



HOKKAIDO UNIVERSITY

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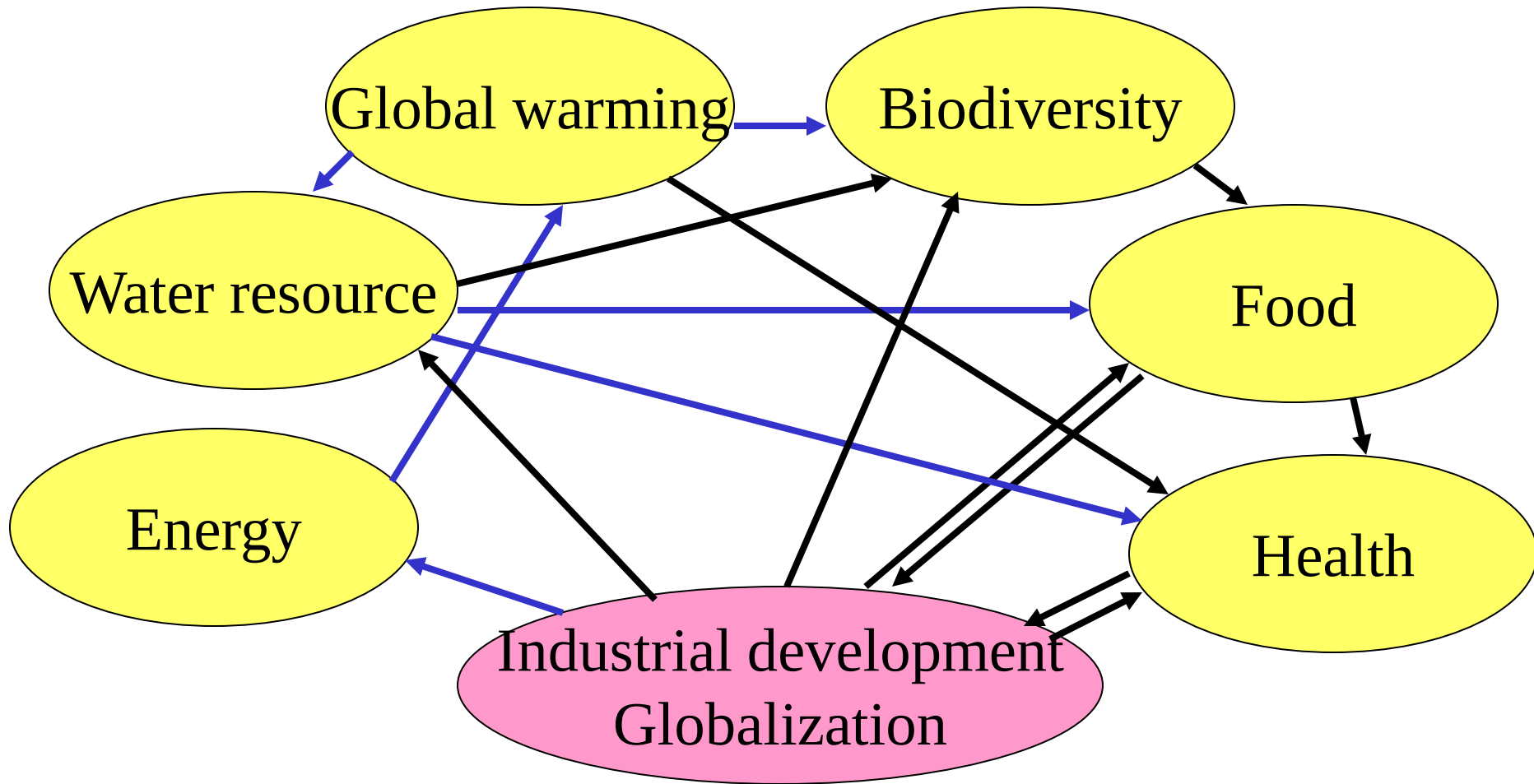
Initiatives by Higher Education for Establishing a Sustainable Society

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Key points

- Six urgent issues:
ENERGY, GLOBAL WARMING,
BIODIVERSITY, FOOD PRODUCTION,
WATER SUPPLY and HEALTH.
- The primary cause in the SOCIETAL SYSTEM
- Efforts of resolving one issue
⇒ an opposite impact on the others
- The issues in complicated relationship

Feedbacks among Urgent Issues

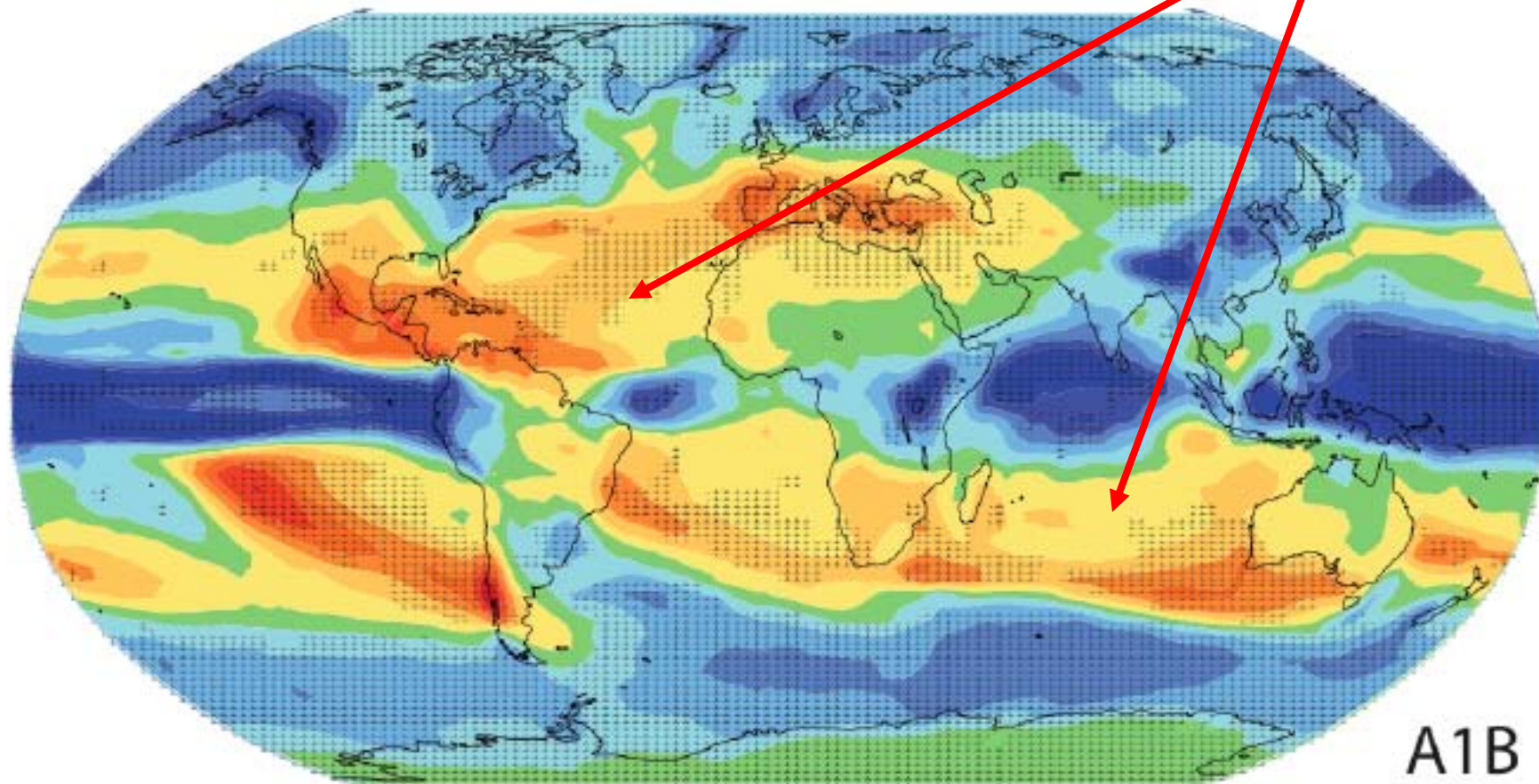


Once each issue gets worse, it worsens the others.
Can we solve all issues at once?

IPCC (Fourth Assessment Report)

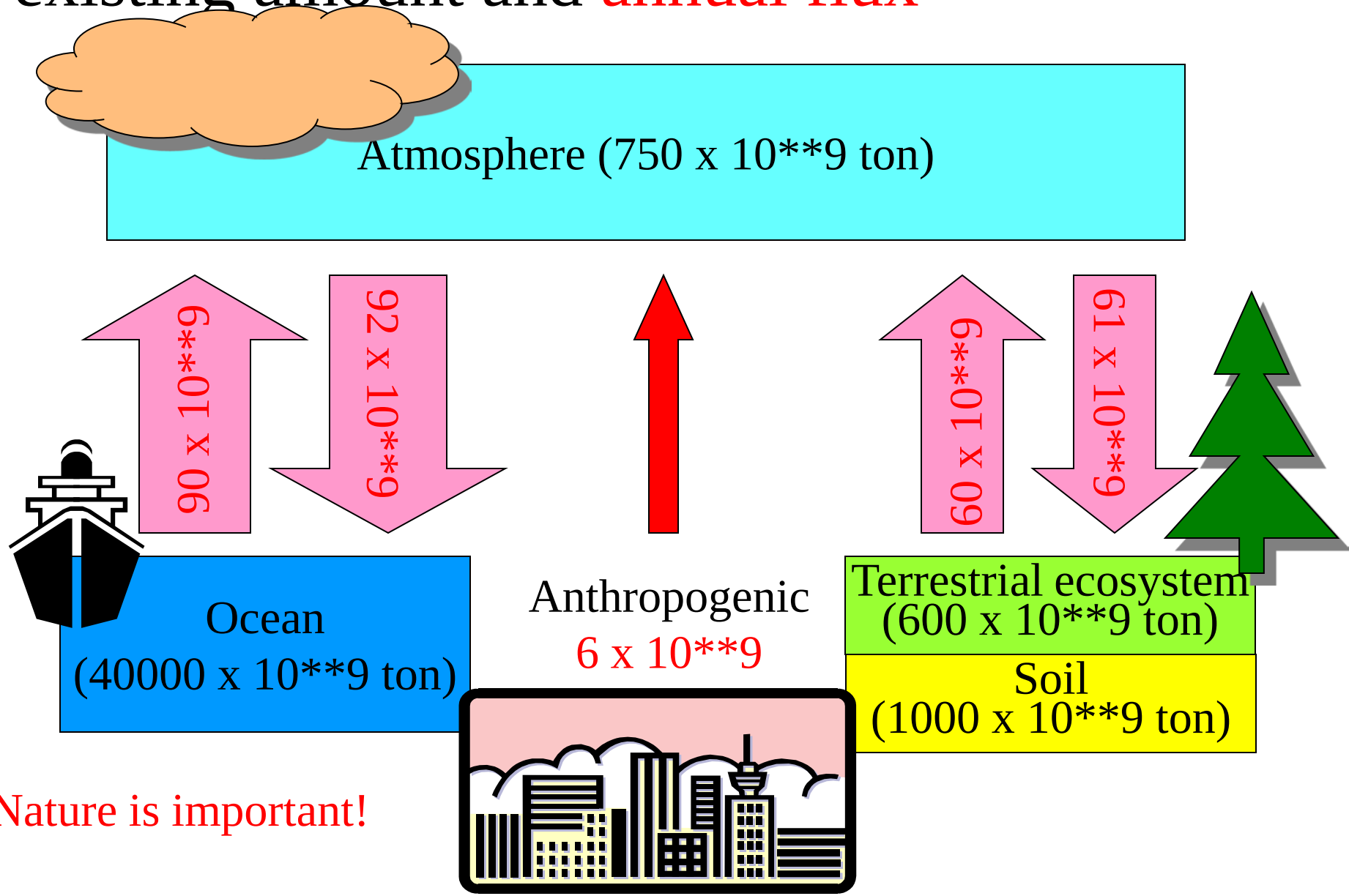
2080-2099

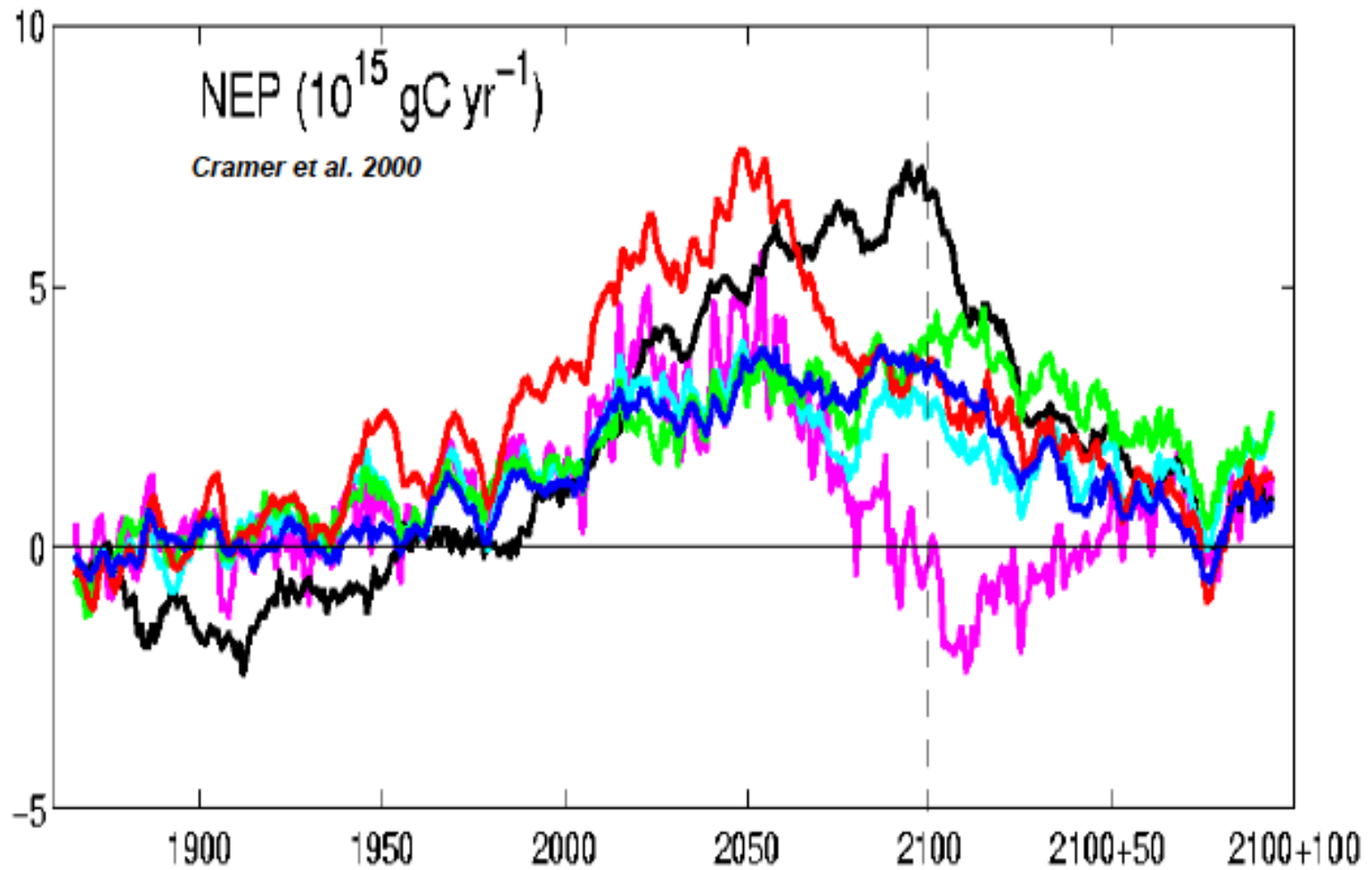
Rain reduction



Global Carbon (Dioxide) Cycle

existing amount and **annual flux**

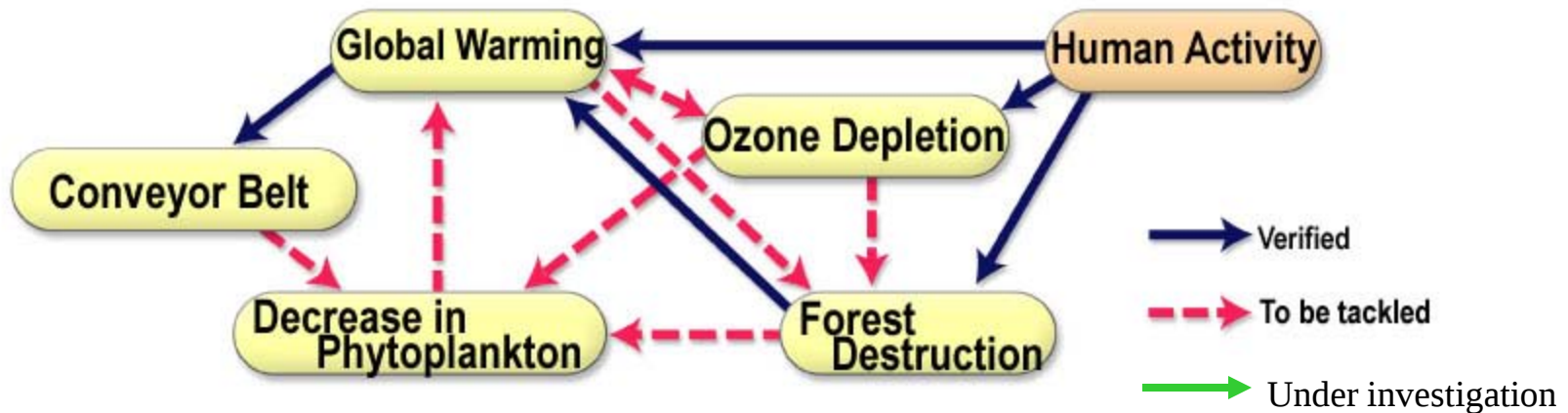
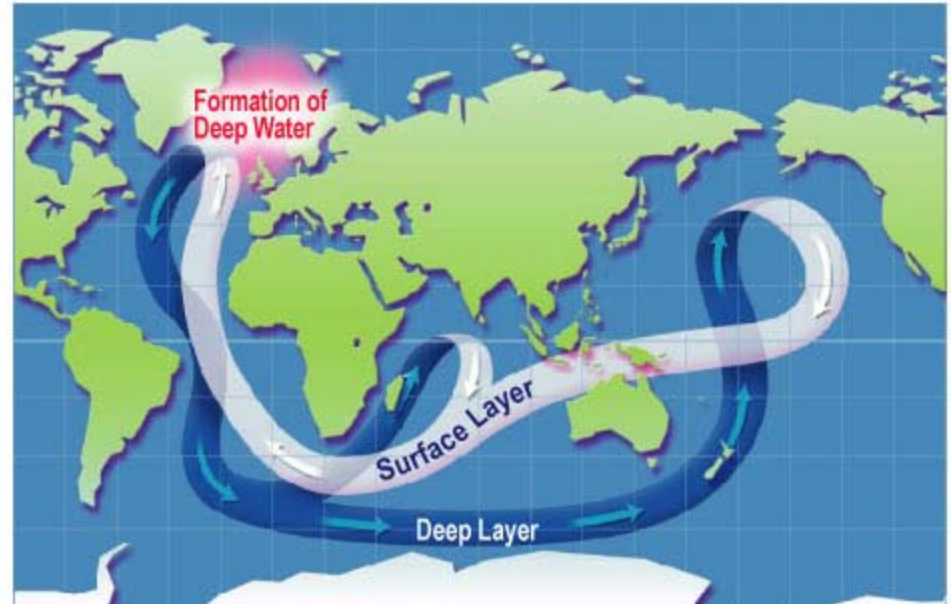
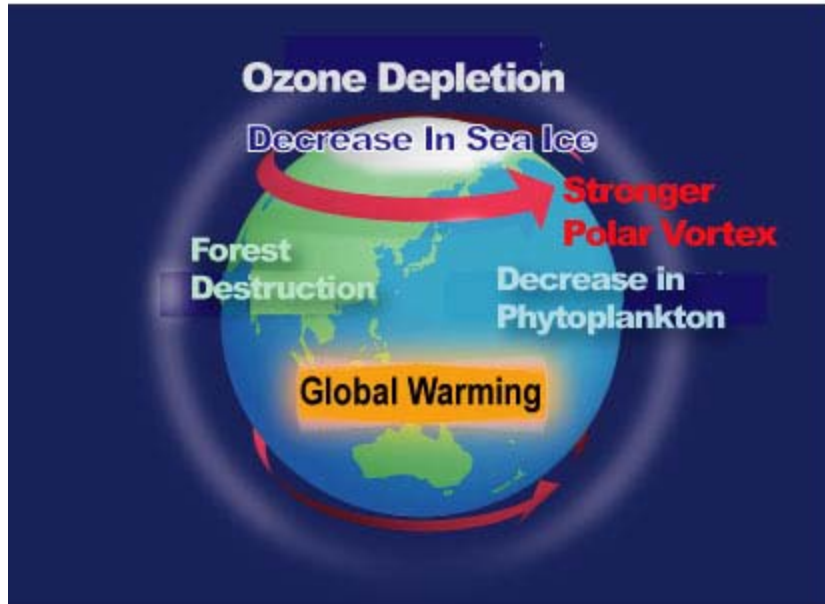




Net Ecosystem Production in various prediction models

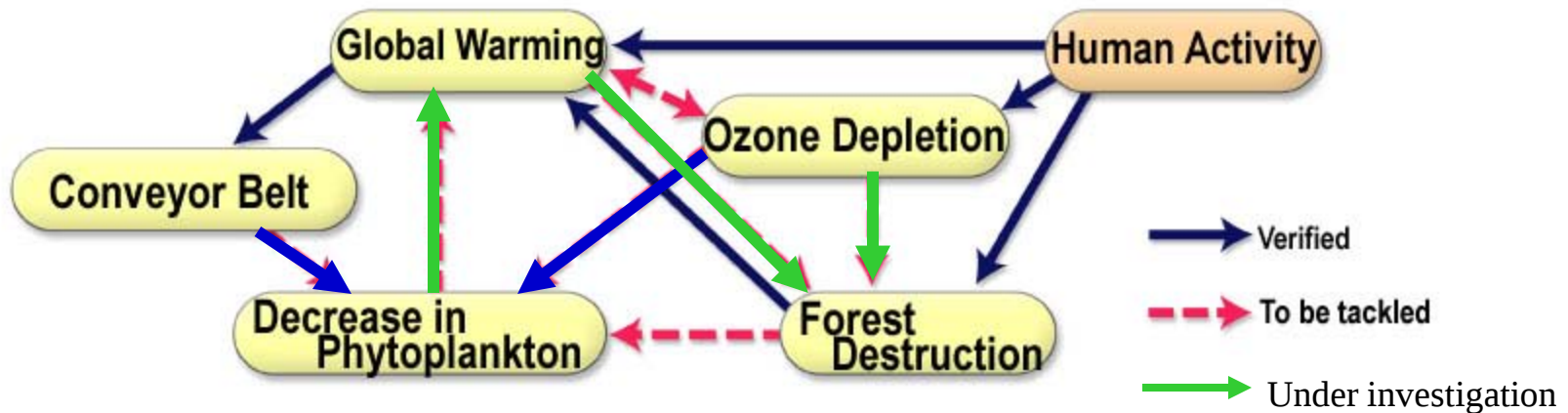
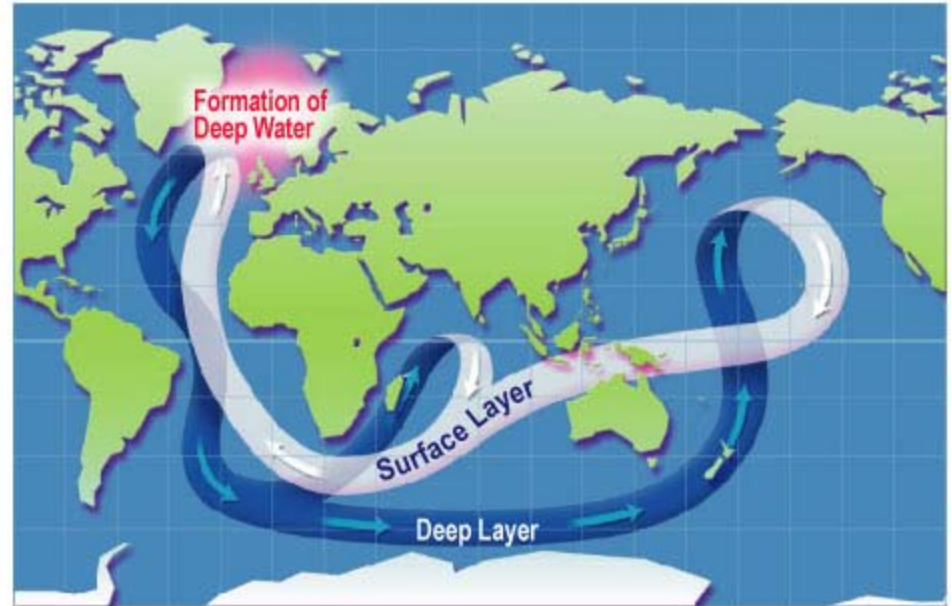
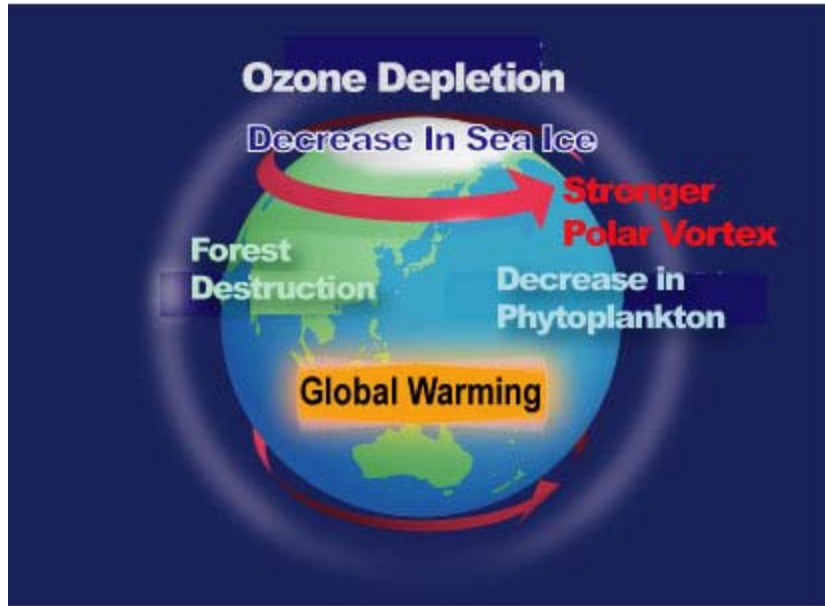
The topics that we focus on

Clarify the mechanism of Abrupt Change

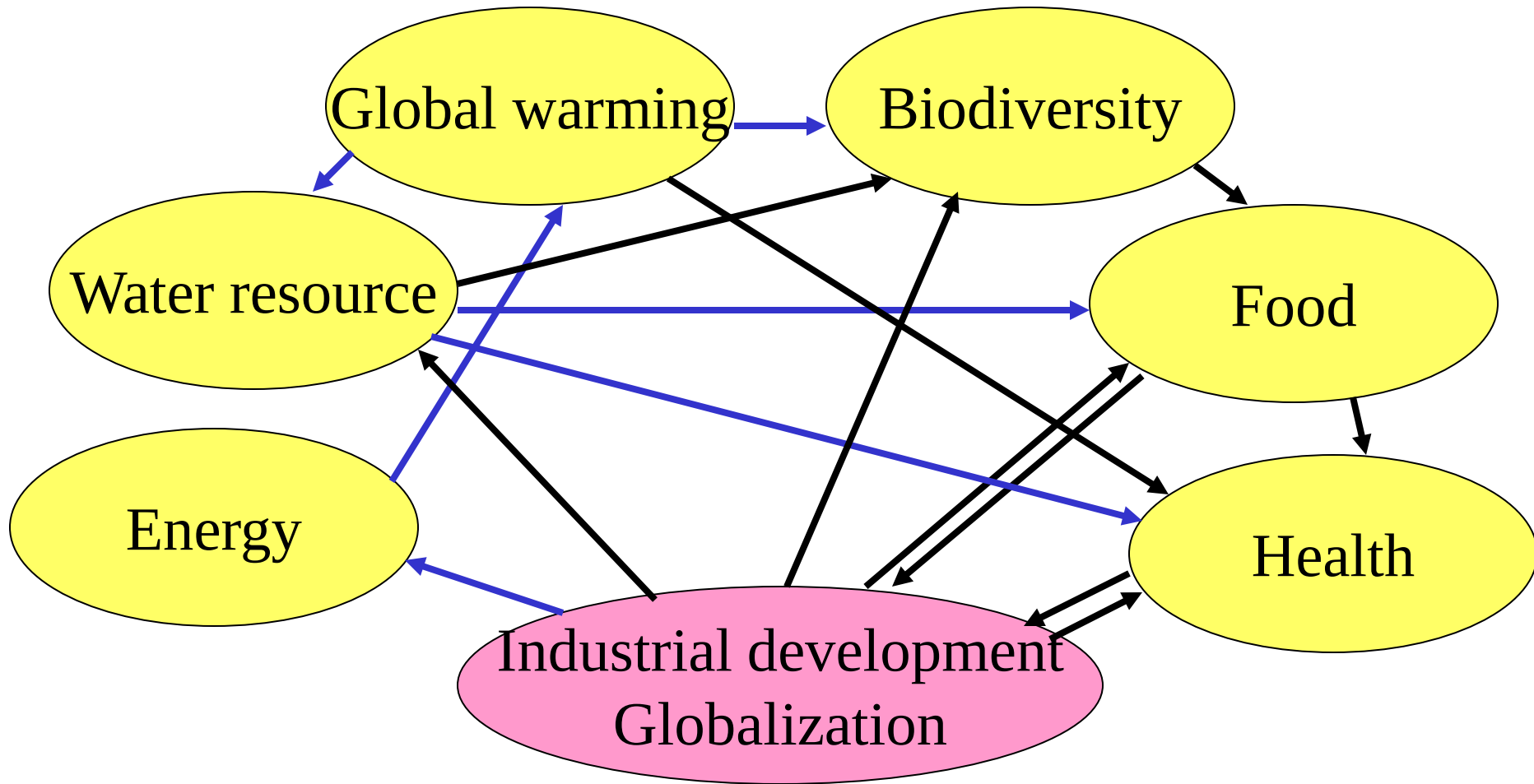


The topics that we focus on

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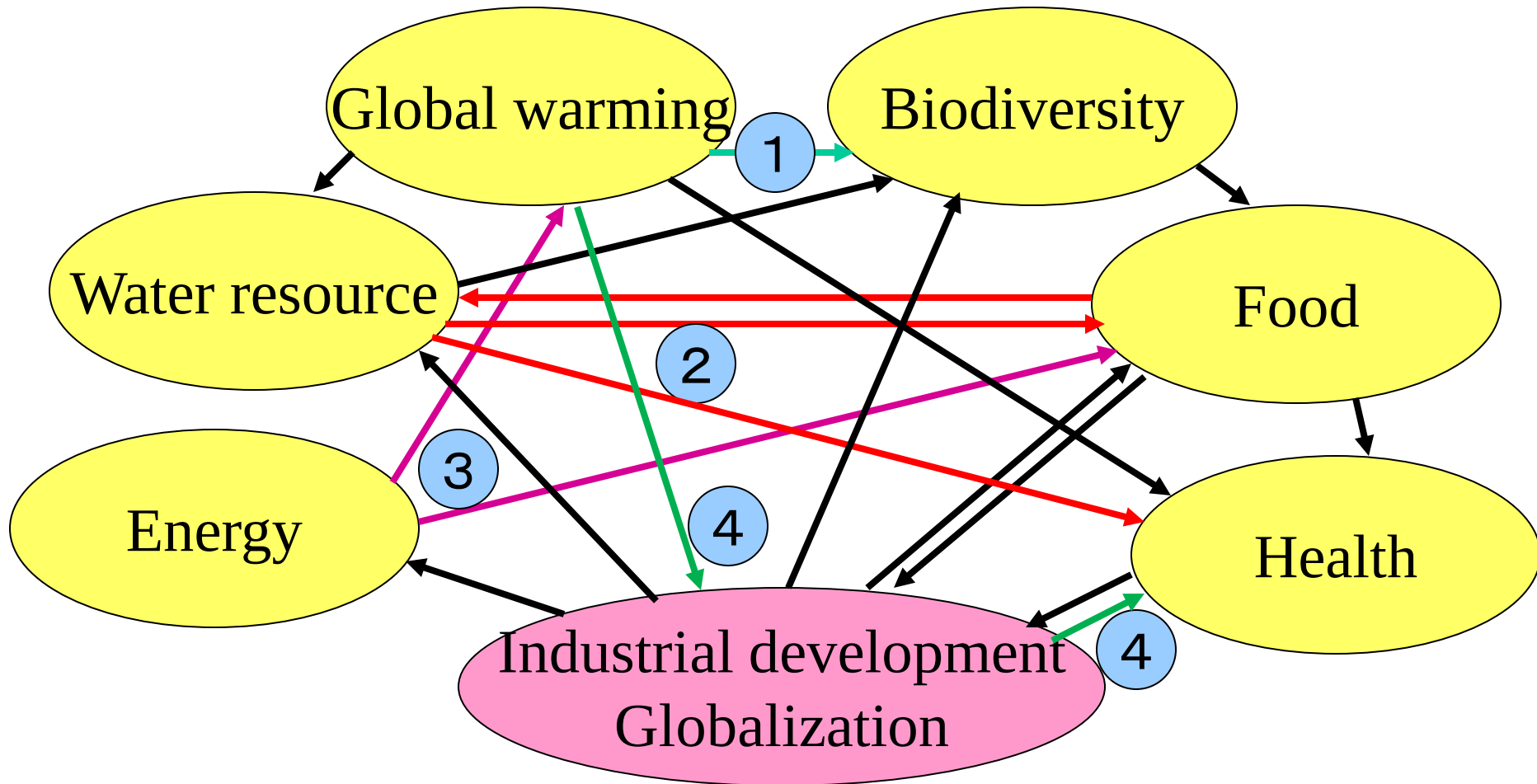


Feedbacks among Urgent Issues



Once each issue gets worse, it worsens the others.
Can we solve all issues at once?

Feedbacks among Urgent Issues



However, we try to solve one issue,
but often make others worse.

(1)
Tree with
higher carbon fixation
↓
Lower biodiversity

(2)
More food, Water resource
↓
Saline soil, Health problem
↓
Less food

(3)
Oil price up
↓
Ethanol from soybean and corn
↓
Food price up, Forest destruct

(4)
Environ. technology transfer
↓
Higher competition
↓
Rich-poor distinction
in developed countries

Beyond Kyoto Protocol

- What will come in 2050-2100?
- The global population has increased by a factor of 2.4 in last 50 years, and will increase.
- Some of the under-developing countries will become developed countries in 50 years, and emit a large amount of carbon dioxide.
- Global warming will change the pattern of rain.
- Biodiversity is reduced and food supply is limited.
- Human health is damaged.
- How can we solve this problem?

Green New Deal

- Aim at both of environment and economy?
- Global environment under deterioration
- Analyze nation-nation relationship in past

A few developed countries (industry) vs. Many under-developing countries (export material)

→ Developing countries play roles similar to Developed countries (industrialization, severe competition, low cost labor in developed countries)

- Impossible to continue the traditional division between developed countries and developing countries
- Hope to move toward harmonious and sustainable society
- We should evaluate Green New Deal actions, on the basis of progressive and smooth shift to sustainable society.

In Japan

- New administration has promised 25% reduction in CO2 emission by 2020.
- Useful as brainstorming
- Politicians are interested in politics (i.e., follow majority of citizens, but often in their election districts).
- Citizens should understand importance of sustainability, develop the concept and move forward to a sustainable society so that politicians follow citizens.

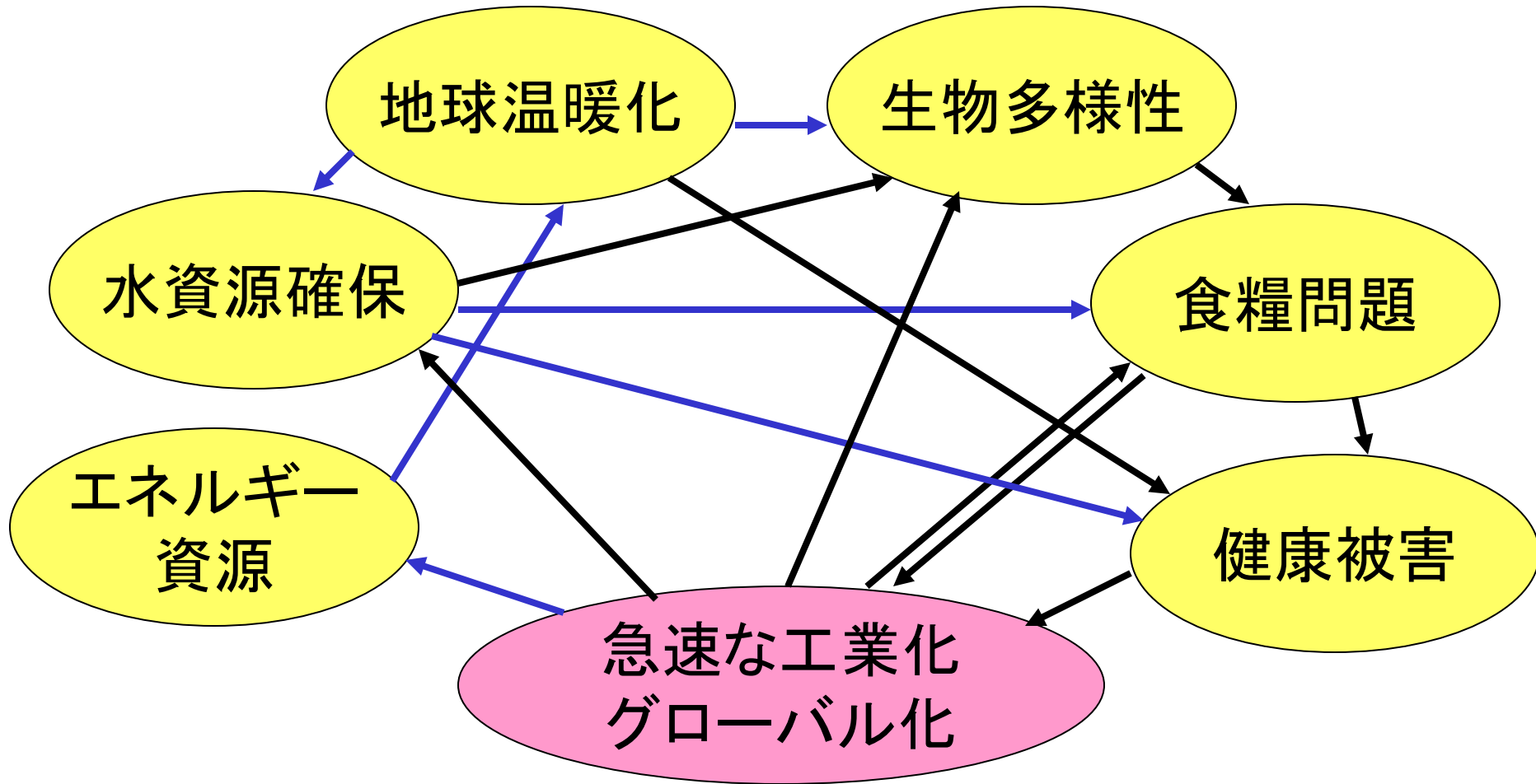
Roles of higher education

- Develop education programs for covering variety of fields with their sophisticated inter-relationship
- Encourage and support students to achieve their capability of and experience in communication and collaboration with world citizens who have diverse backgrounds in culture, economy, information, value, etc.

大事な点

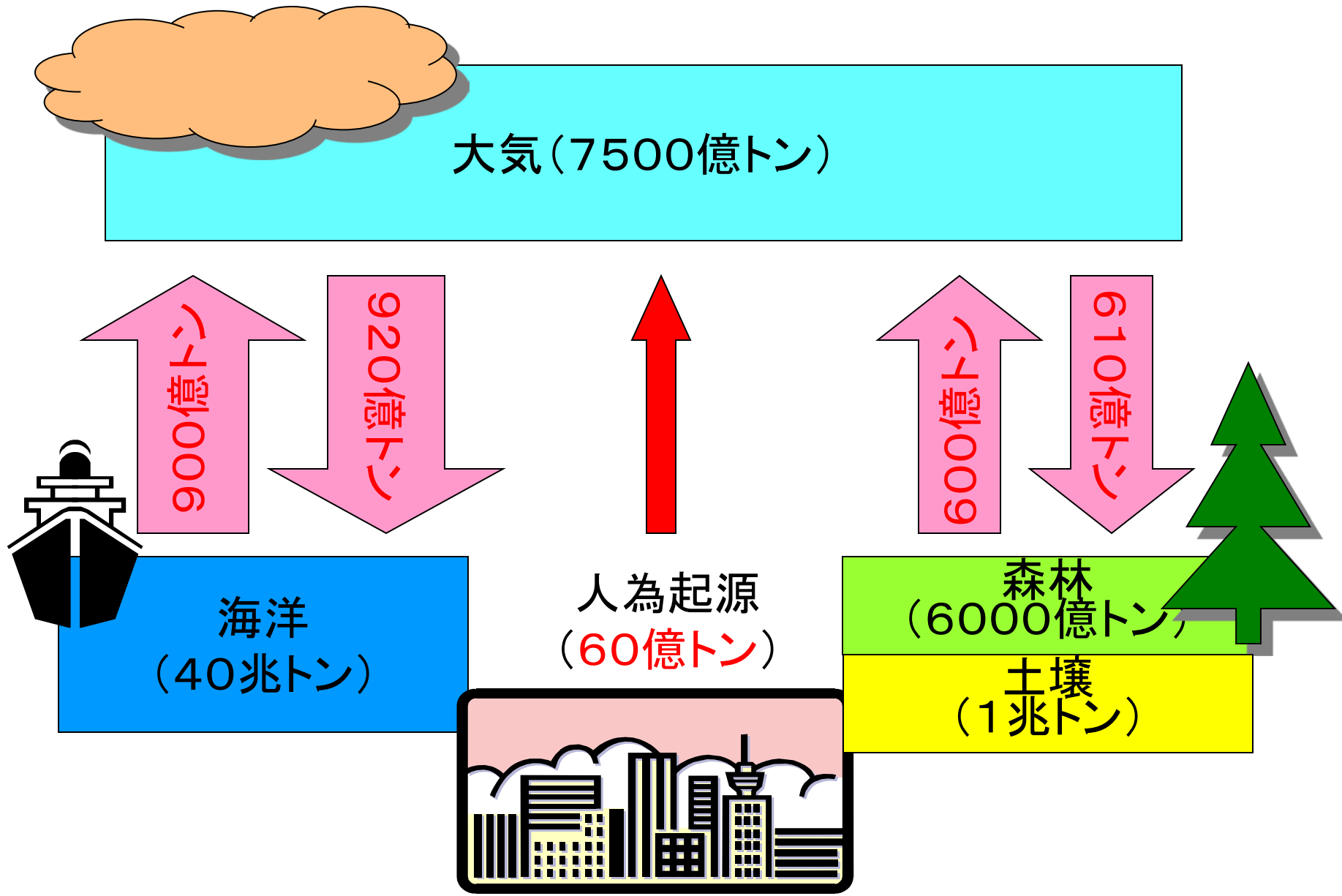
- 6つの緊急課題: エネルギー、地球温暖化
生物多様性、食糧生産、水資源、健康
- 根底には社会システム
- 個別の課題を解決する努力
⇒ 他への悪影響
- 諸課題の間には複雑な関係がある

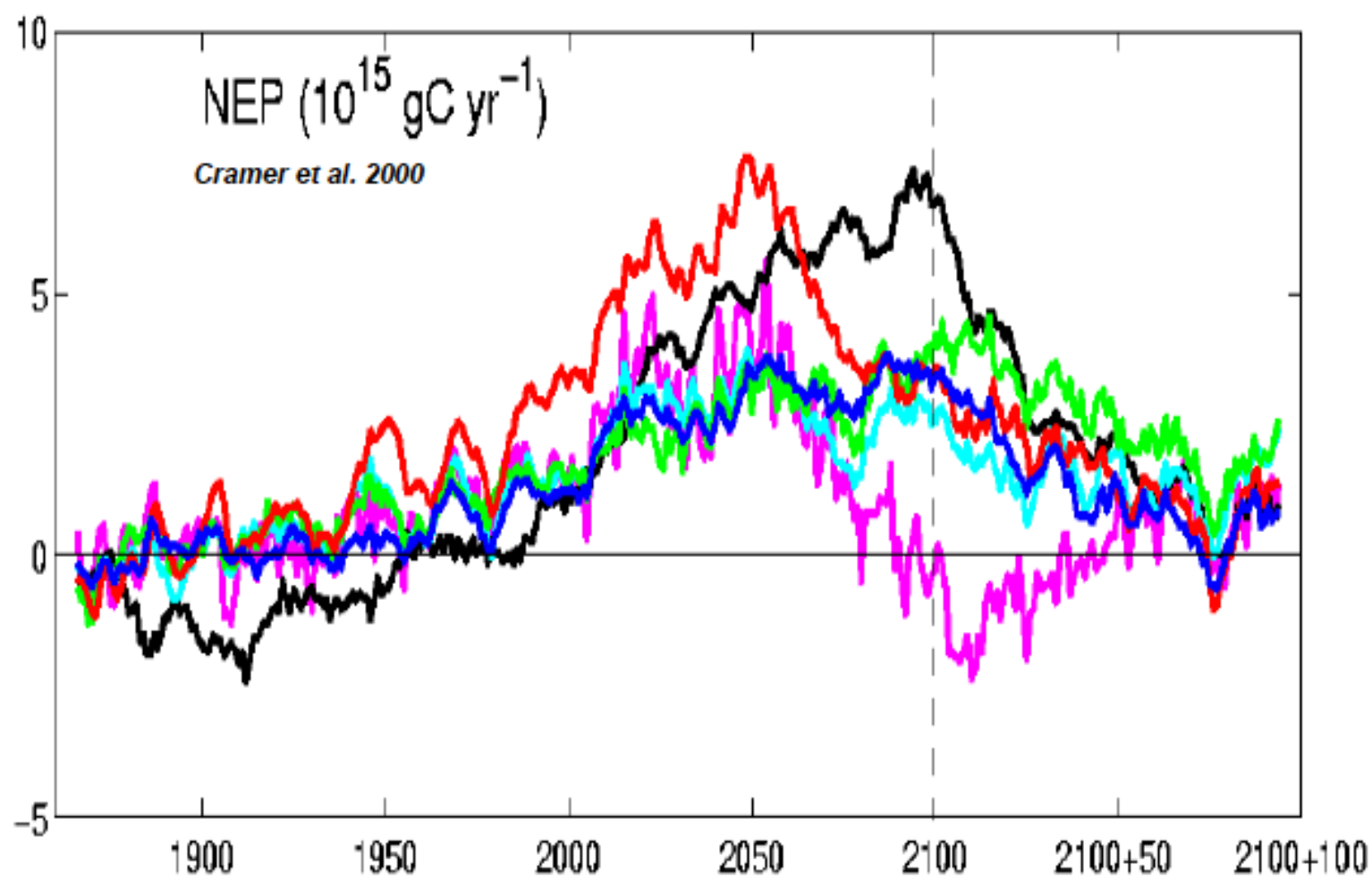
世界が直面している課題



ひとつの課題が悪化すると他の課題も深刻化する
ひとつの課題の解決が他の課題も解決する？

地球上の炭素存在量と循環(年あたり)

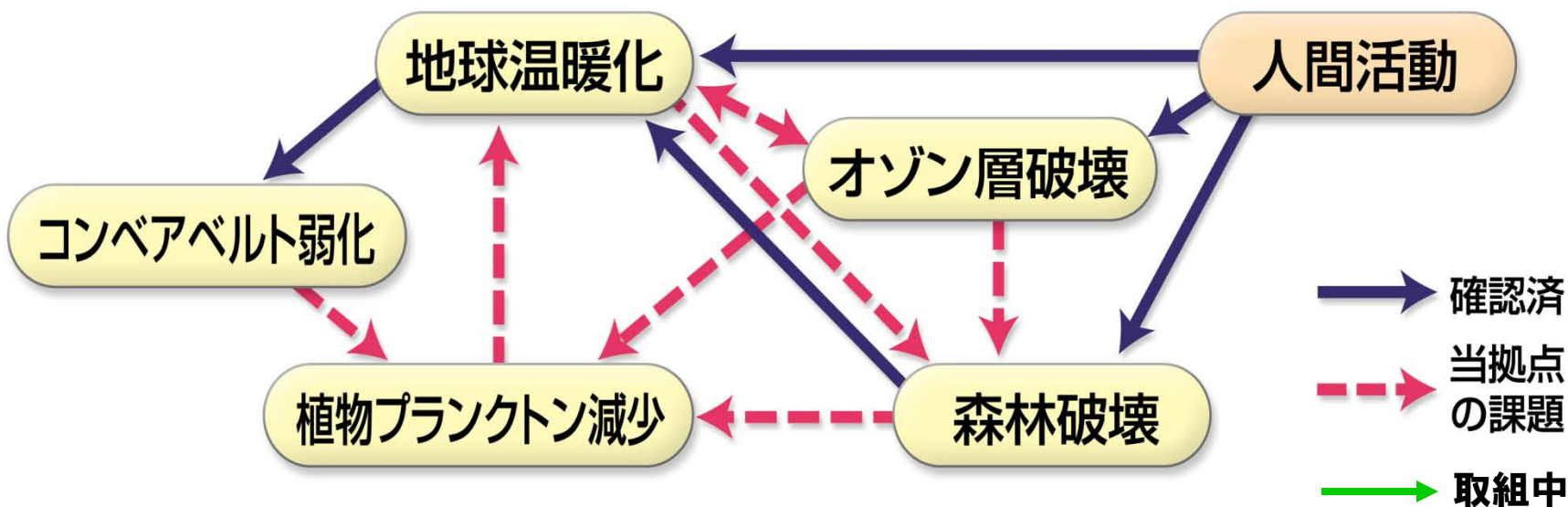




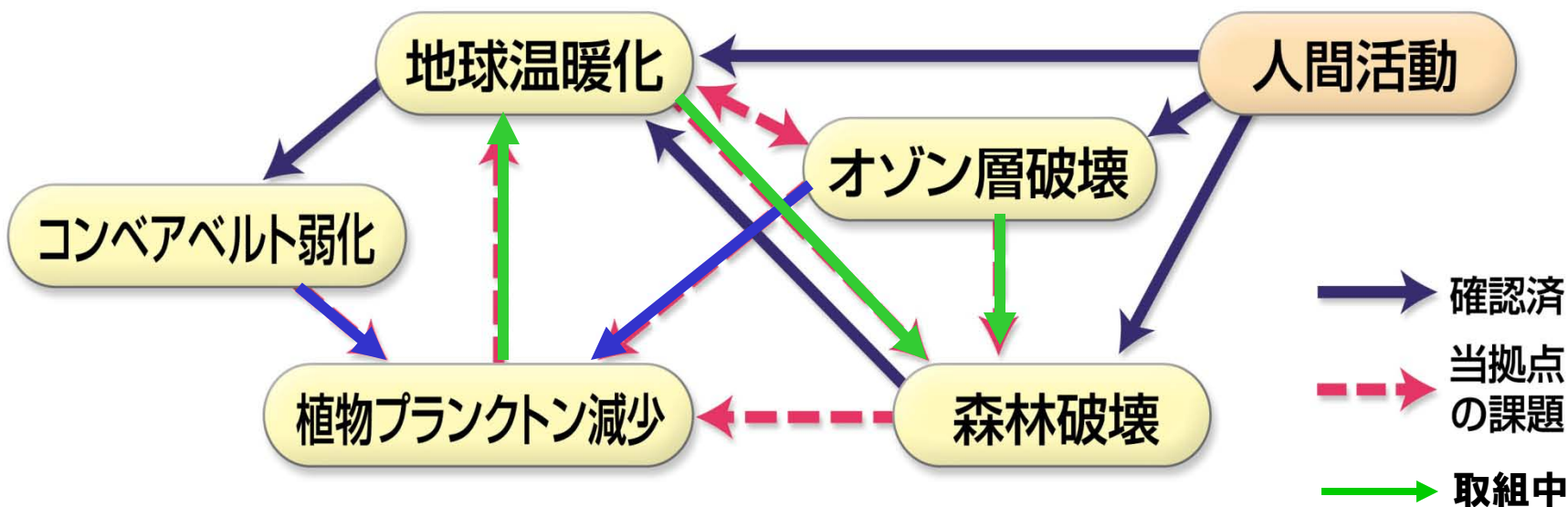
モデルによる陸域炭素吸収量の変動予測

①世界最高水準の拠点形成実現に向け最重要視している事項

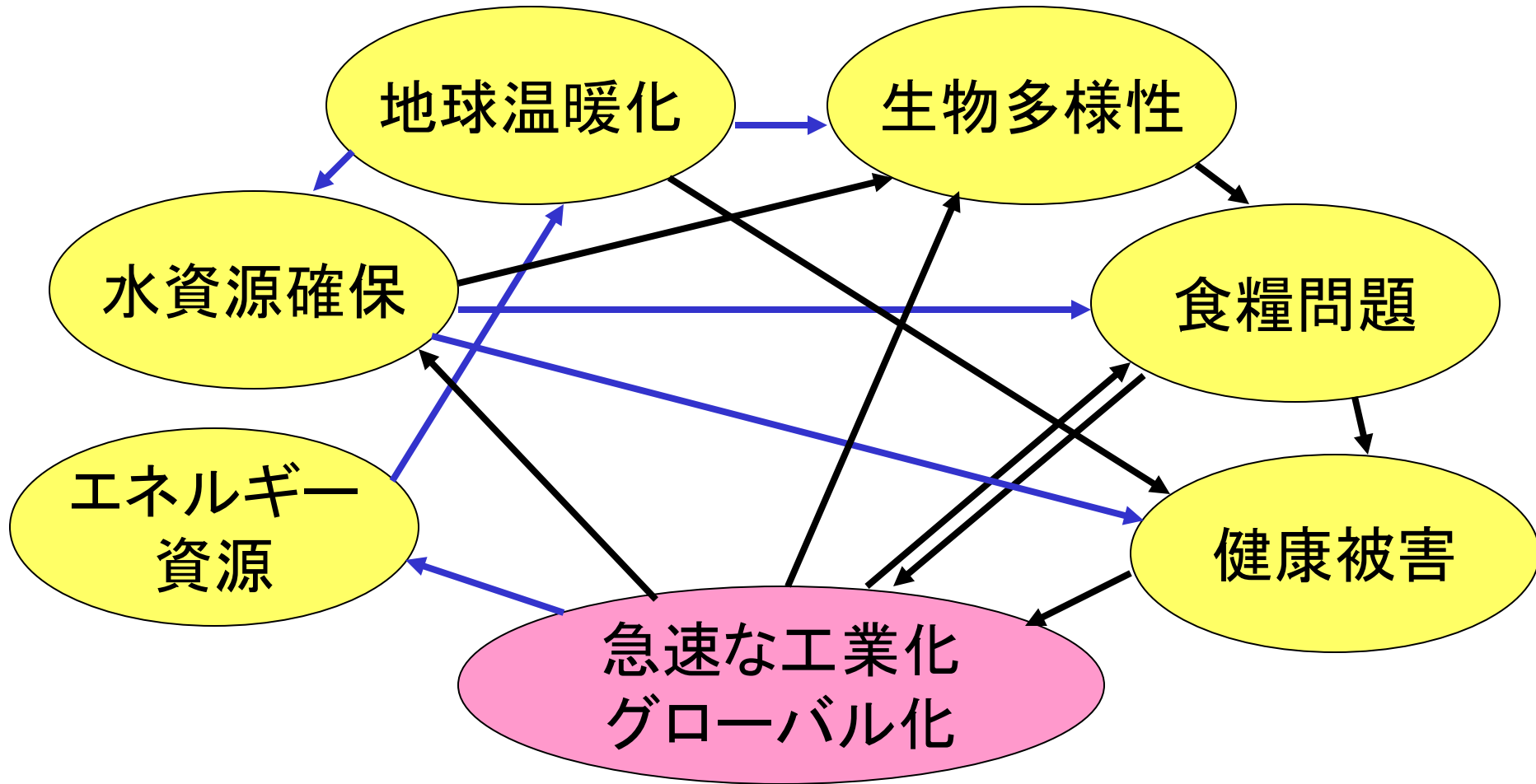
劇的な変化メカニズムの解明



劇的変化メカニズムの解明

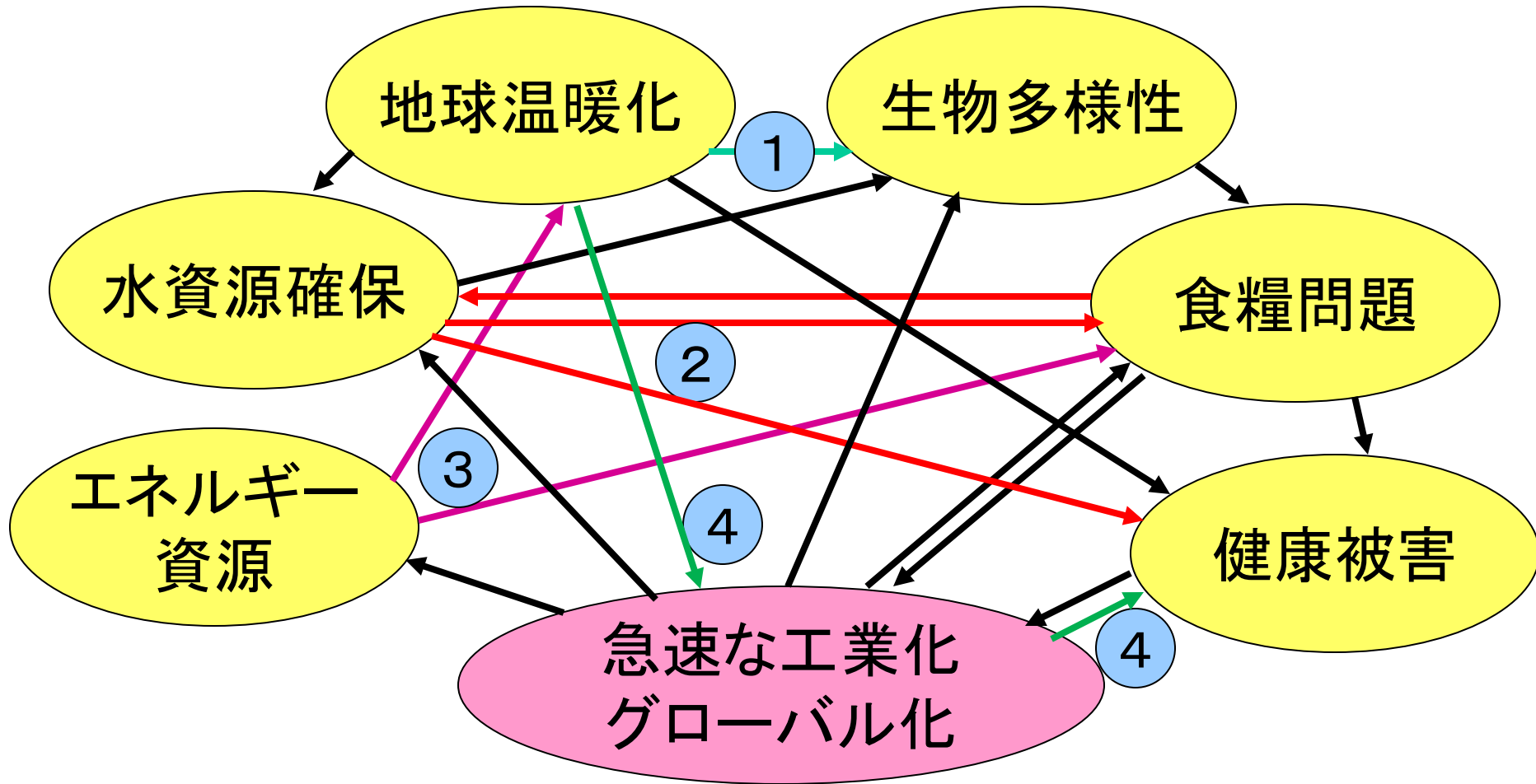


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世界が直面している課題



しかし人間の**浅知恵**でひとつの課題を解決しようとすると、さらに他の課題の解決を難しくする

(1)
炭素固定能の高い樹木
↓
生物多様性の低下

(2)
食糧生産・水資源確保
↓
塩害で土壌劣化・健康被害
↓
食糧生産低下

(3)
石油価格高騰
↓
大豆・さとうきびからエタノール
↓
食糧価格高騰・森林破壊

(4)
途上国へ技術移管
↓
競争激化
↓
先進国内の格差拡大

京都議定書を超えて

- 2050-2100にどうなるか？
- 人口増加は過去50年で2.4倍に
- ある途上国は50年のうちに先進国となり大量の二酸化炭素を排出する
- 地球温暖化は降水パターンを変える
- 生物多様性が低下し、食糧生産をおびやかす
- 健康被害も増大
- **どのように解決する？**

グリーン・ニューディール

- 未曾有の経済危機に環境重視で産業と雇用？
- 地球規模の環境問題も必然的に深刻化
- 根本的な国際社会の変遷を分析
先進国は少数(製造)vs途上国が多数(原材料)
→新興国が先進国の仲間入り(新興国でも製造、競争激化、先進国の労働が低廉化)
- 従来の産業・貿易・労働の国際分業は継続不可
- 協調し持続可能な社会に移行できるか
- 持続可能な社会に移行する貢献度を基準に選別すべき

日本では

- ・ 新政権は2020年までに1990年比で25%の二酸化炭素排出削減を宣言した
- ・ 既成概念を打ち破る効果をもつ
- ・ 政治家は政治に関心をもつ（国民の多数派に付く、自分の選挙区だけの危険性もあるが）
- ・ 国民が持続可能な社会を理解し、その概念を作り上げ、前進することが肝要である。政治家が付いてくるように

高等教育機関の役割

- 複雑な相互作用をする多様な分野について、現場で学ぶことができる教育カリキュラムを作り上げる
- 学生が多様な文化、経済、情報、価値観の背景をもつ世界中の市民と意思疎通をし、また協働できる能力を、十分な経験を通じて身に付けるよう支援を行う