

The 4th World Congress of Biosphere Reserves

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- The 6th Meeting of WNICBR (Workshop on Islands and Coastal BR)
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A Framework for Establishing Strategies Responding to Climate Change on Island and Coastal Biosphere Reserves

Dai-Yeun Jeong

Director, Asia Climate Change Education Center, South Korea
Jeju Secretariat, World Network of Island and Coastal BRs

jeongdy@jejunu.ac.kr

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Table of Contents

- I **Research Questions and Objectives**

- II **The 1st Stage of Research - Climate Change Impact on ICBRs**

1. Research Framework
2. Major Findings

- III **The 2nd Stage of Research - Establishment of Strategies Responding to Climate Change on ICBRs**

1. Major Sectors to Be Covered
2. Framework for Establishing Strategies

- IV **Expected Results from the Research**

- V **Some Important Points to Be Discussed**

I . Research Questions and Objectives

1. Research Questions

- A wide range of natural and socio-economic sectors being impacted by climate change have been studied at a local, national, and global level.
- Various strategies against climate change (mitigation/adaptation) are also established and implemented at a global, national and local level.
- However,
 - even though international protected areas (IPAs) including BR are more vulnerable to climate change,
 - quite few research has been done on
 - the impact of climate change on IPAs
 - establishment of IPA-specific strategy against climate change

I . Research Questions and Objectives

2. Research Objectives

- Funded by Division of Ecological and Earth Sciences Man and Biosphere (MAB) Programme, UNESCO
- Being composed of two stages of research on Island and Coastal BRs
 - 1st stage: March 2014 to February 2015
 - 2nd stage: June 2015 to May 2017
- Research sites
 - Jeju Island BR in South China Sea
 - Menorca BR in the Mediterranean
 - Macchabee-Bel Ombre BR in Indian Ocean
 - Príncipe Island BR in the Gulf of Guinea
 - St. Mary's BR in Caribbean

I . Research Questions and Objectives

2. Research Objectives

- Main objective of the 1st stage of research
 - Analysis of climate change impact on Island and Coastal BRs
 - by desk research

- Main objective of the 2nd stage of research
 - Establishment of strategies responding to climate change impact on Island and Coastal BRs
 - applicable to other sites of BRs

I . Research Questions and Objectives

2. Research Objectives

- Research Team

- Dai-Yeun Jeong (Principal Investigator)

- Director of Asia Climate Change Education Center, South Korea
- Director of Jeju Secretariat, WNICBR
- Emeritus Prof. at Jeju National University, South Korea

- Ragen Parmananda (Co-Researcher)

- Scientific Officer (Conservation) in the National Parks and Conservation Service, Mauritius

I . Research Questions and Objectives

2. Research Objectives

- Research Team

- Juan Rita (Co-Researcher)

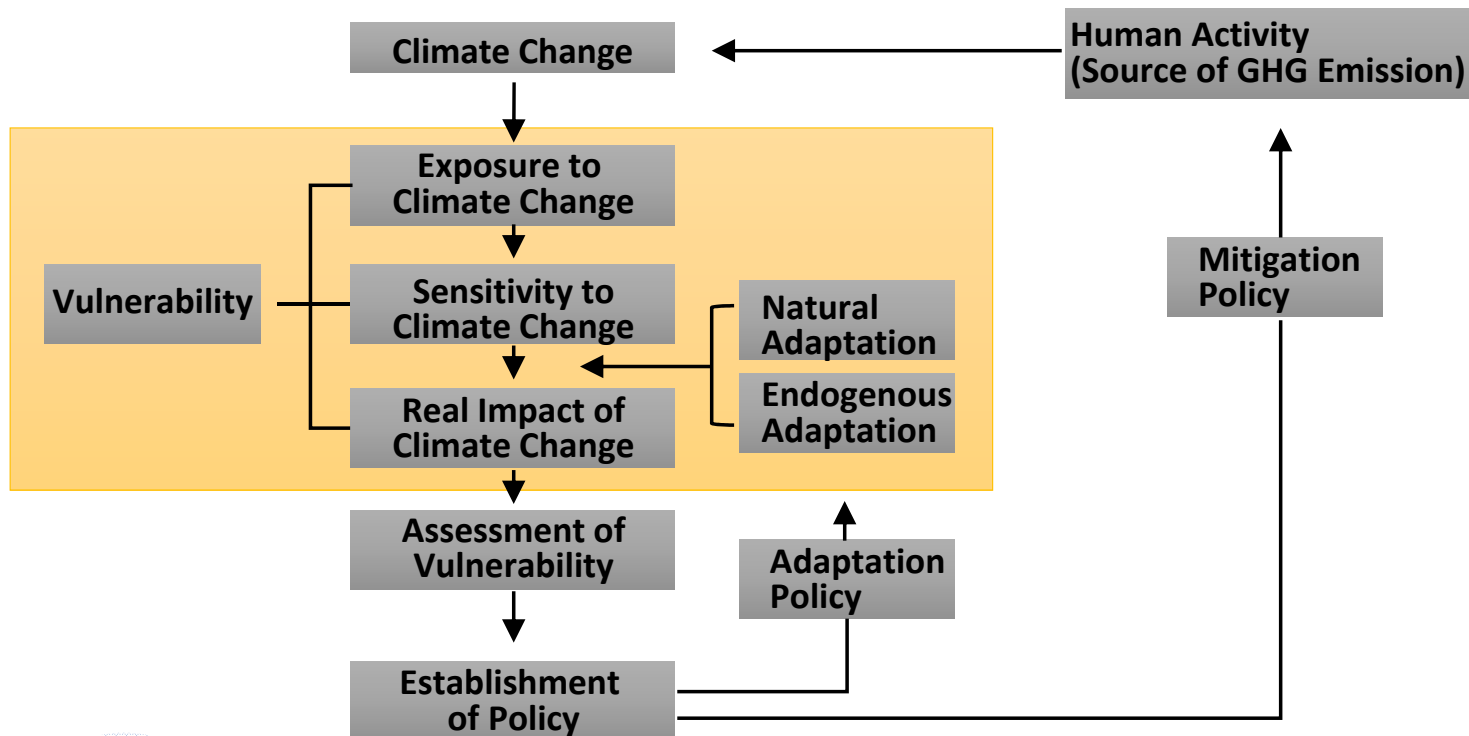
- Prof. of Botany, Department of Biology, Balearic Island University, Spain

- António Abreu (Co-Researcher)

- Biologist - Environmental Expert, Vice Chair of the European Environment Advisory Councils
- Prof. of Environment and Tourism, ISAL, Madeira Autonomous Region, Portugal

II. The 1st Stage of Research – Climate Change Impact on ICBRs

1. Research Framework



II. The 1st Stage of Research – Climate Change Impact on ICBRs

2. Major Findings

Terrestrial Ecology	A	B	C	D	E
Changes in the distribution of main plant communities	●	●	●		
Changes in the phenology of some insects	●				
Shifts in the distribution areas of migratory birds	●				
Increase of forest pathogens and insect pests		●			
Increase of risk of some endangered plants		●	●	●	●
Increase of exotic invasive species		●	●	●	
Changes in certain ecosystems that threaten vulnerable species		●		●	●

A: Jeju Island BR

B: Menorca BR

C: Macchabee-Bel Ombre BR

D: Príncipe BR

E: St. Mary's BR

II. The 1st Stage of Research – Climate Change Impact on ICBRs

2. Major Findings

Geology and Geography	A	B	C	D	E
Increase of naked lands and caved valleys	●				
Soil erosion and other related phenomena	●		●	●	●
Coastal, beaches and dune erosion	●			●	
Reduction of fresh water resources		●			

Agriculture	A	B	C	D	E
Reduction in the profitability of traditional agricultural production	●	●	●	●	●
Shifts in the areas where crops can be grown	●				
Emergence of new diseases or insect pests in crops or livestock	●	●			

A: Jeju Island BR

B: Menorca BR

C: Macchabee-Bel Ombre BR

D: Príncipe BR

E: St. Mary's BR

II. The 1st Stage of Research – Climate Change Impact on ICBRs

2. Major Findings

Tourist Resort (Tourism)	A	B	C	D	E
The reduction in quality of beaches due to erosion or other related phenomena	–	●			●
Impact of hurricanes on touristic island attractiveness	–			●	●
Likely changes in the duration of the tourist season	–	●			
Reduction of touristic quality of coastal areas due to increasing jelly fish	–	●			

A: Jeju Island BR

B: Menorca BR

C: Macchabee-Bel Ombre BR

D: Príncipe BR

E: St. Mary's BR

II. The 1st Stage of Research – Climate Change Impact on ICBRs

2. Major Findings

Marine Ecology	A	B	C	D	E
Significant demographic changes in algae and sea grass communities	●	●	–	–	
Spreading whitening of algae	●		–	–	
Increase of invasive species of algae from warmer habitats	●	●	–	–	
Shifts in the distribution areas of some fishes linked to changes of sea water temperature	●	●	–	–	
Increase of marine invasive species from tropical areas	●	●	–	–	
Changes of fisheries	●				●
Likely impact on mangroves and coral reefs due to rising sea temperature					●

A: Jeju Island BR **B:** Menorca BR **C:** Macchabee-Bel Ombre BR
D: Príncipe BR **E:** St. Mary's BR

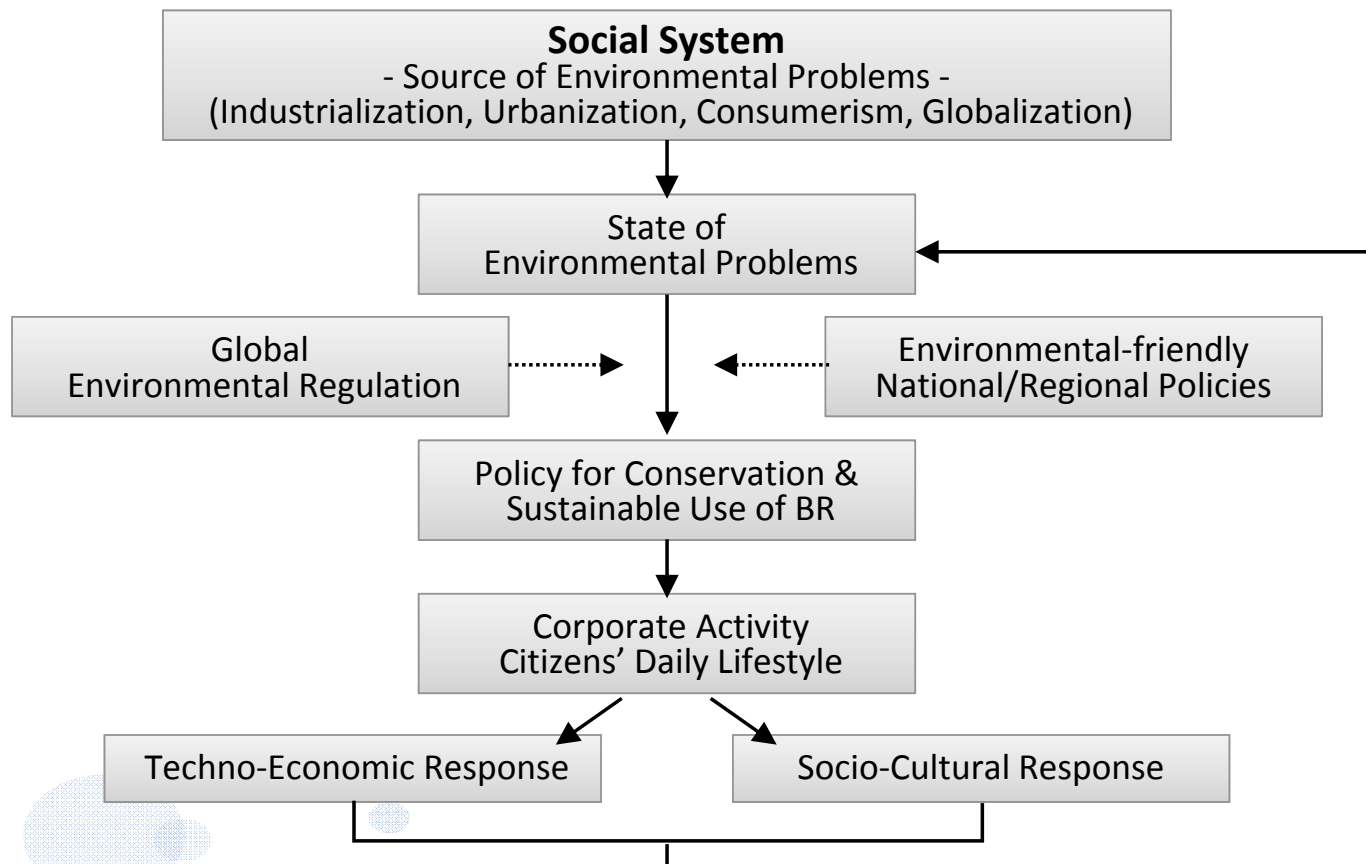
III. The 2nd Stage of Research - Establishment of Strategies Responding to Climate Change on ICBRs

1. Major Sectors to Be Covered

- Strategy on ecological vulnerability
 - Ecosystem
 - Biodiversity
 - Vegetation
 - Species
- Strategy on social vulnerability
 - Erosion (soil, coastal including beaches)
 - Natural disaster
 - Resilience of community
- Strategy on economic vulnerability
 - Resources (water, forest, etc.)
 - Agriculture
 - Tourism
 - Fishery industry

III. The 2nd Stage of Research - Establishment of Strategies Responding to Climate Change on ICBRs

2. Framework for Establishing Strategies



IV. Expected Results from the Research

- Providing a comprehensive, synthetic, and systematic strategy being established on the basis of considering
 - the existing mitigation and adaptation measures in general,
 - the existing region-specific mitigation and adaptation measures,
 - and the real climate change impacts on the research sites.
- Providing ICBR-specific strategies.
- Providing more useful management of ICBRs in terms of conservation and sustainable use.
- Providing an inferential guideline of how to manage the BRs located in other than island and coastal areas.
- Providing UNESCO with a basic reference for
 - more effective and efficient management
 - and sustainable use of BRs including ICBRs against climate change.

V. Some Important Points to Be Discussed

- Limitation inherent in existing researches on BR
 - Segmental (limited sectors)
 - Not deep analysis
 - Less systematic (with related sectors)
- Not easy to analyze and extract the net impact of climate change in terms of methodological technique
- Not sure the measures launched by each research site are effective on preventing BR from climate change impact
- Periodic research on the impact is necessary for conservation and sustainable use of BR

Thanks a lot for your listening