



# **19th Asia-Pacific Seminar on Climate Change**

Session II  
Adaptation to Climate Change/  
Scientific and Technological Aspects

## **Integration into Sustainable Development**

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# Adaptation to climate change as “National Security”

- Readiness to climate change  
= Defense from unexpected extreme  
events caused by climate change

## Construction of adaptive infrastructures (“Hard Adaptation”)

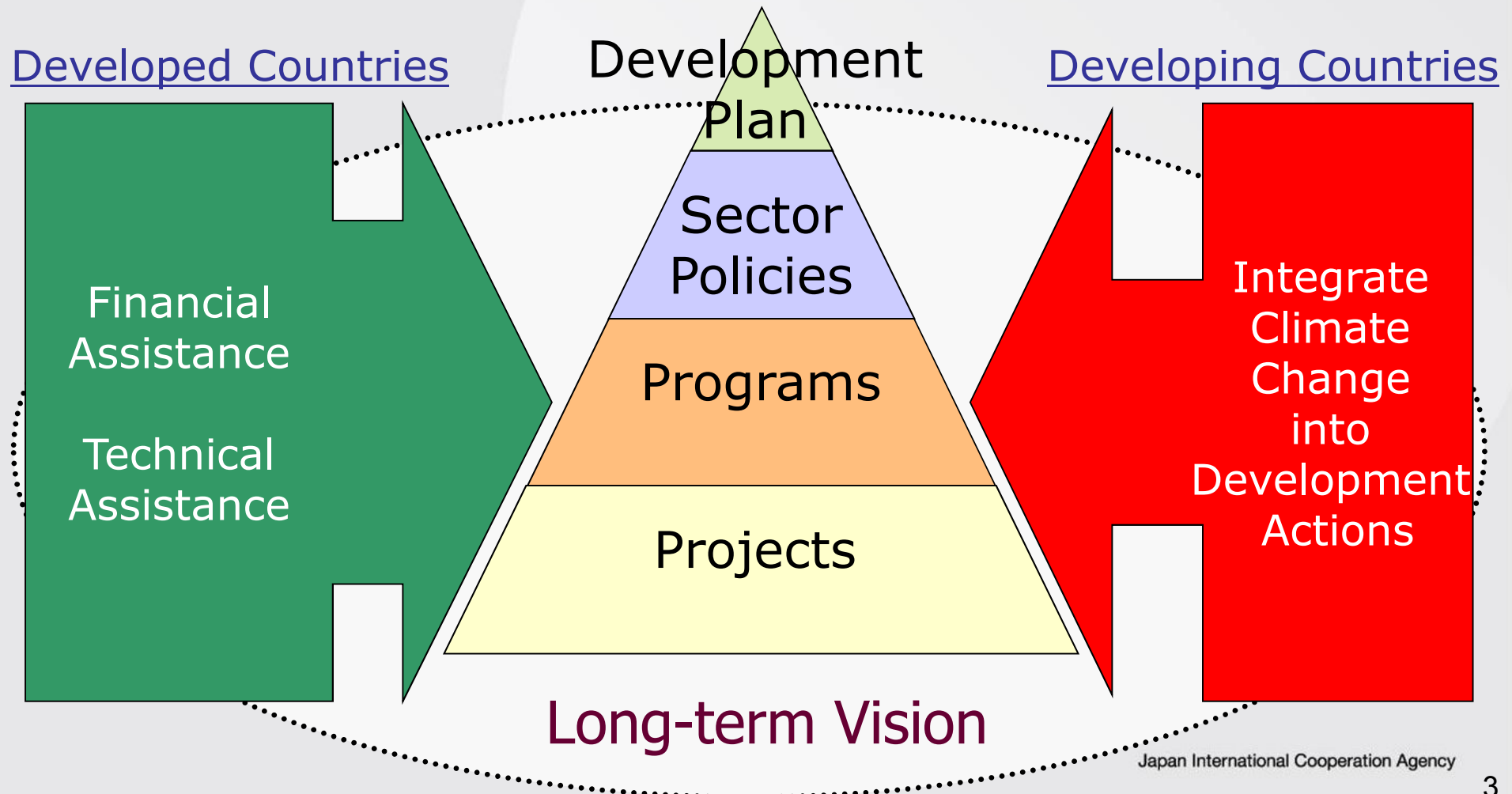
- Irrigation system, Watershed management, Dykes and coastal management, water supply and sewerage, High-standard transportation network, disaster prevention infrastructures, etc
- **Climate-proofing infrastructures** (Road, Rail, Power station, etc)

## Training and awareness raising activities to local people (“Soft Adaptation”)

- Workshops & Seminars, Training for evacuation, Support for Community-based adaptation, etc

# Integration of Climate Change Agenda into Development Actions

Cooperation for Sustainable Development from various levels

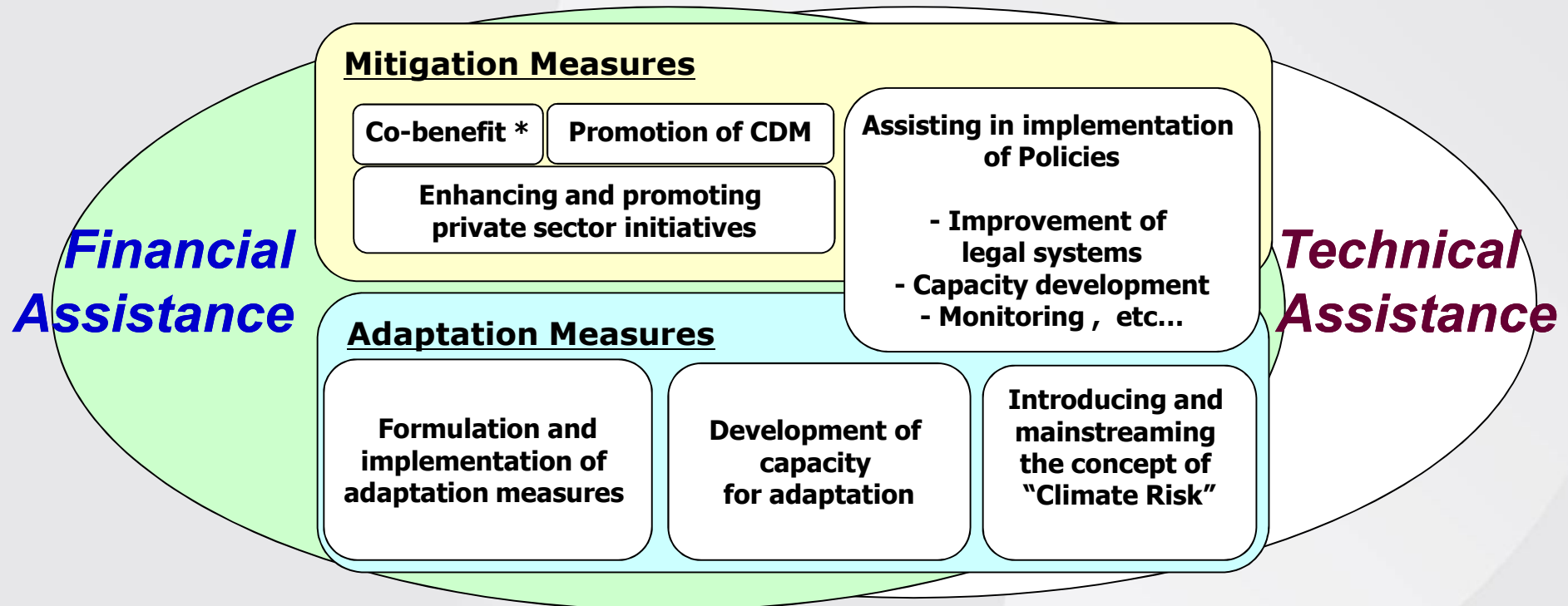


# Integration of Climate Change Agenda into Development Actions

Sector	Risks due to climate change	Possible Countermeasures
Water resource	Decrease of water due to drought Deterioration of water quality	Water supply project, Water conservation measures, Waste water treatment
Disaster prevention	Natural disasters such as flood damage and landslide disaster	Disaster prevention measure Coastal protection measure
Agriculture	Effects on agricultural products due to drought and other reasons	Enhancement of irrigation facility Promotion of water-saving agriculture Changing cropping pattern
Forest & Ecosystem	Decrease of forests due to drought and progressive desertification Death of coral reefs due to rising sea water temperature	Prevention of desertification Afforestation, sustainable forest & ecosystem management
Health & Sanitation	Expansion of distribution range of infectious disease transmitting species	Countermeasure against infectious diseases, control of epidemic diseases
Society & Economy	Loss of Assets (including infrastructure), Social instability	Improve social & economic resilience to extreme weather

*Many similar Policies/Projects/Activities may be found in Development Policy and/or Plan*

# JICA's Operation Addressing Climate Change



Utilize Japan's private cutting-edge technologies effectively

Promote globally conducive research

\* "Co-benefit" approach ... Project or program which realize both developmental benefits for developing country and GHG emission reductions.

## Example of Japanese ODA Project for Adaptation (1): Flood Control

### The Philippines: Iloilo Flood Control Project (loan)

- Project objectives:
  - To enable Iloilo City to withstand the floods within the 20-year return period.
  - To improve sanitation conditions and the living environment of the people living in this area, and in turn, to contribute to the development of the regional economy.
- Expected effects of the Project:

	Reference (1994 Flood)	Without Project	With Project
Cost of Disaster (Million Peso)	1,152	863	0
No. of affected households	24,836	21,990	0



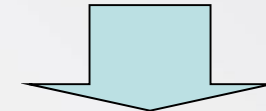


## Example of Japanese ODA Project for Adaptation (2): Coastal Management

### Indonesia: Bali Beach Conservation Project (loan)

#### – Project objectives

- To conserve four beaches in Bali, where coastal erosion is becoming a growing concern due to the impact of enlarged ocean waves arisen from deterioration of coral reefs
- To counteract the current and future problems, thus inducing sound socio-economic development in the area
- To be considered as an effective adaptation measure to rising sea levels due to climate change

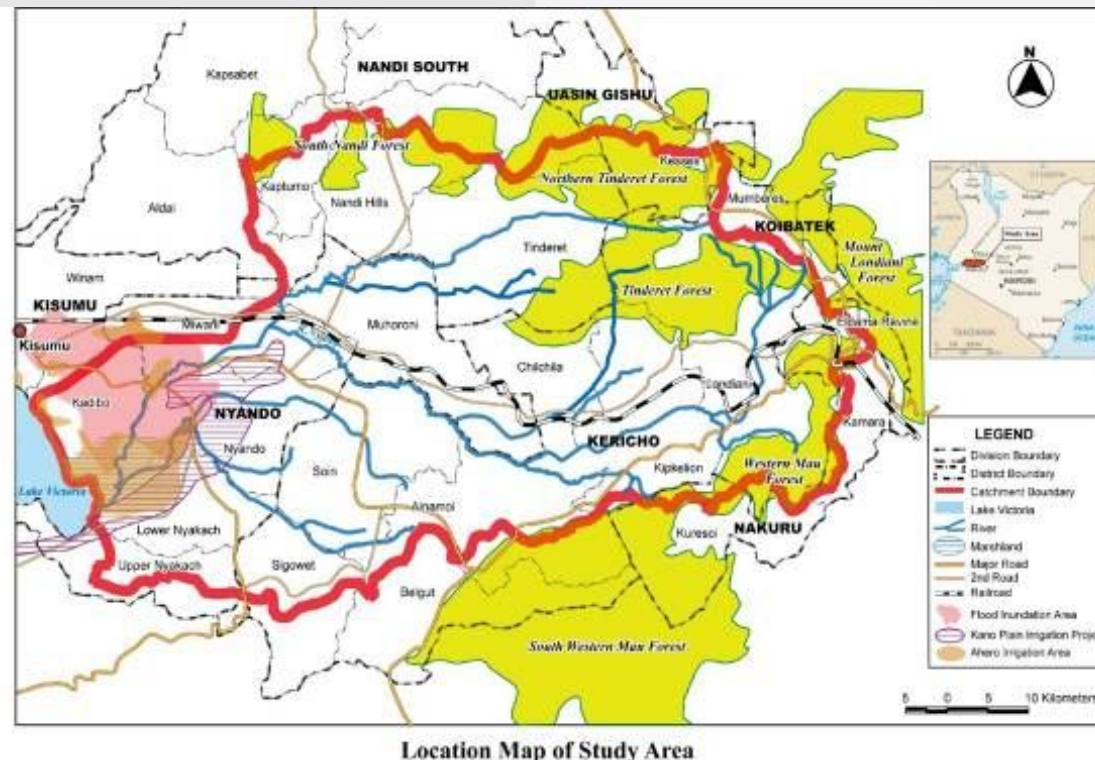


## Example of Japanese ODA Project for Adaptation (3): Community based Project

Kenya: Programme for Community-based Flood Disaster Management  
to Adapt to Climate Change in the Nyando River Basin (grant)

### Project outline

To improve flood management capacity through community-driven disaster management programmes by providing structural and non-structural measures to adapt to negative impacts of climate change.





## Example of Japanese ODA Project for Adaptation (4): Disaster Mitigation

### Bangladesh: Multipurpose Cyclone Shelters Projects (grant)

Since 1991, JICA has constructed 91 shelters consistently. Shelters are used primarily as elementary schools.

Local people to evacuate to shelters with the cyclone and high tide water alert.



#### **Cyclone (Sidr)**

15<sup>th</sup> Nov, 2007

Maximum wind speed :  
69m/s(250km/h)

Minimum pressure:  
944hpa



# ***Scientific and Technological Aspects***

## **Vulnerability of Coastal Cities**

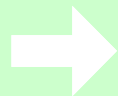
Increase in number of Asian coastal mega cities and  
expansion of population in the existing cities

Concentration of economic activities along rivers and coasts



### High vulnerability to climate change

Rise in  
temperature

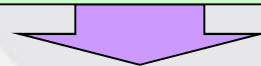


Increasing floods  
Change in ecology



Socio-economic  
impacts

*Is growth sustainable? Are cities livable?*



Incorporation of mitigation and adaptation  
policies to climate change in city planning



# JICA-WB-ADB Joint Research: Climate Change Impact and Adaptation in Asian Coastal Cities

## Assessment on vulnerability to floods caused by climate change

Cities      JICA                      : Manila  
                  World Bank : Bangkok and Kolkata  
                  ADB                         : Ho Chi Minh City                      and others

**Prediction of floods  
applying climate models  
for 2050**

Change in precipitation/  
Sea-level rise/Storm surge

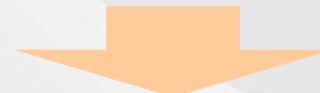


**Empirical analysis on vulnerability  
of household/firm**

: Estimation of costs of floods



**Impact on urban infrastructure  
(transportation/energy/communi-  
cation/sanitation etc.)**



**Adaptation and mitigation policies to climate change**

# Approach to assess climate change vulnerability

ADB-JICA-WB Joint Research:

## Climate Change Impact and Adaptation in Asian Coastal Cities

- 1 Downscale IPCC climate models for temperature increase @2050 for B1 and A1FI scenarios
- 2 Assess local effects on precipitation and combine with sea level rise/ storm intensification
- 3 Simulate different types of hydraulic effects: 1) through river systems, 2) through accumulation of water at lake, and 3) through sea level rise and storm surge at the coast (combination depends on city)
- 4 Based on the flood maps produced for 18 cases (3 climate scenarios x 2 infrastructure scenarios x 3 return periods), estimate socio-economic impact (both direct and indirect) with available data, thus deriving the benefit side of adaptation.
- 5 Consider investment mix and their costs necessary for adaptation (focusing on flood control infrastructure)
- 6 Cost-benefit analysis

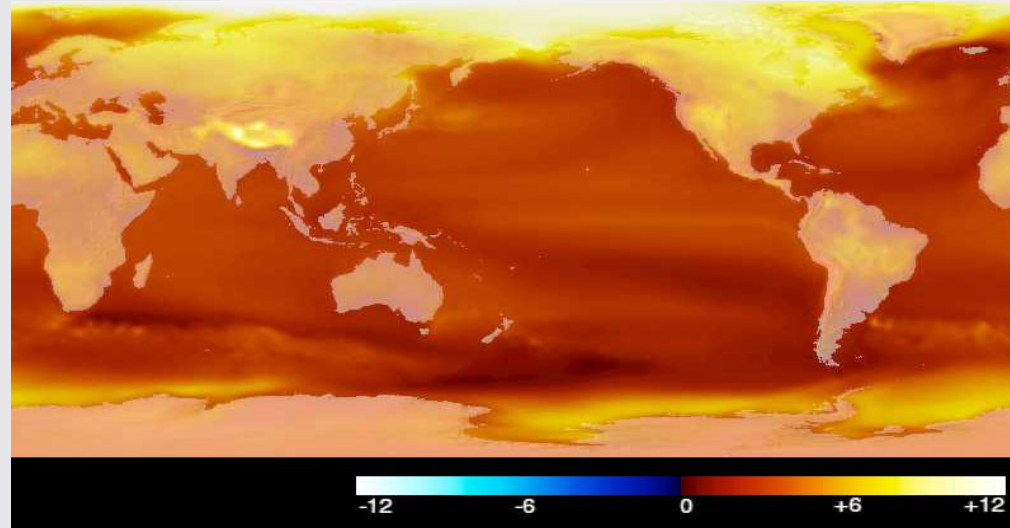
## Conclusions of the Research

- Costs of damage will be substantial in Asian Coastal Mega-Cities
- Urban plans and flood protection infrastructure need to take climate risks into consideration
- Need to address other non-climate factors such as improved management of canals and drains
- Potential cross-fertilization with disaster risk reduction community





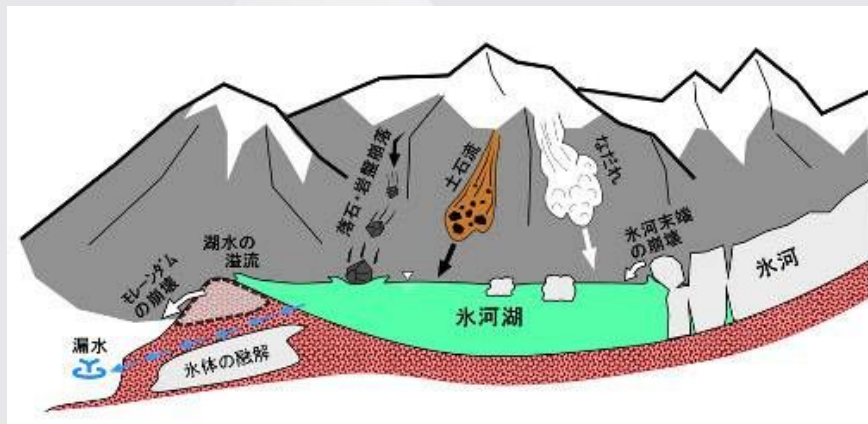
# Capacity Development for Adaptation to Climate Change in Asia - Climate Change Analysis



- Technical assistance (training in Japan) on downscaling methods for local-scale climate change scenario: Thailand, Indonesia, Philippines, Viet Nam and Bangladesh
- High-resolution climate models with “Earth Simulator” (20km-mesh atmospheric model).
- Result of the simulation will help to develop adaptation policies and measures.

## Study on Glacial Lakes Outburst Floods (GLOF) in Bhutan Himalayas

- To assess a risk of GLOF in Bhutan Himalayas jointly by the Royal Government of Bhutan (RGB) and Academia of Japan.
- To develop the capacity of RGB for investigation and research on GLOF phenomena
- To enable RGB to plan an effective disaster management
- To be conducted under the Science and Technology Research Partnership for Sustainable Development (SATREPS), in collaboration with Japan Science and Technology Agency (JST)

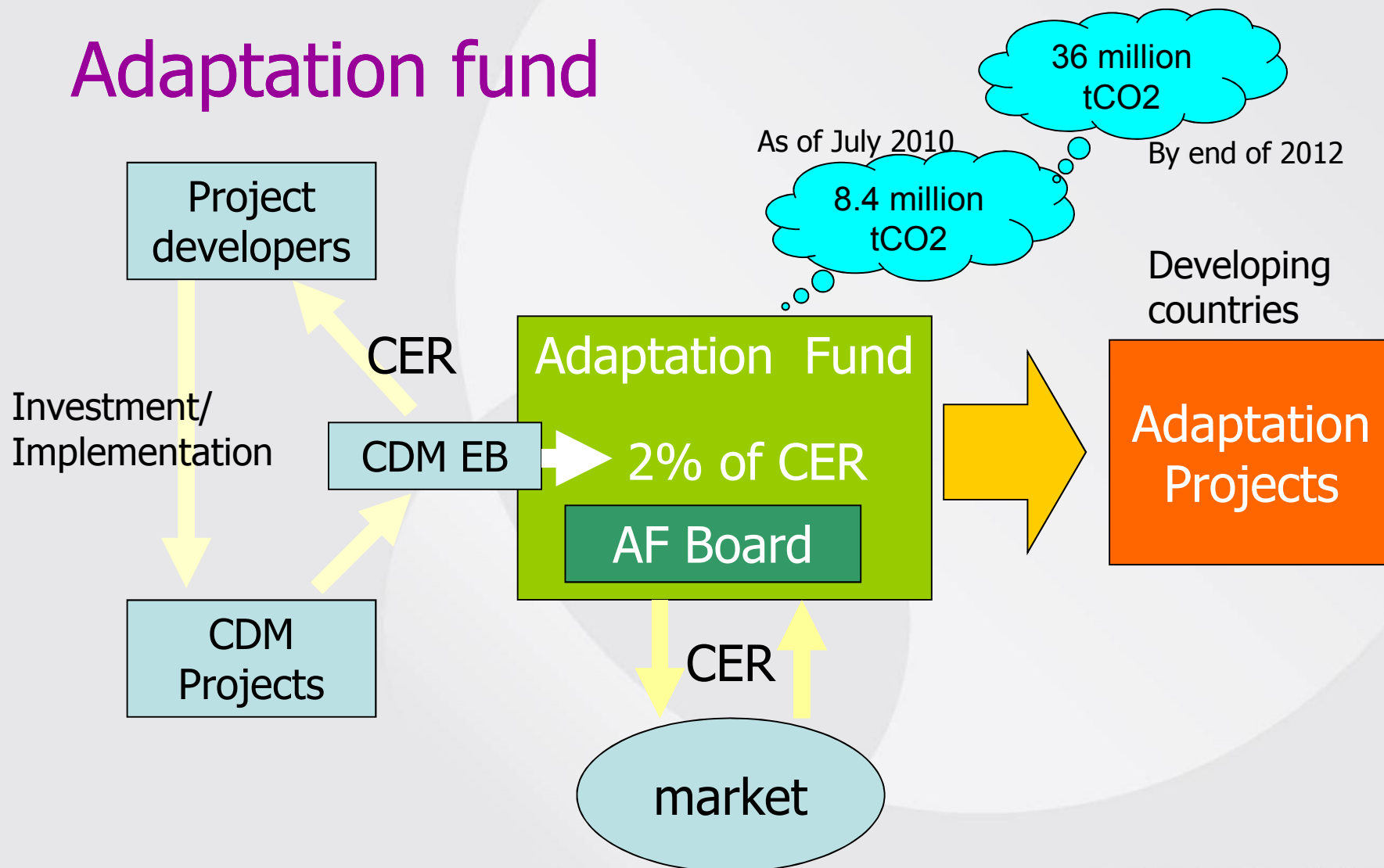


Source:  
Jiro Komori,  
Univ. of Nagoya



# Adaptation Finance

## Adaptation fund



# Adaptation Finance

- Adaptation fund
  - 36million CO<sub>2</sub> (CERs) → USD 600million

***Is it enough?***

- Possible options
  - Increase rate of share of proceeds
    - Impact on CDM market...
  - Finance options
    - ODA, Private finance, Funds, or any other?

- Copenhagen Green Climate Fund

- New market opportunities

- Insurance (Disaster / Weather Insurance)
- Weather Derivatives
- CAT Bond

# Thank you for your attention

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