



# AIM/Material India with Natural Resources

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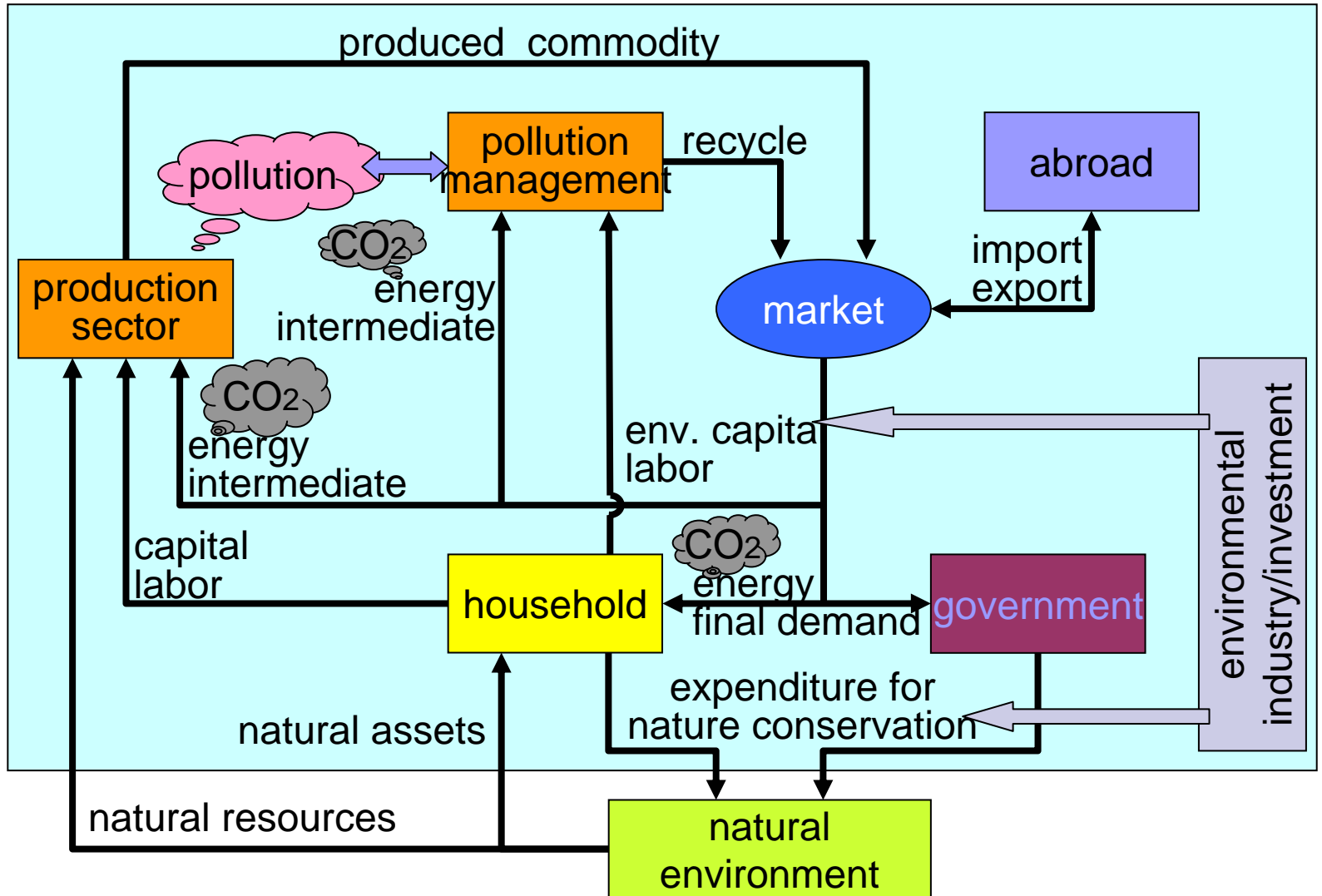
National Institute for Environmental Studies

# Outlines

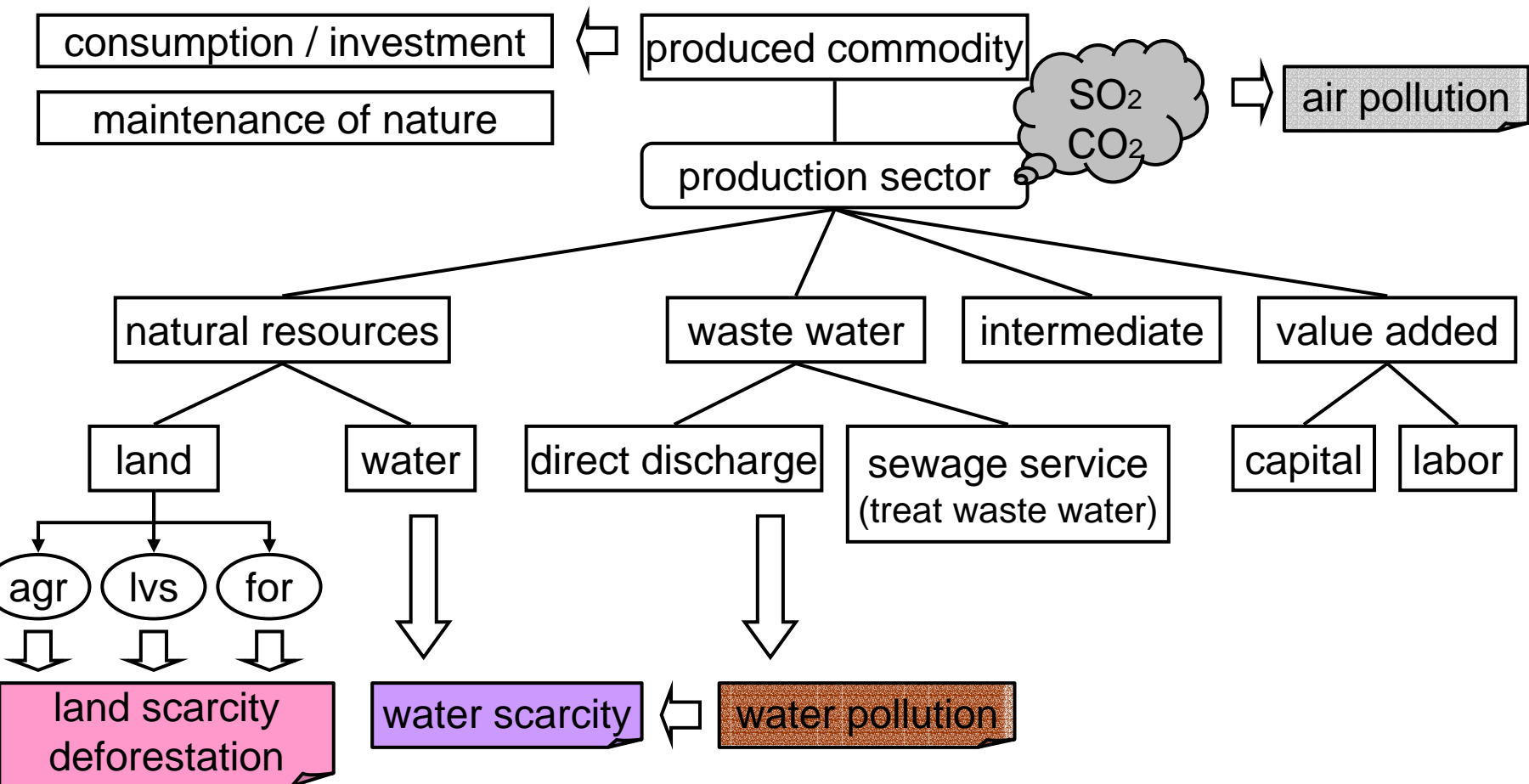
- **Introduction of natural resources into AIM/Material model**
    - Water, air, landuse, forest, ...
  - **Simulation analyses on natural asset constraints and countermeasures**
    - What is the better policy option for sustainable development?
- **This is the 1st trial applying AIM/Material with Natural Resources to India**



# Model Overview



# Relationship between economy and environment in this example



# Model

- **Country: India**
- **Time period: 1993-2030**
- **Economy: 28 sectors & 29 commodities**
- **Environment:**
  - landuse
  - forest
  - water
  - air

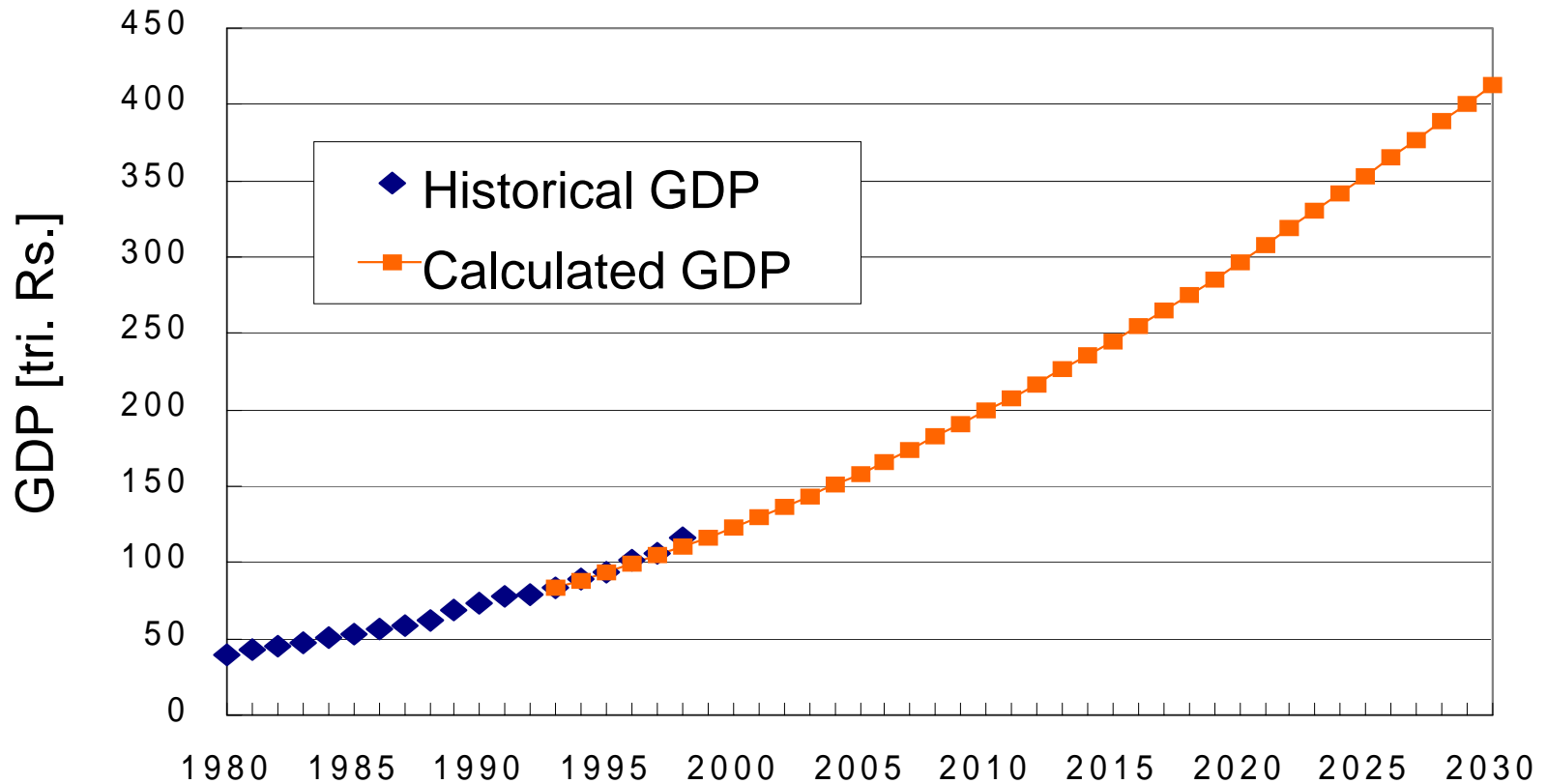


# Scenarios

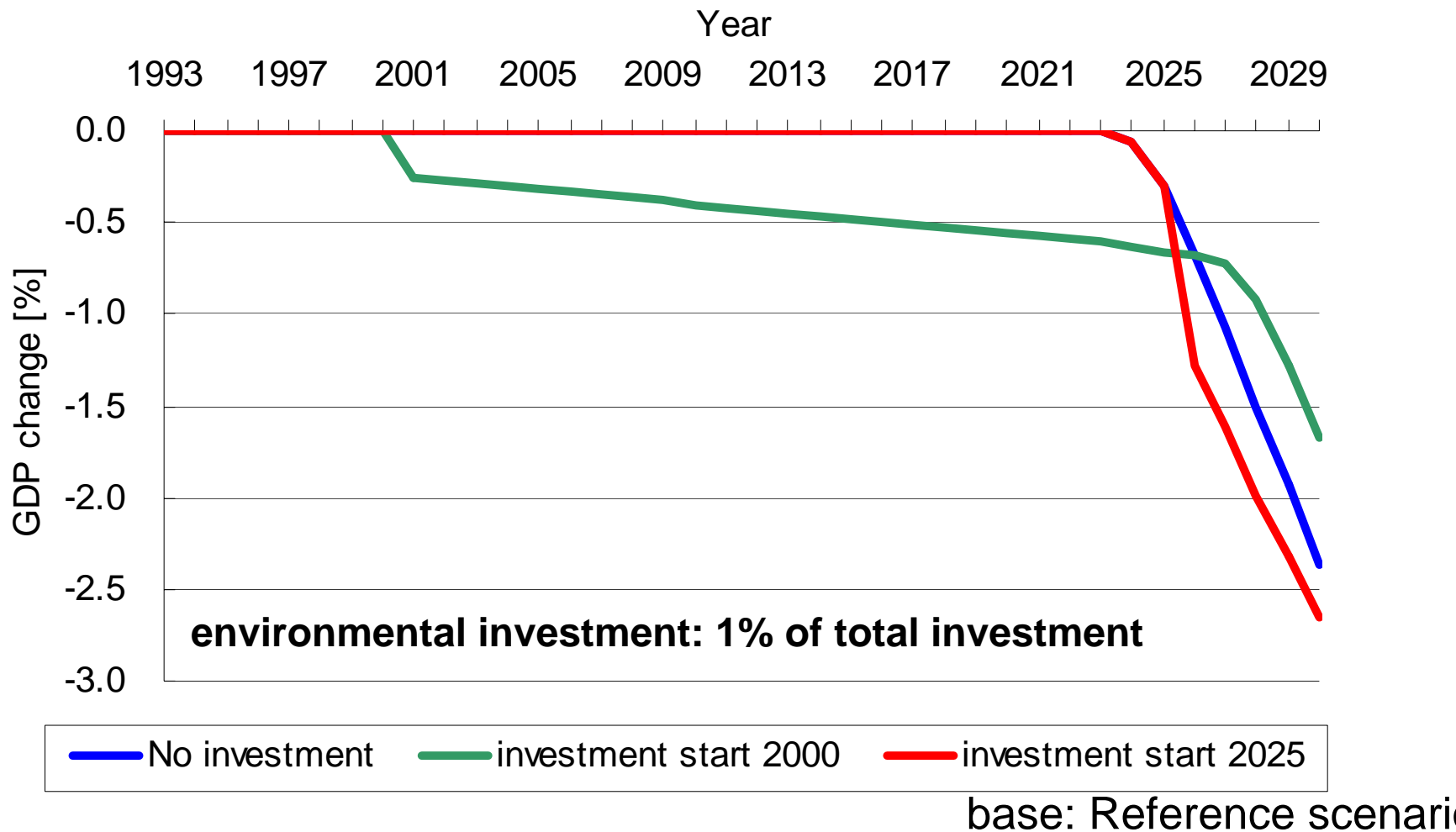
- **Reference scenario: without natural resource constraints**
- **Natural resource constraints scenario**
- **Land use management scenario**
  - environmental investment to land management
- **Waste water management scenario**
  - environmental investment to waste water management in sewage sector
- **Reforestation scenario**
  - reforestation by CDM and fuelwood usage



# Preliminary results: **GDP in reference scenario** (without natural resources constraint scenario)

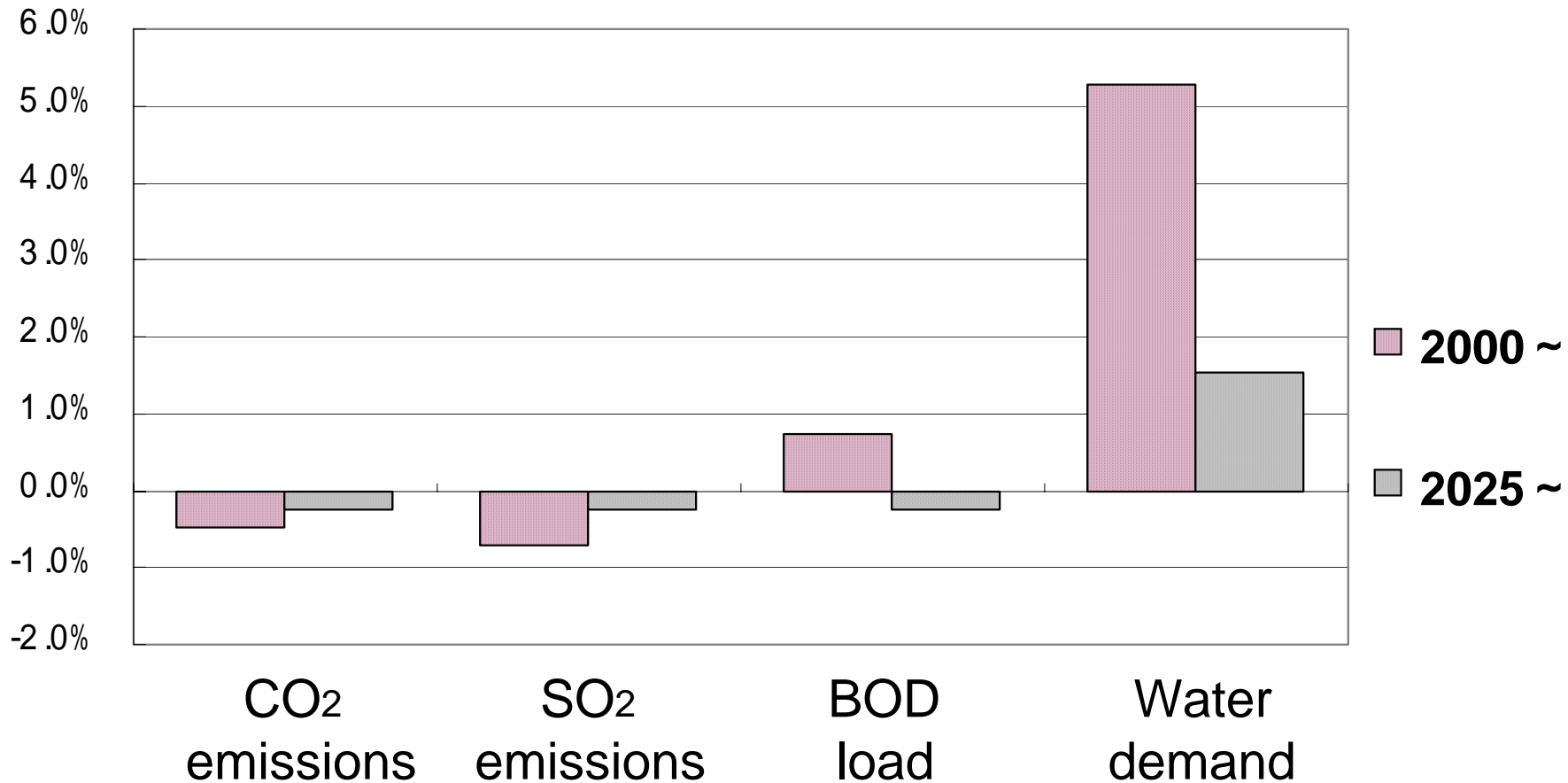


# Preliminary results: GDP change in Landuse constraint and countermeasures





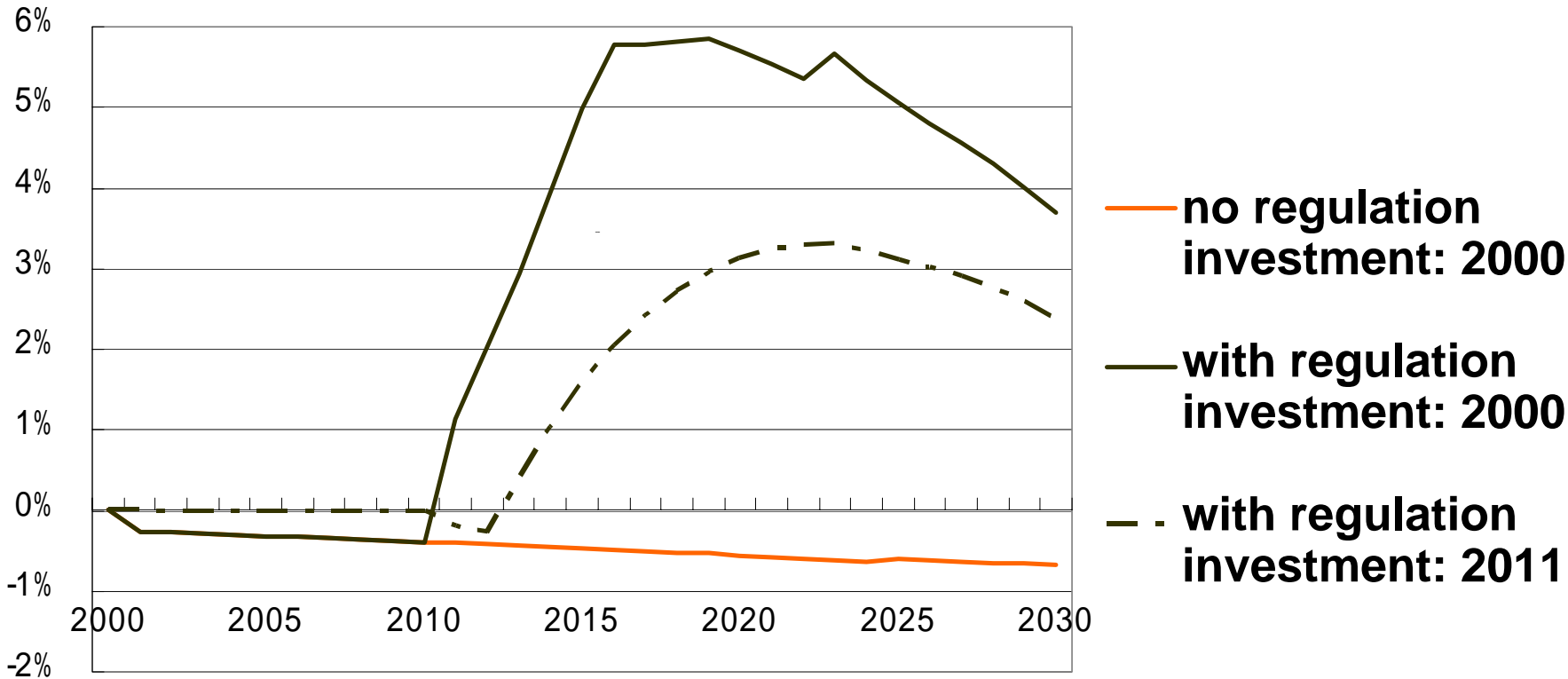
# Preliminary results: Environmental change in landuse constraint and countermeasures



Base: Natural resource constraints scenario



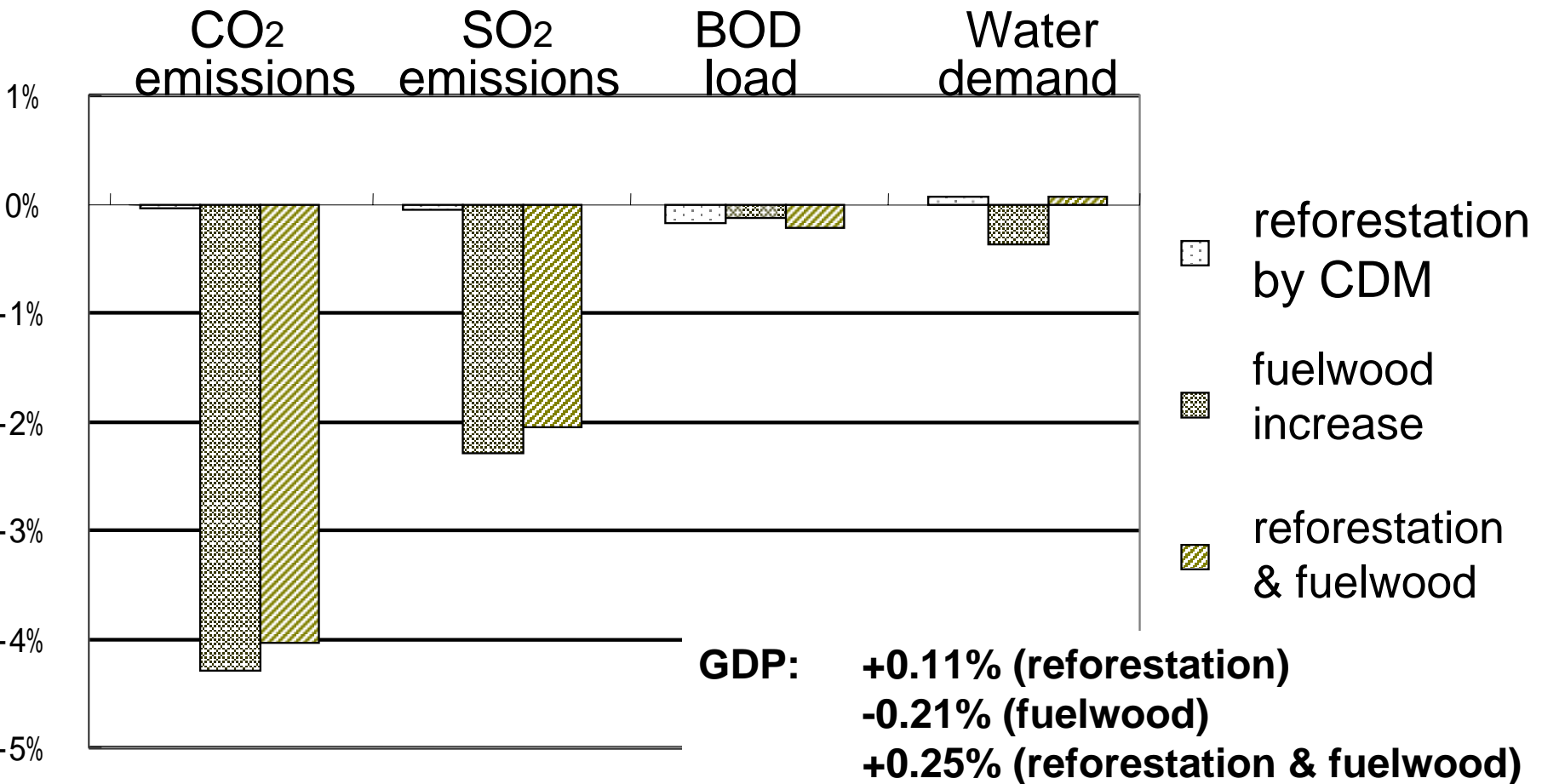
# Preliminary results: GDP change in Water pollution control scenarios



**environmental investment: 1% of total investment**

Base: Natural resource constraints scenario (no regulation case)  
Regulation without investment (with regulation case)

# Preliminary results: Effects of reforestation and fuelwood in 2030



# Conclusion

- **Natural resource constraints have potential to decrease economic activity in the future. Especially landuse constraint is most severe.**
- **As for landuse constraint, the prior countermeasure is important. Countermeasure after observing scarcity of land are useless. On the other hand, other pressures to natural resources such as water will increase. As a result, simultaneous countermeasures are necessary.**
- **Prior investment to water treatment are also effective, because it will bring more economic benefit.**
- **Reforestation by CDM will enhance economic activity. Moreover, increase of fuelwood beside reforestation will be more effective countermeasure from the viewpoint of not only economy but also CO<sub>2</sub> and SO<sub>2</sub> emissions reduction.**
- **Application of this model may be introduced into AIM/Ecosystem model.**