DC開発フォーラム
「複眼でみる温暖化」第3回セミナー

途上国は適応できるのか

小林隼人

7月30日

複眼でみる温暖化シリーズ

第1回 (5月16日)

- Kyoto mechanism (CDM)

第2回 (6月16日)

- Post Kyoto negotiations
- G8 summit: 50-50

第3回 (7月30日)

- Impacts and Adaptation

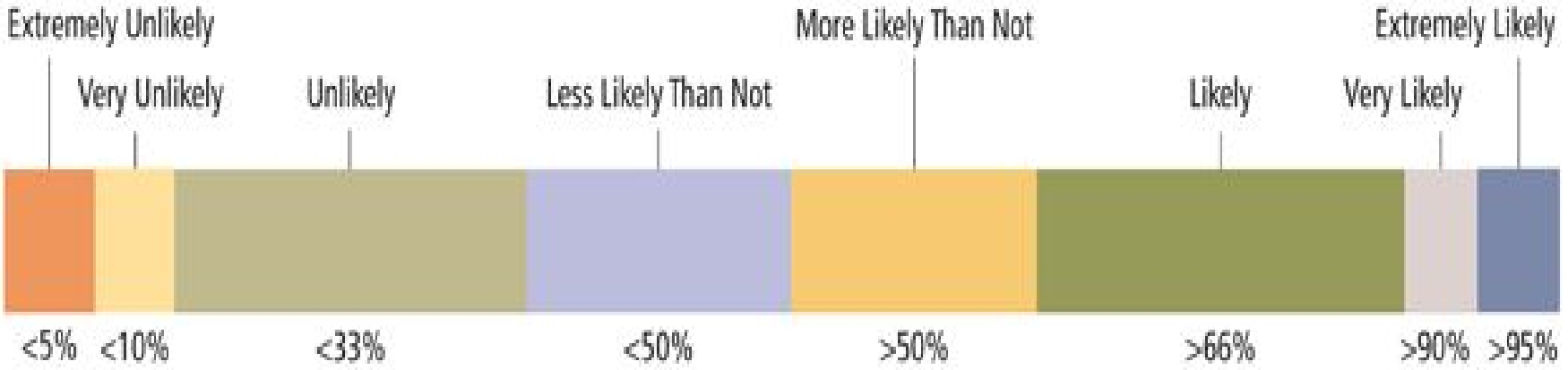
第4回 (8月)

- Clean energy

The evolution of IPCC reports

- 1990, 1995, 2001 and 2007

  "it is "very likely" that emissions of heat-trapping gases from human activities have caused "most of the observed increase in globally averaged temperatures since the mid-20th century" (4th)



IPCC reports do not cover…

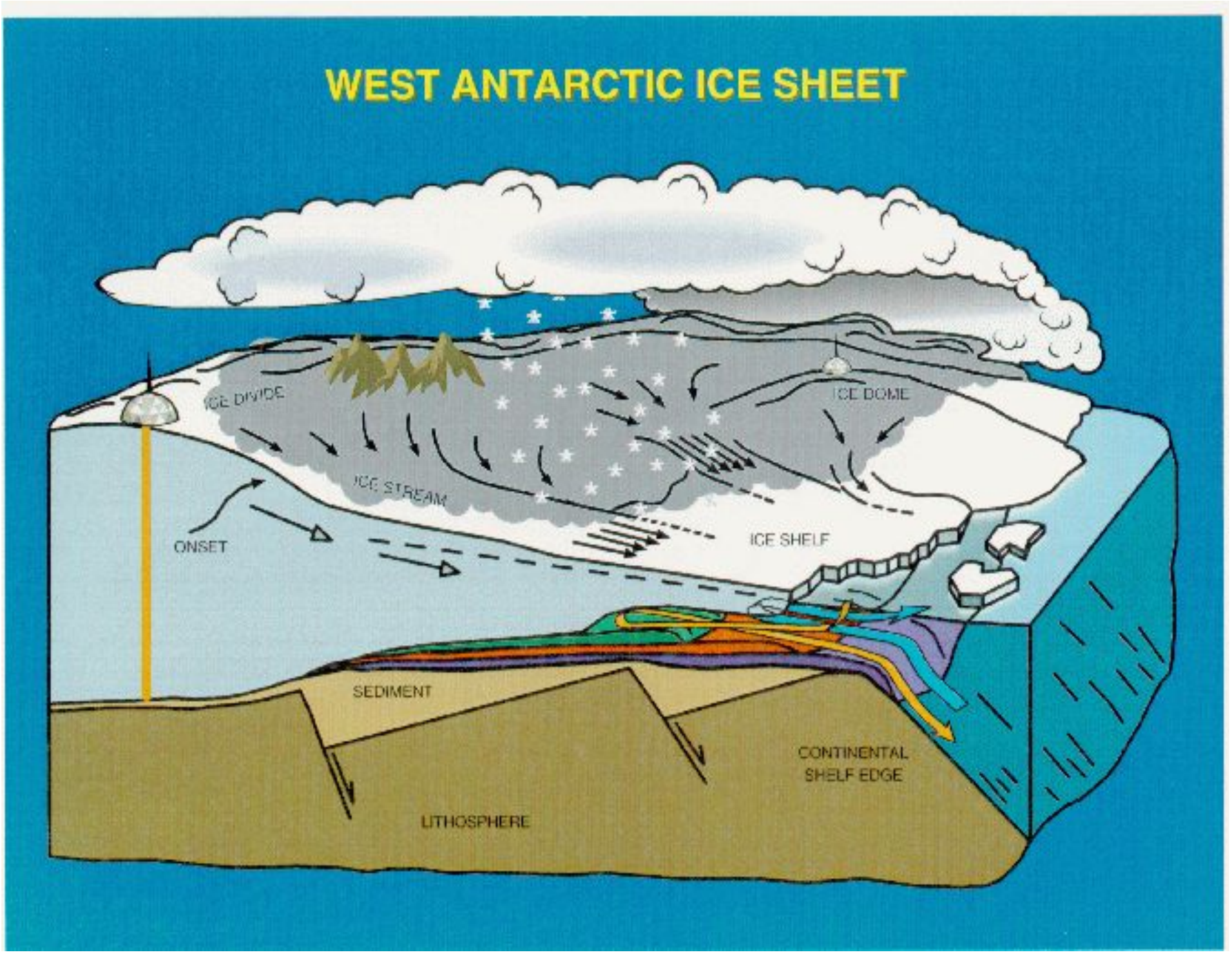
- Methane emissions from Tundra

- Ice sheets Greenland and Antarctica

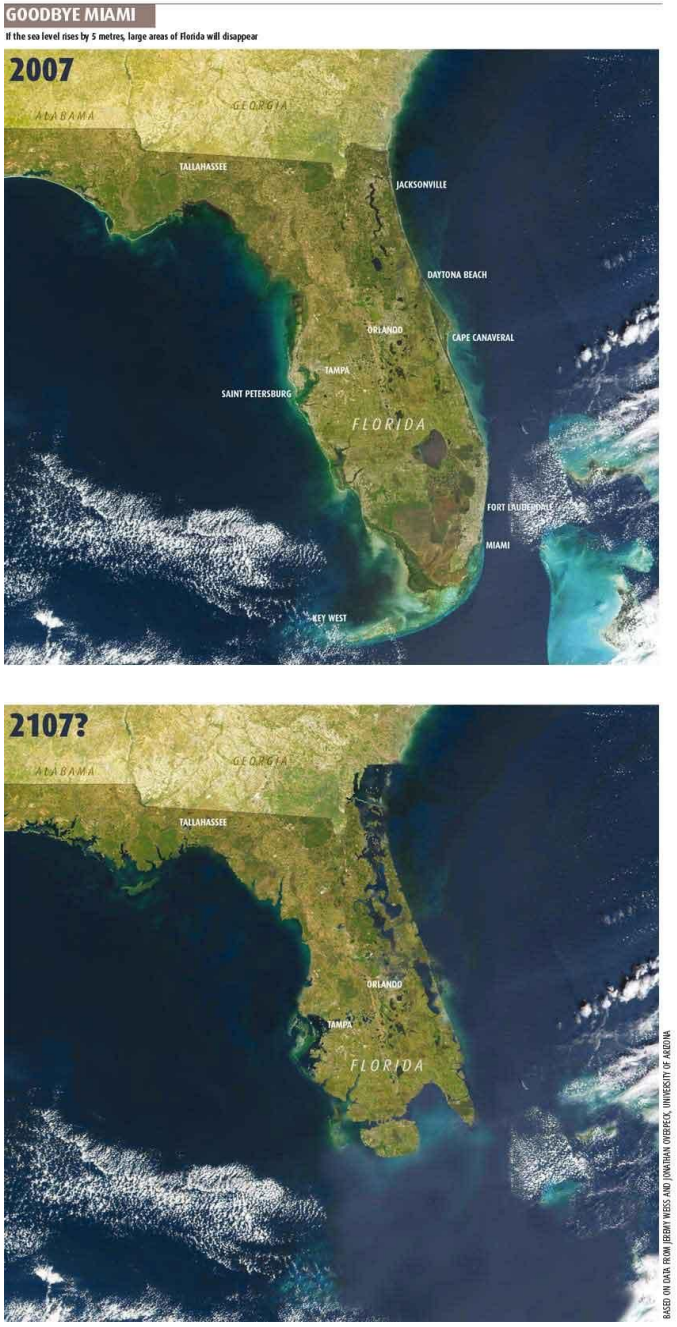
  "*Business-as-usual global warming would almost surely send the planet beyond a tipping point, guaranteeing a disastrous degree of sea level rise.*"

  James Hansen,
  NASA Goddard Institute for Space Studies

- H_2S and mass extinction (or rotten eggs?)


WEST ANTARCTIC ICE SHEET
ICE DIVIDE
ICE DOME
ICE STREAM
ONSET
ICE SHELF
SEDIMENT
CONTINENTAL
SHELF EDGE
LITHOSPHERE

5 meters sea level rises will…



Impacts of sea level rise in developing countries

- A 1m rise would create 56 million refugees in 84 developing countries. The number increases to 89 million and 245 million in the case of a 2m sea level rise and 5m sea level rise respectively.

- East Asia appears to be hit most severely
  - 1m Sea Level Rise affect 2% population and 2% of GDP in East Asia; 5m sea level rise will affect 8.6% of population and 10.2% of GDP

Adaptation

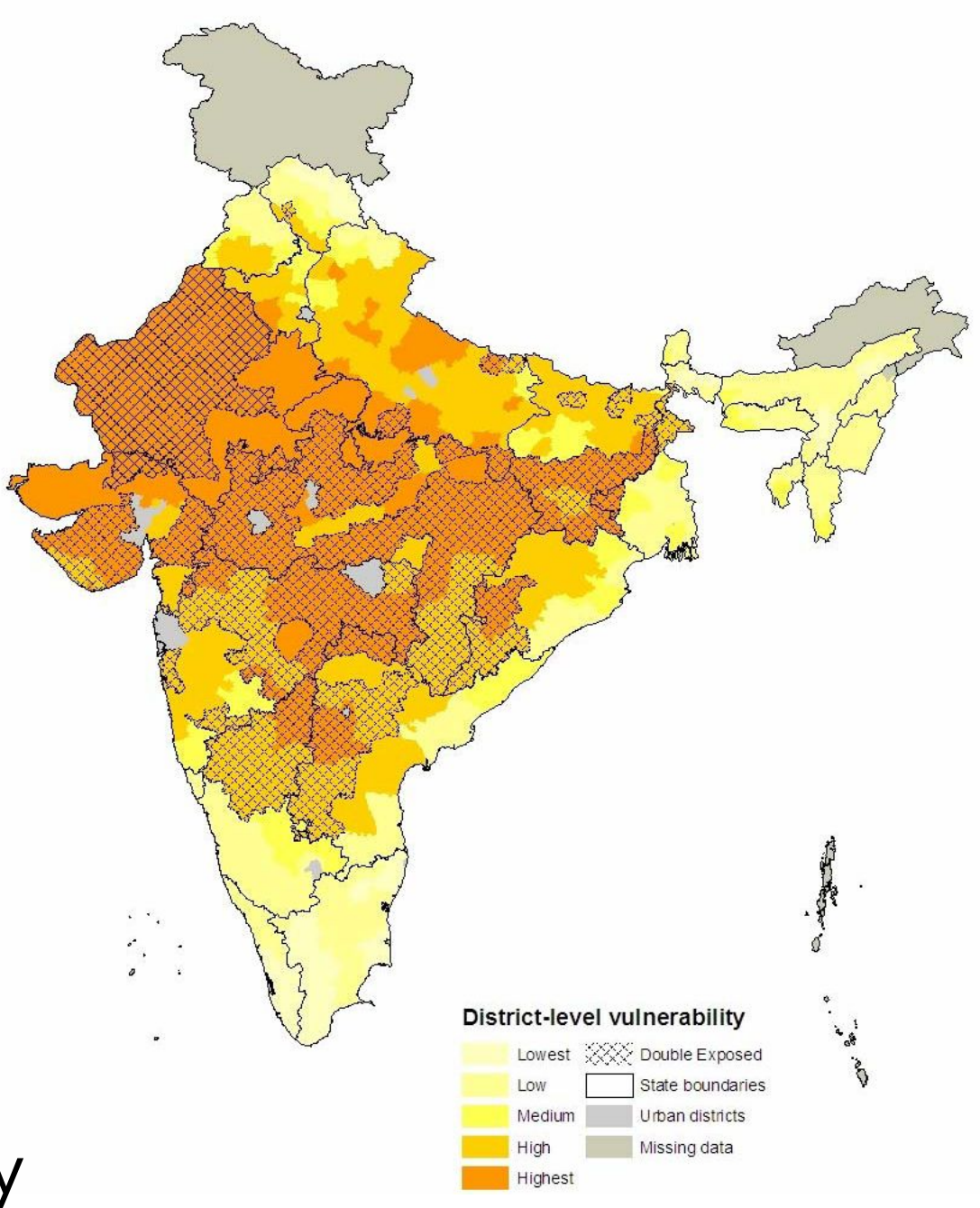
Adjustment in natural or *human systems* in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation. (IPCC)

→ Technology and policy interventions

Vulnerability

Vulnerability is function of impacts, sensitivity and capacity to adapt

Huge Challenges to developing capacity with limited capacity



Impacts on water resources

- 雨季の洪水リスクの増加と乾季の水不足
- 異常気象、台風, ハリケーンの増加
- 氷河湖決壊リスク

氷河湖の水抜き

Ecosystem

- 動物相・植物相の変化
  - 気温, 水温上昇
  - 積雪の減少
  - 移入種, 新たな病原菌のリスク

- Coral reef
  - 30%が既に危機的状況,
  - 海水温上昇により、さらにリスクは増加

- 渡り鳥ー特に長距離を移動する種へのリスク

Agriculture and Food Security

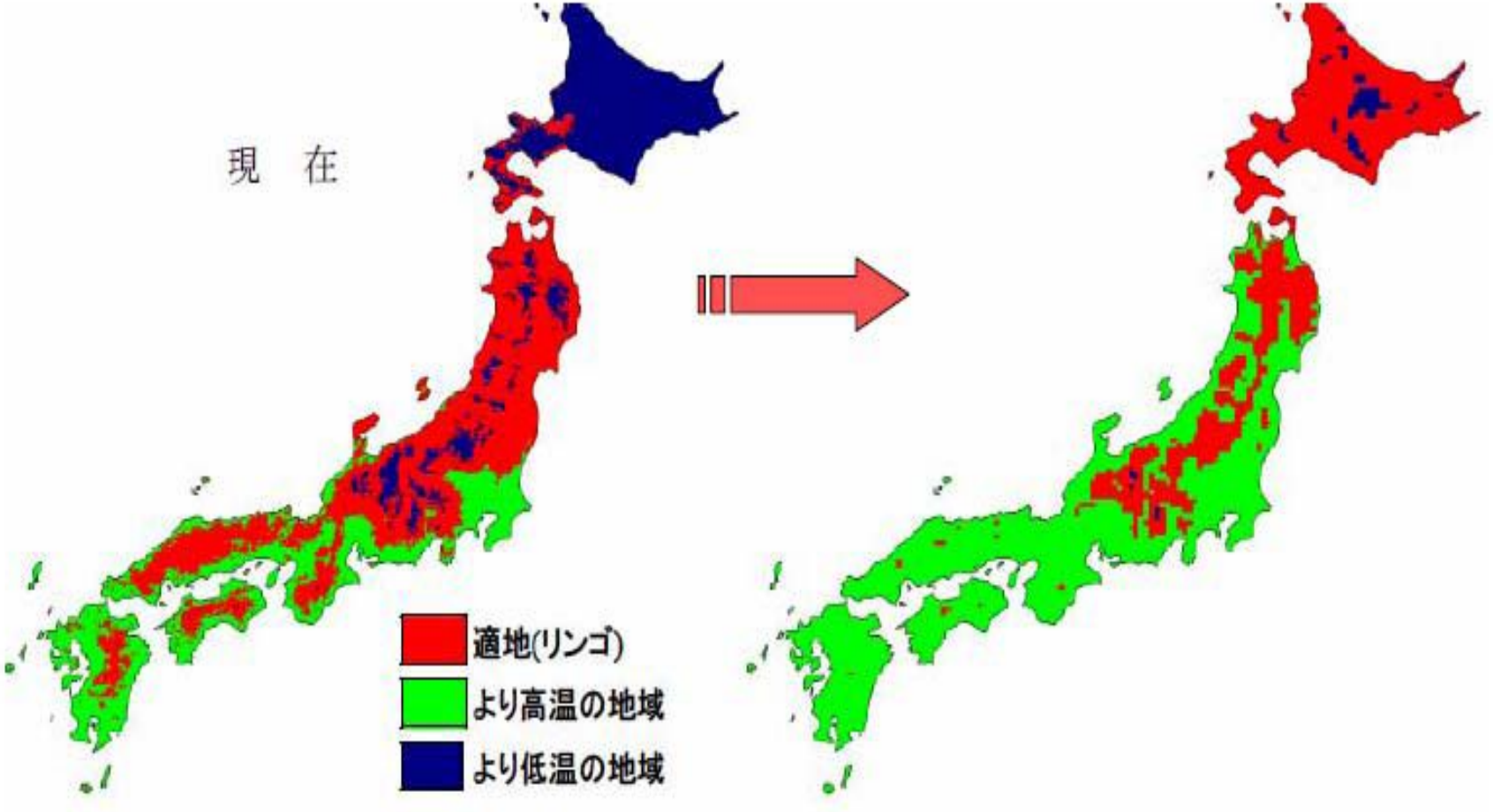
- 温暖化による植生の変化, 淡水資源の減少
  - 途上国（特にアフリカ）の農業生産性
- 単位あたりの 栄養分減少
- 人口増加と消費増
- エネルギー、肥料価格の高騰
  - Food Crisis
  - Bread martyrs

With wine, we can taste climate change

- Champagne goes to England, Rieslings go to Sweden
- Major losers include France, Spain and Napa valley

Each one degree increase in temperature in France is equivalent to moving 200 km

And Apples too…



Human Health and Security

- 病原菌の生息範囲の拡大
  マラリア, デング, 日本脳炎

- 環境難民（島嶼国、低地国）
  ツバル, キリバスからNZへの移住

- 地域紛争リスクの増大

  46 countries (2.7 billion people) at high risk of armed conflict, and an additional 56 states (1.2 billion people) at risk of political instability (International Alert).

The cost of adaptation

- US$86 billion per year (UNDP)
- Africa: 5-10% of GDP per year
- UN Adaptation Fund
  - currently 60 million --- expected to increase to 300 million by 2012
  - funded by 2% levy on CDM
- More and more funds by WB, ADB, Japan, but disbursement tend to be slow:

  Of more than $1 billion pledged at the 2002 Johannesburg Earth summit for improving preparedness of vulnerable countries, less than $180 million have been delivered

Sustainable biofuels?

- Algae or halophytes

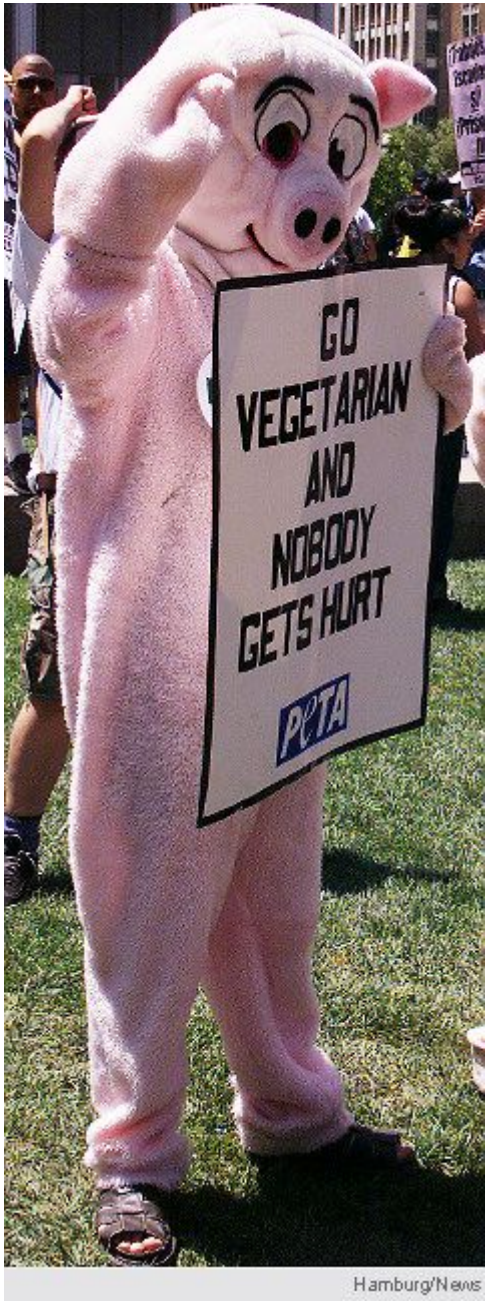
Do not compete with food, returns 70% of the fresh water now used for conventional agriculture back for direct human use

Massive potential for deserted coastlines in Africa

Meat without animals?

$1 million prize to the first person to come up with a method to produce commercially viable quantities of *in vitro meat* at competitive prices by 2012

save water, save land and
save animals – but do people eat it?



Oil 2.0?

- LS9 Inc.
  Oil 2.0: bugs and yeasts that excrete biofuels – skip the expensive distillation process

- Craig Venter
  "make a bacterium that will eat CO_2, drink water, ingest sunlight and produce fuel in 1-2 years"

Cost, risks and opportunities

- Expensive, but costs of non-action will be even more expensive
- Mechanism to transfer money and technologies to developing countries
  - Clean Technology Funds
  - CDM
- Risk is high, but opportunities are also significant

Better to be proactive - Thank you