveness

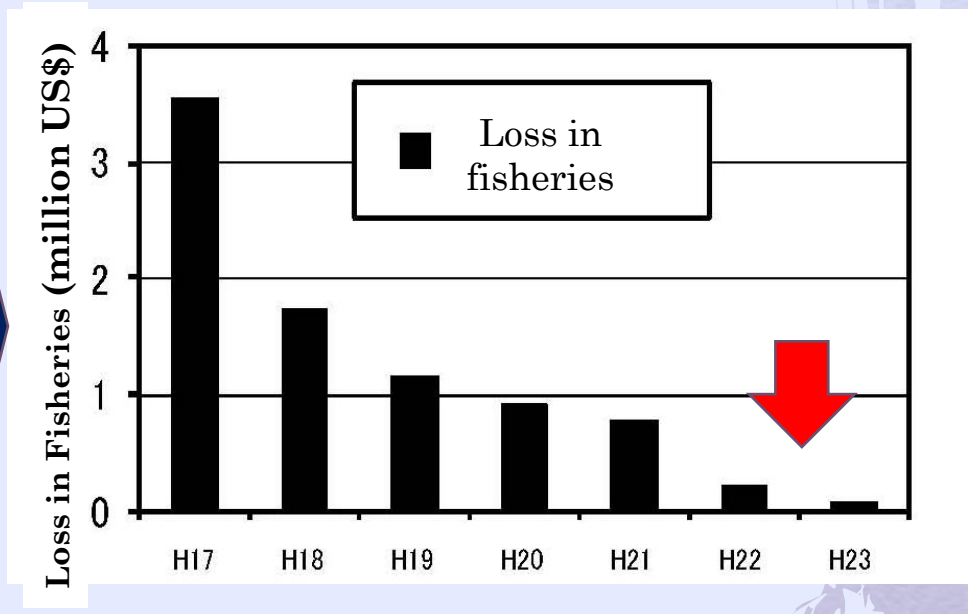
Outcomes:
- **Increased number of early detection of red tide: 71 to 181**
- **Reduced economic loss: US$35,000/year to 0**

Prediction/early detection of red tide in Japan 2

Best Practice 3: Early detection and prediction of red tide movement using remote sensing techniques

(Oita Prefecture, Japan)



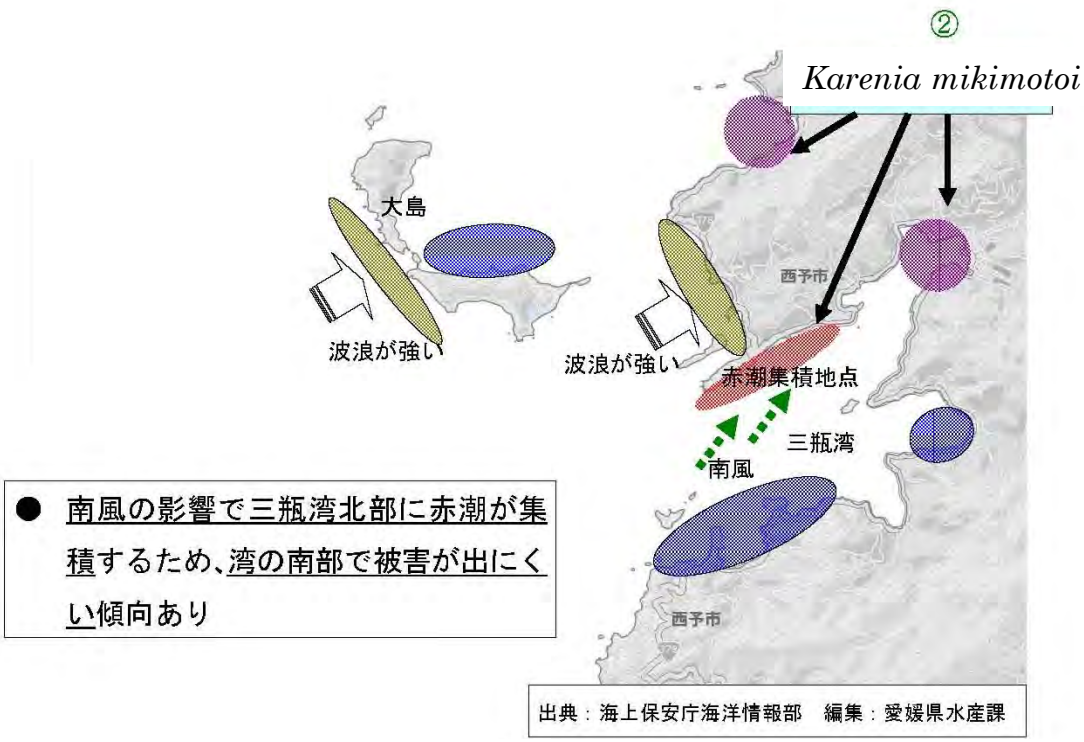


Oita Pref. Agri. Forest. Fish. Res. Center

Preventive measures in Japan

Best Practice 4: Evacuation map of fish cage

(Ehime Prefecture, Japan)



Fisheries Division, Ehime Prefecture

- Red-tide prone sea area
- Sea area where red tide occurs by certain conditions
- No red tide-prone sea area
- Sea area where is recognized as no evacuation site

Thank you

Fruitful partnership