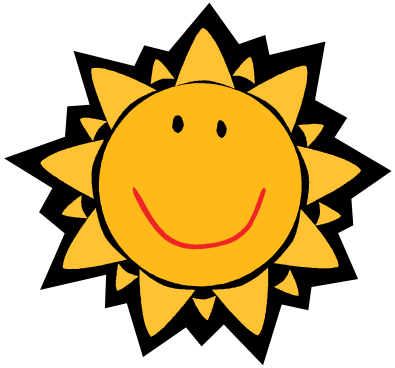
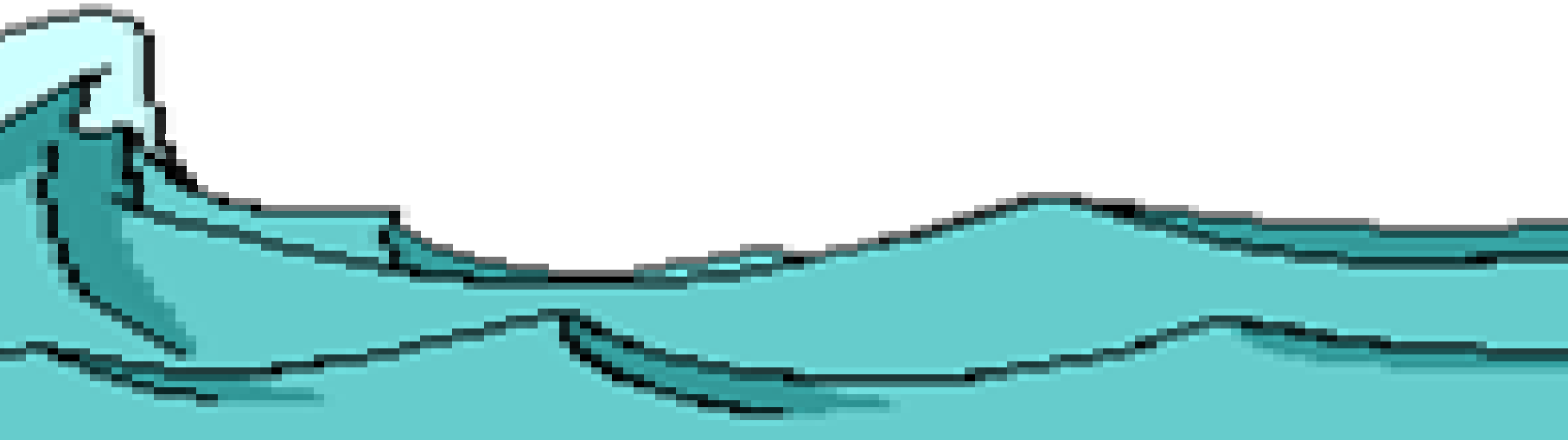


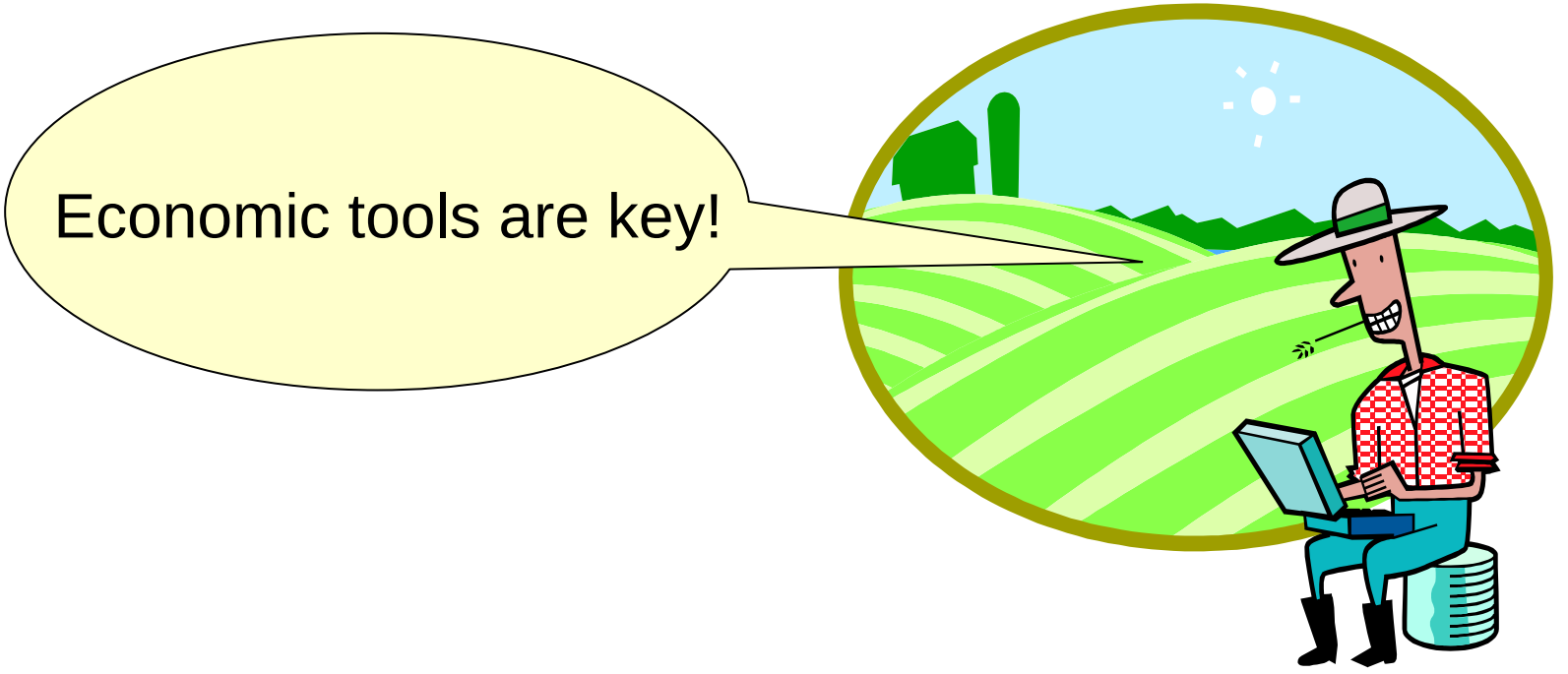
Water Resources

Naoko, Shun, Manbo, Miki



Focus of Study

Economic instruments that induce efficient water-use for agricultural water



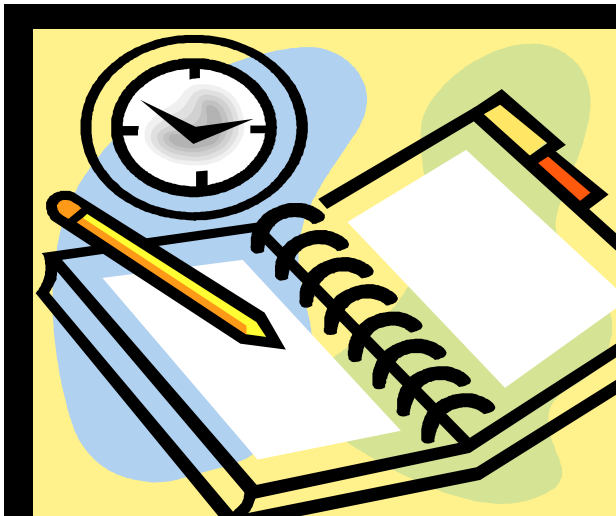
Agenda

① Impacts of Climate Change

② Options of Water Management

③ Economic Measures

④ Considerations



It's quiz time!!

What is the percentage of FRESH WATER in the amount of water on Earth?

A: 20%

B: 10%

C: 5%

D: 2.5%

How about fresh water
that is easy for us to use ?

A: 2.0%

B: 1.5%

C: 0.8%

D: 0.2%

Facts and Figures on water

Fresh water
about 2.5%

Seawater
about 97.5%

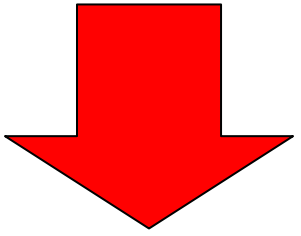
We can use only 0.8% of the amount of water on the earth!!!

① Impacts of Climate Change

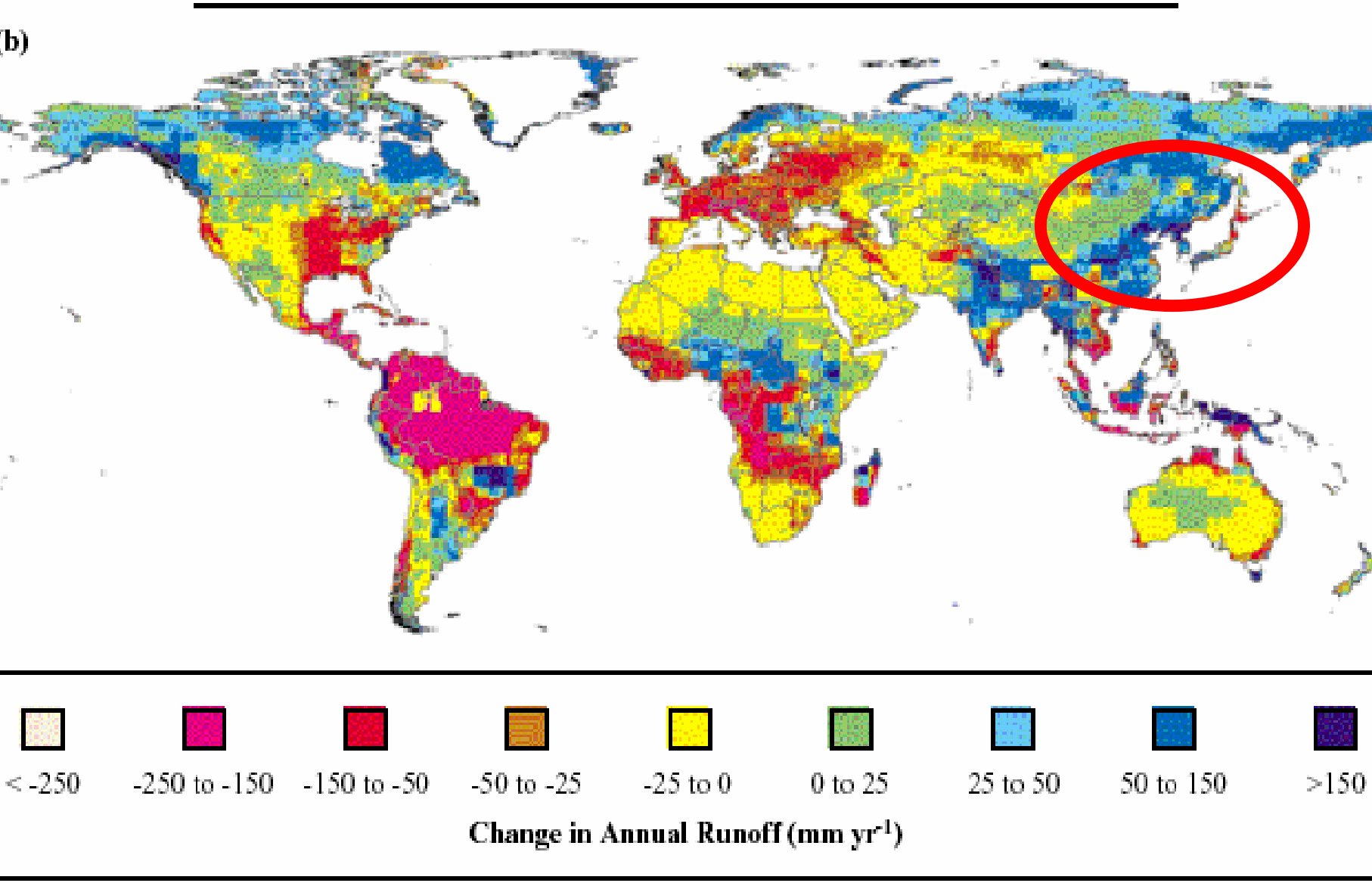
World

- *Temperature*

  ⇒ increase about 0.6℃



evaporation & precipitation



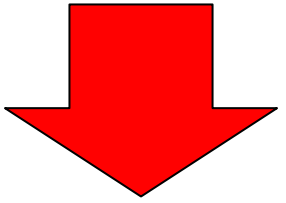
source: IPCC Third Assessment Report "Climate Change 2001"

Impacts of Climate Change

Japan

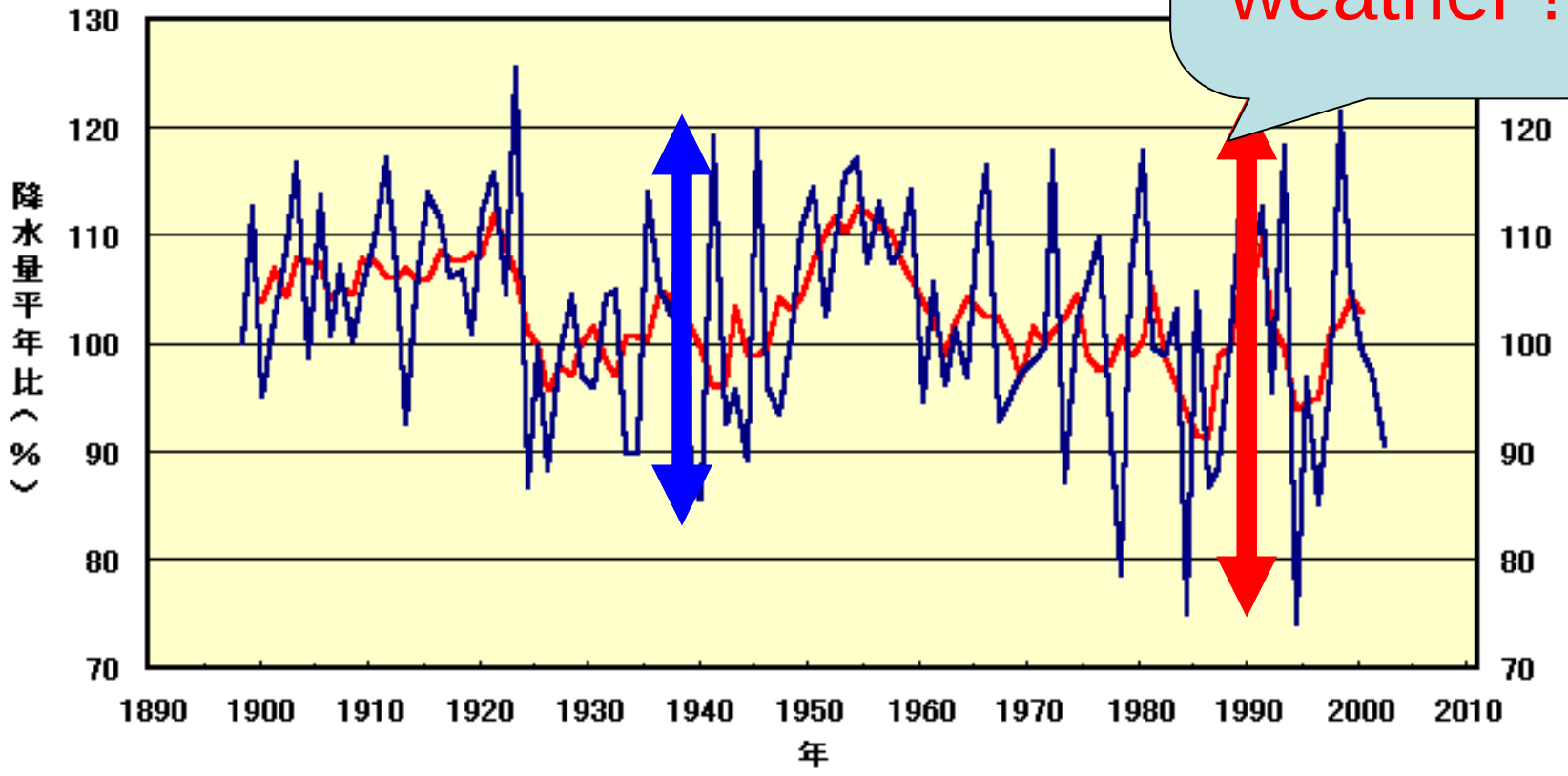
- *Temperature*

  ⇒ has increased about 1.0℃



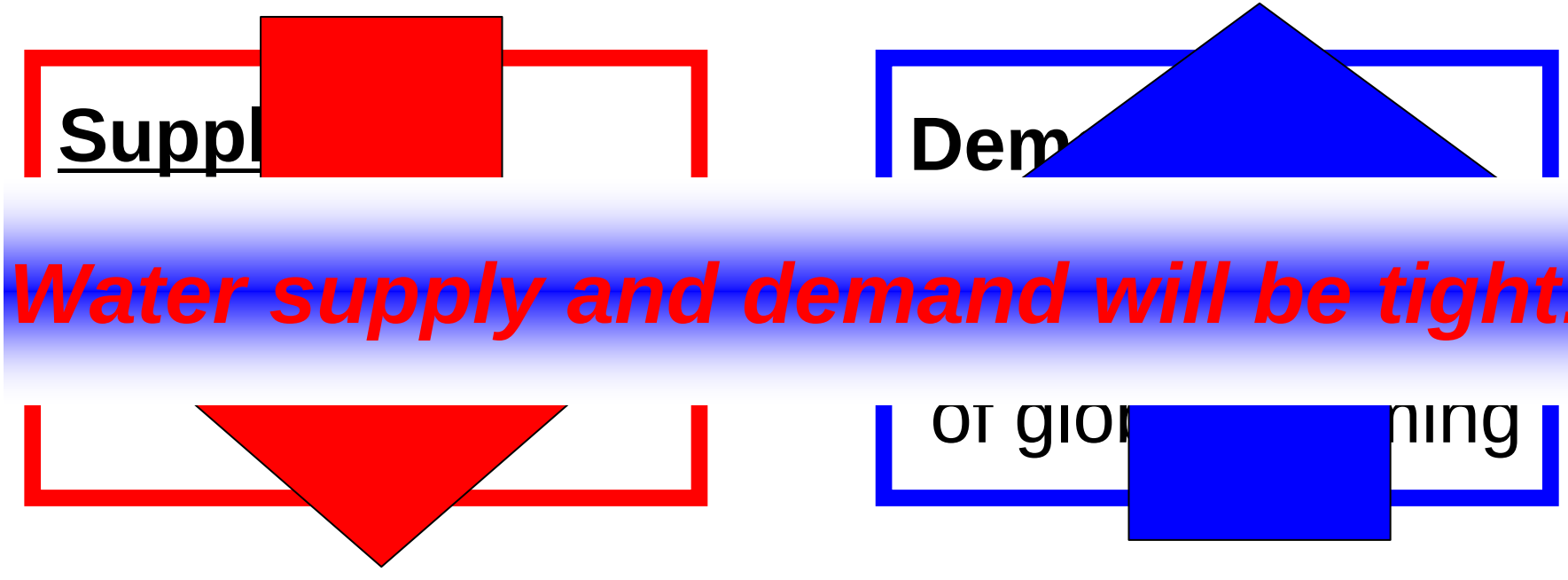
evaporation & precipitation will increase

The Change in Precipitation ir

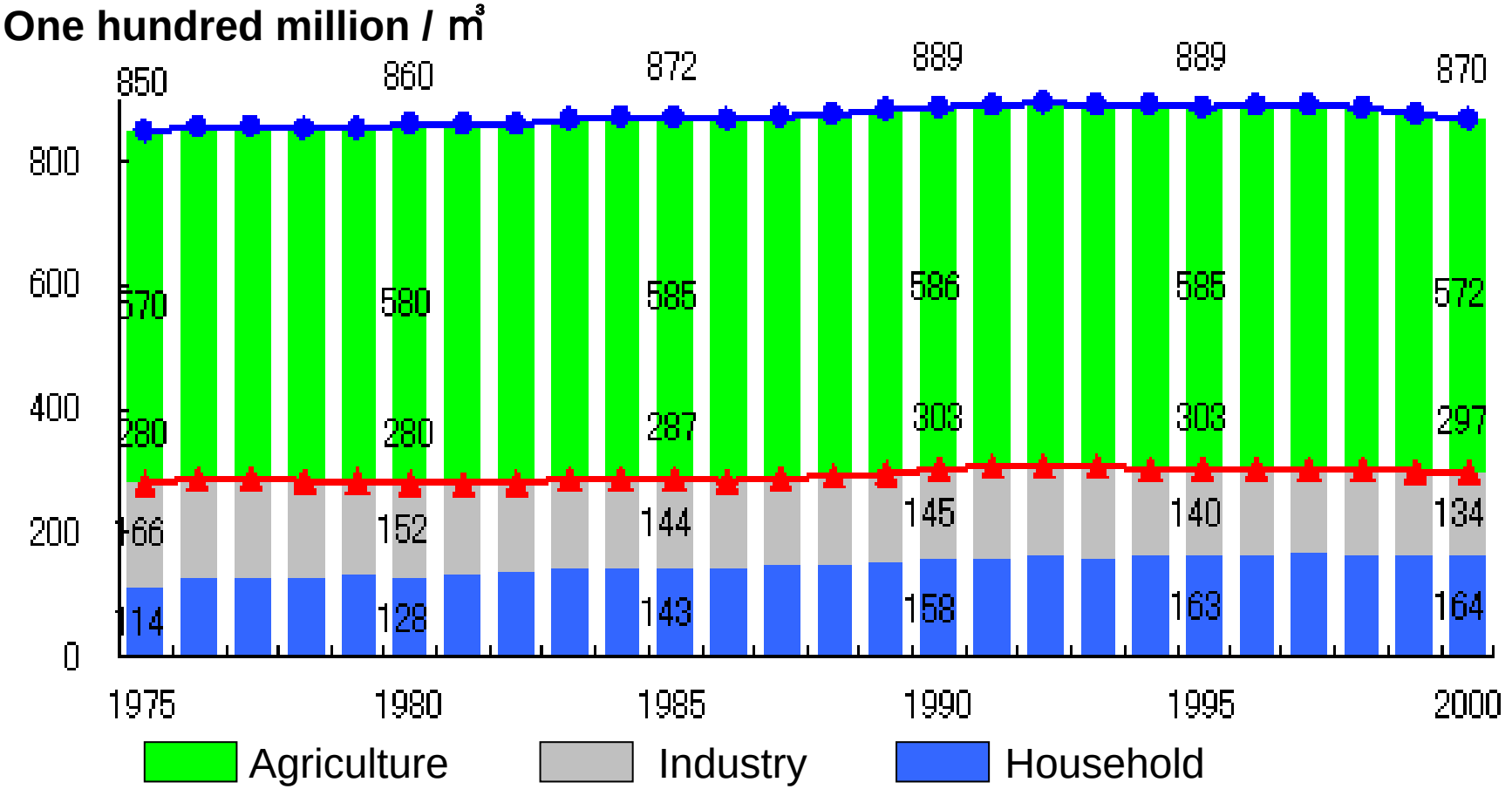


source: Japan Meteorological Agency

Prospect in Japan



Water use in Japan



source: Ministry of Land, Infrastructure and Transportation

Agenda

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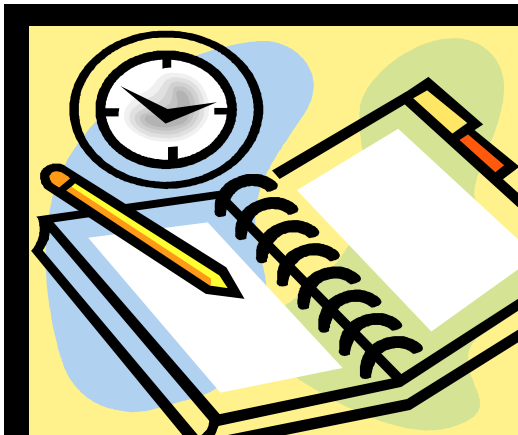
③ Economic Measures

④ Application

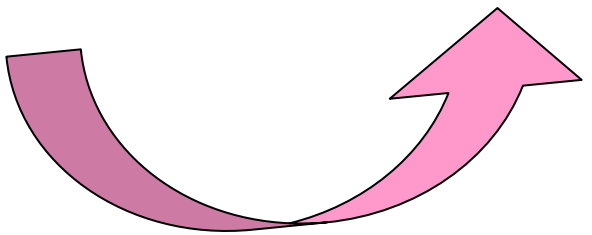
⑤ Alternative Measures



② Water Management

Supply-Side Management

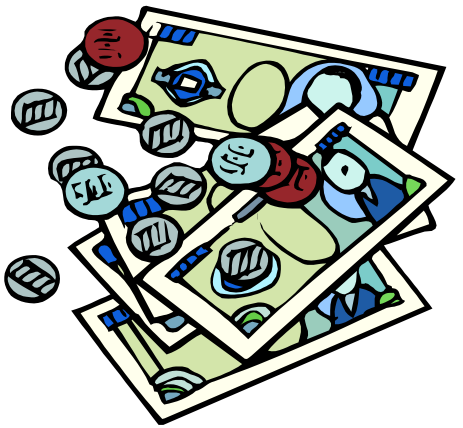
Demand-Side Management



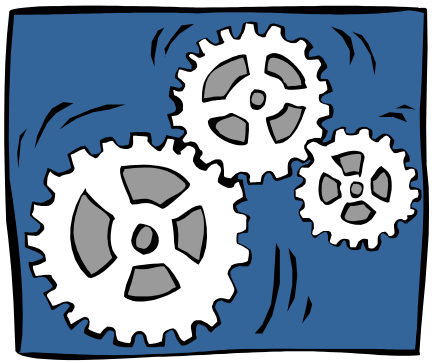
Socio-economic Factors

Demand Side Management

Economic measures



Technological measures



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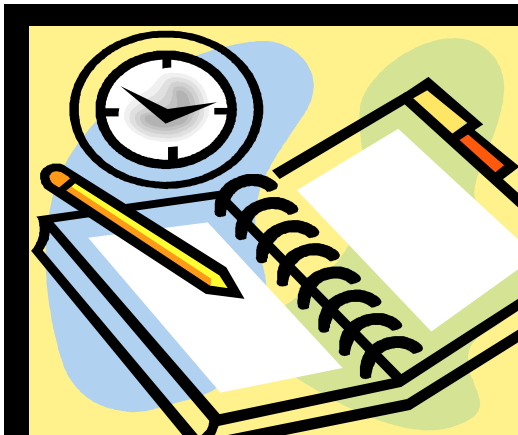
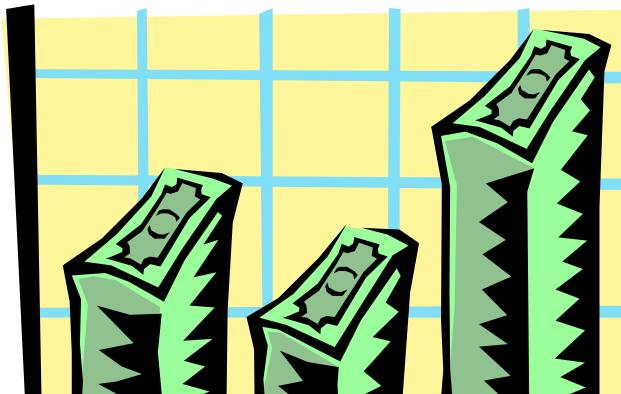


1. Evolution in the international community

"…water has an economic value in all its competing uses and should be recognized as an economic good"

Dublin Statement Principle 4



Consideration should be given to the gradual implementation of pricing policies that are geared towards cost recovery and the equitable and efficient allocation of water, including the promotion of conservation." United Nations 1997

…countries are moving towards water pricing schedules that … help provide incentives for efficient water use and generate funds for necessary infrastructure development and expansion."

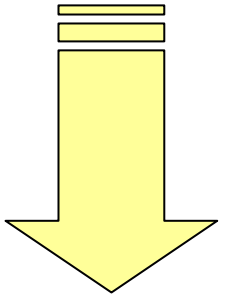
OECD 2003, Improving Water Management

2. Economic Measures

① Area-pricing

② Volumetric pricing → pricing

③ Tradable water rights → trading



incentives for efficient water use

Present situation in Japan

Pricing

- Area pricing

Trading

- no market

Measures for efficient water-use

(A) Volumetric pricing

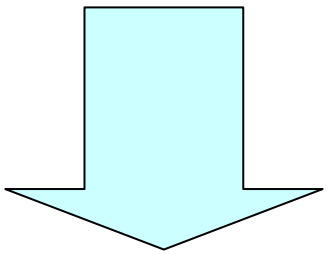
(B) Trading of Water rights

(A) Volumetric Pricing

Area-pricing

= pricing by acreage

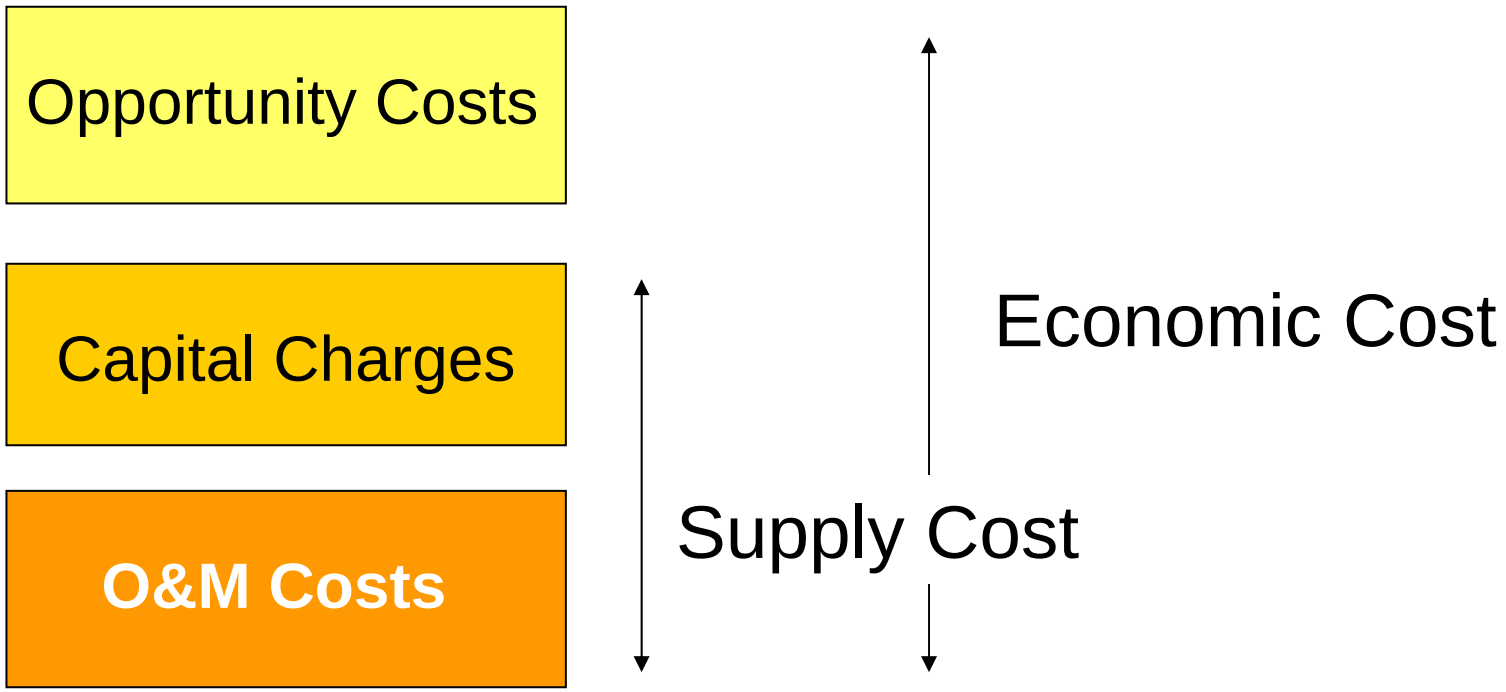
⇒ no incentive for efficient use



Volumetric pricing

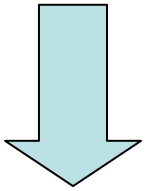
= pricing by the amount of water

Price of Water



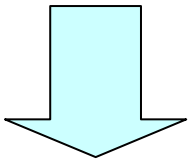
(B) Water markets

Arrangement in which holders of water rights trade them with each other or to outside parties.



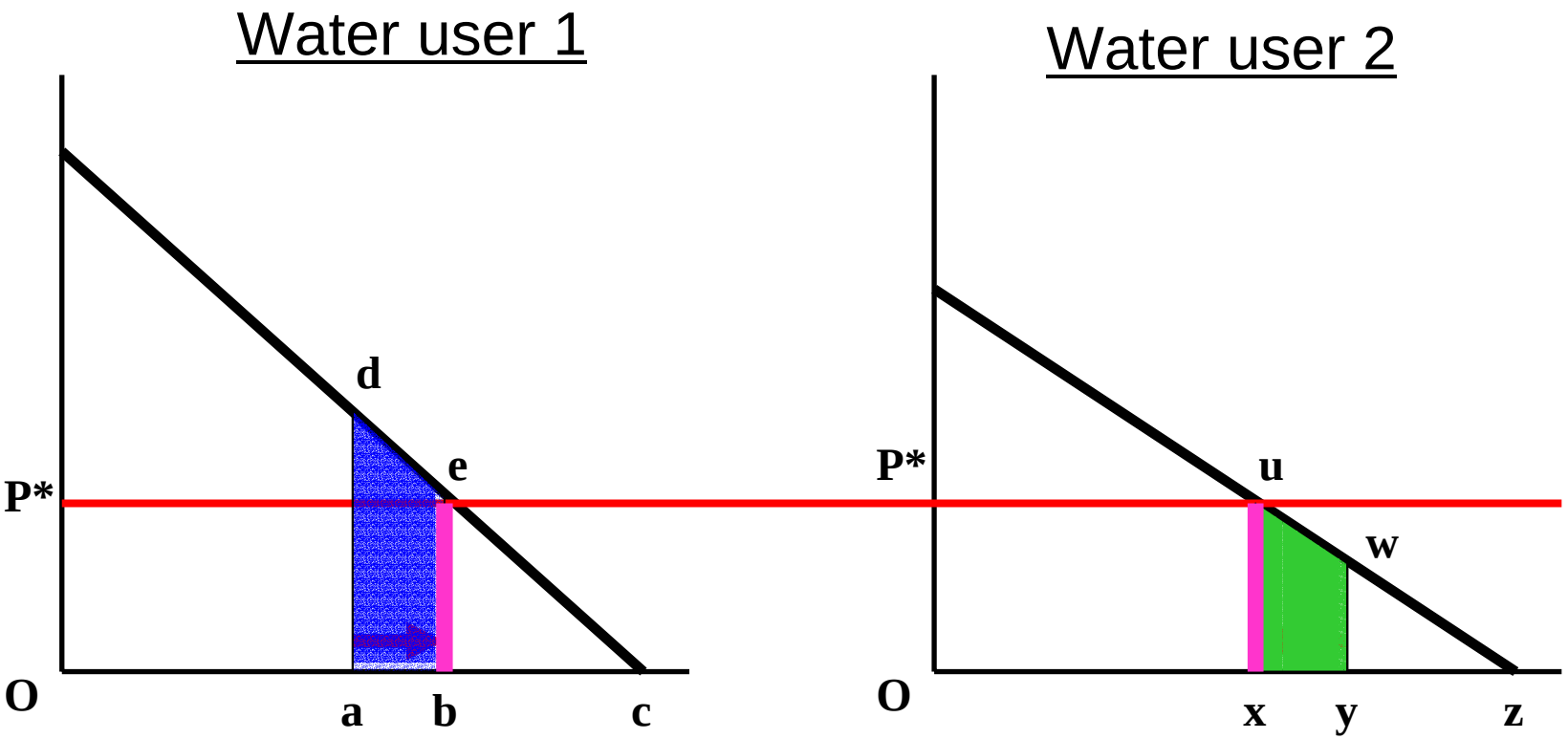
It increases the efficiency of water use and allocation within and among sectors.

- Allocation of tradable water rights to water users.



- transactions between the higher productive and the lower equalize marginal saving cost of all participants.

Mechanism of Tradable Water Rights



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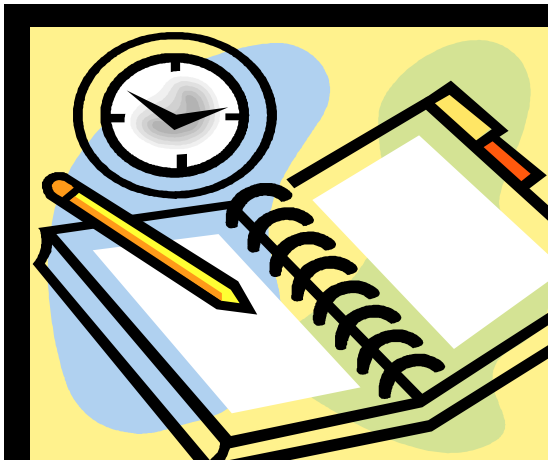
④ **Considerations**



(A) Volumetric pricing

Pros: incentive for efficient use

Cons: implementation costs

Study done by Tsar and Dinar:

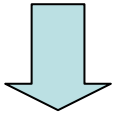
If the cost of applying volumetric pricing techniques exceeds 10 percent of the revenues collected through charges, simple area pricing maybe more efficient.

(B) Water market

Pros: incentive for efficient use

Cons: establishment & allocation of tradable water rights, metering

Japan: Historical rights & Legal rights



lack of transparency

If volumetric water metering and tradable water rights are established, economic instruments that promote efficient agricultural water-use can be used in Japan.

Environmental Externalities

Difficult to valuate

Negative

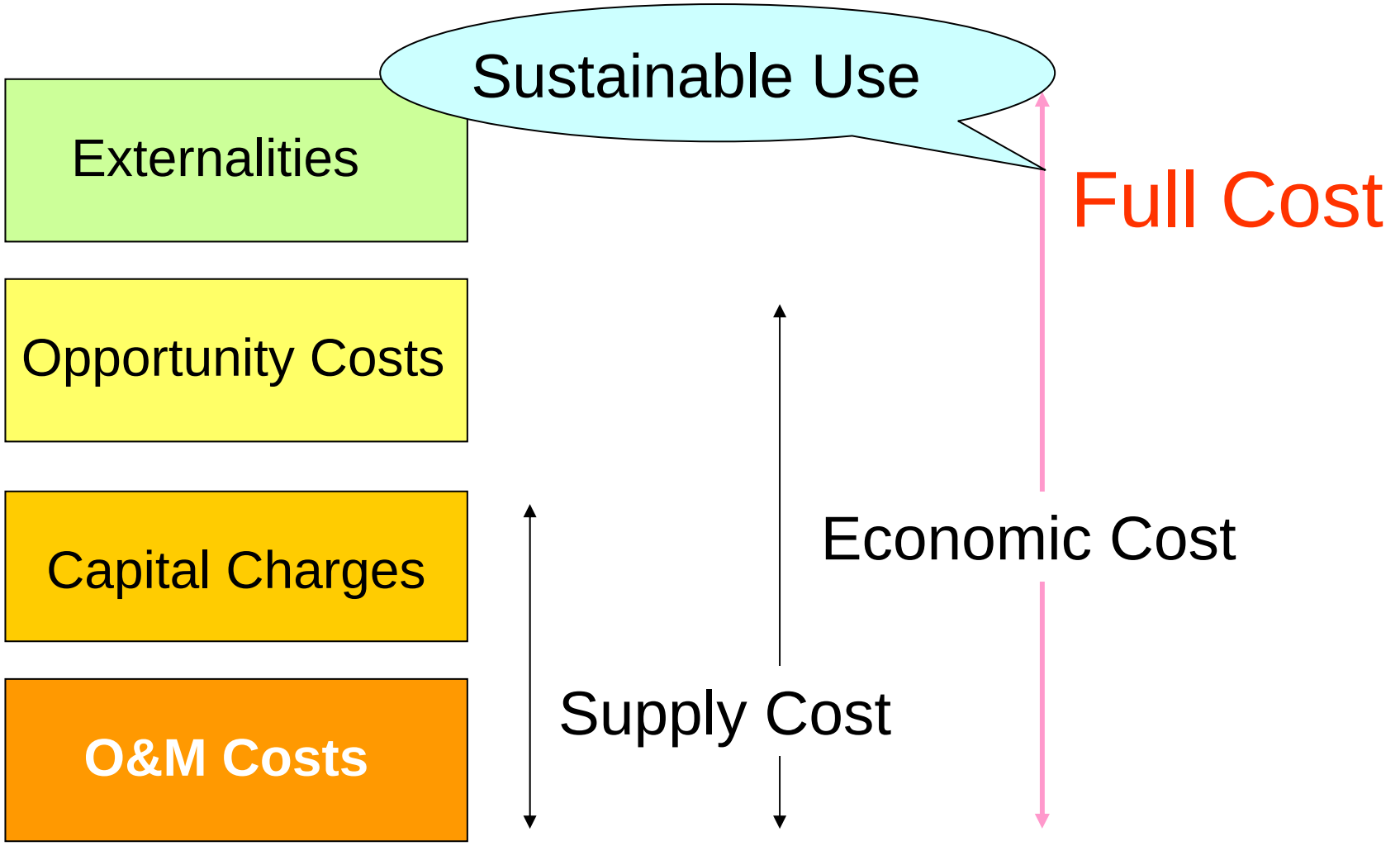
pollution, salinity

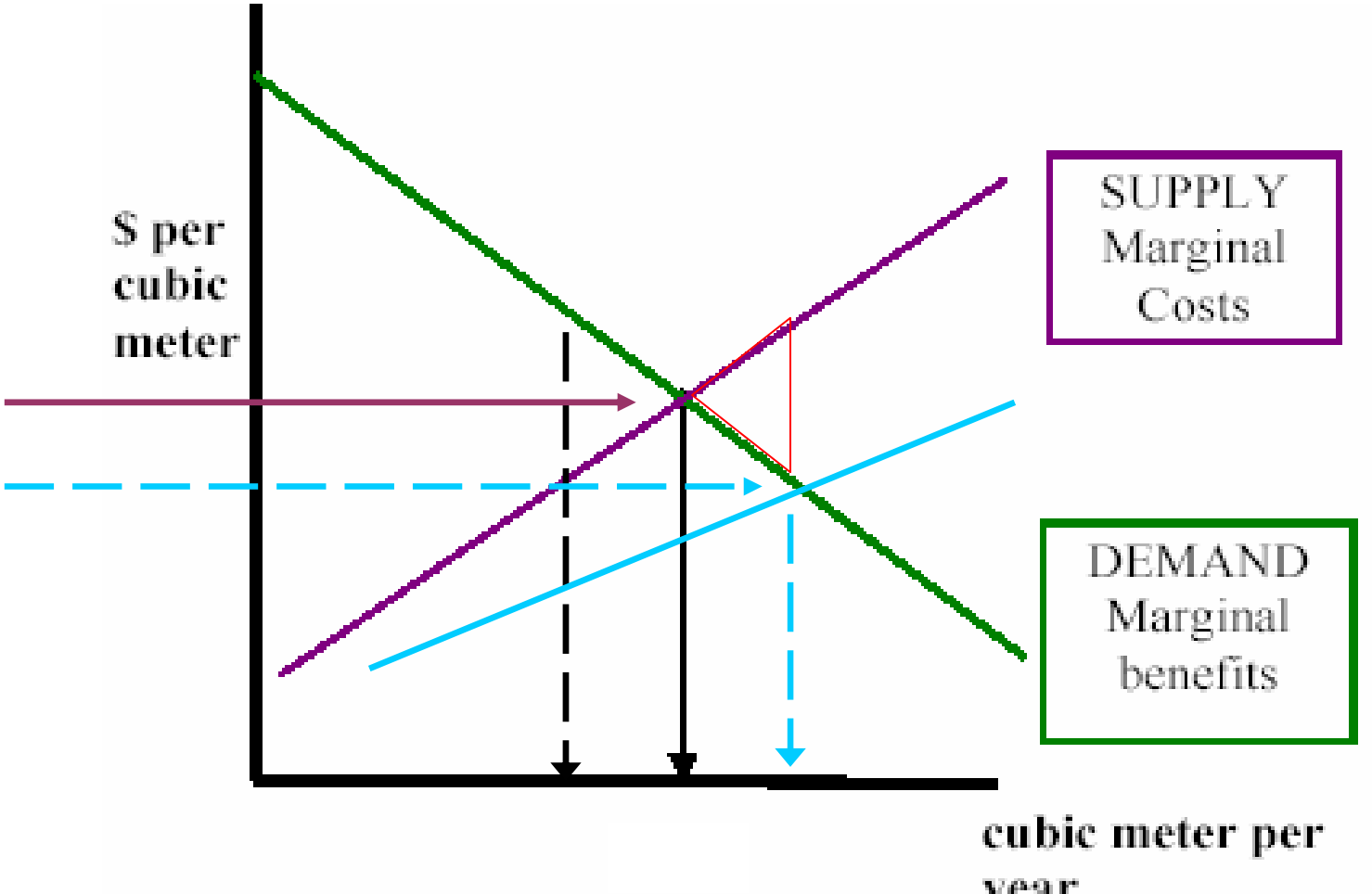
Positive

recharging groundwater aquifer,

creating landscape, biodiversity

Price of Water




$ per cubic meter
SUPPLY Marginal Costs
DEMAND Marginal benefits
cubic meter per year

Conclusion

Japan should consider using economic instruments that induce efficient water-use for agricultural water. In order to do so, implementation of metering costs should be valuated as well as the externalities involved with agriculture.