

# How to teach systemic thinking in Geography lessons?

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Geography Educators' Days 2019

Tokiwa University Ibaraki

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# Teaching Geography



**What is our target?**

# Strong arguments for geographical education are

2016  
International  
Charter on  
Geographical  
Education

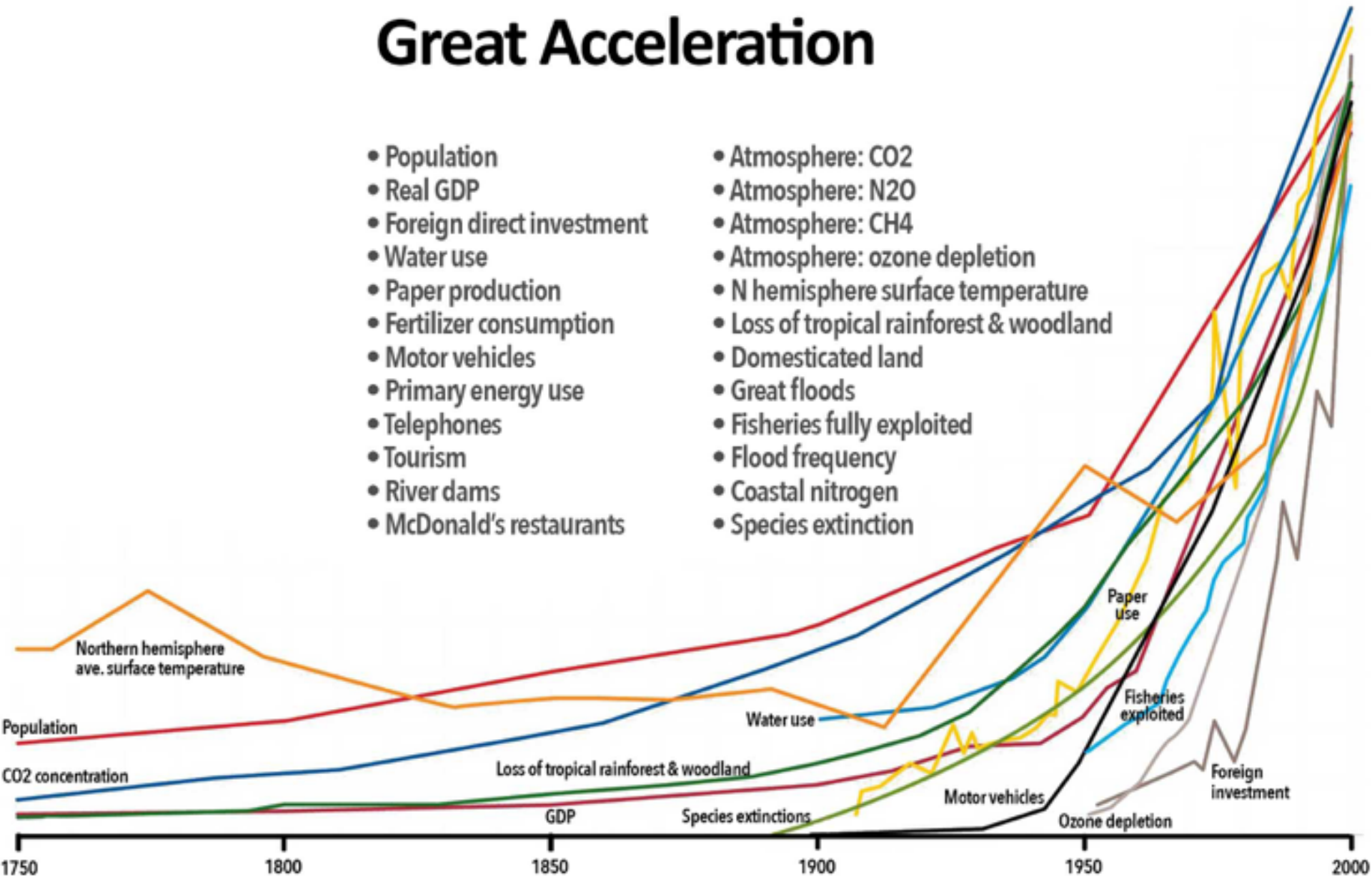


- Geography helps people to think critically about sustainable living locally and globally and how to act accordingly.

Geography is much more than learning many facts and concepts. Its focus is on the patterns and processes that help us to understand an ever-changing planet.

# Great Acceleration

- Population
- Real GDP
- Foreign direct investment
- Water use
- Paper production
- Fertilizer consumption
- Motor vehicles
- Primary energy use
- Telephones
- Tourism
- River dams
- McDonald's restaurants
- Atmosphere: CO2
- Atmosphere: N2O
- Atmosphere: CH4
- Atmosphere: ozone depletion
- N hemisphere surface temperature
- Loss of tropical rainforest & woodland
- Domesticated land
- Great floods
- Fisheries fully exploited
- Flood frequency
- Coastal nitrogen
- Species extinction



# Strong arguments for geographical education are

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**Globalization**

**Climate  
change**

**Hunger**

**Energy-  
supply**

**inequality**

**Poverty**

**soil  
degradation**

**Natural  
Hazards**

**Loss of  
biodiversity**

**Shortage of  
Resources**

**Migration/  
refugees**

**Mega-Cities**

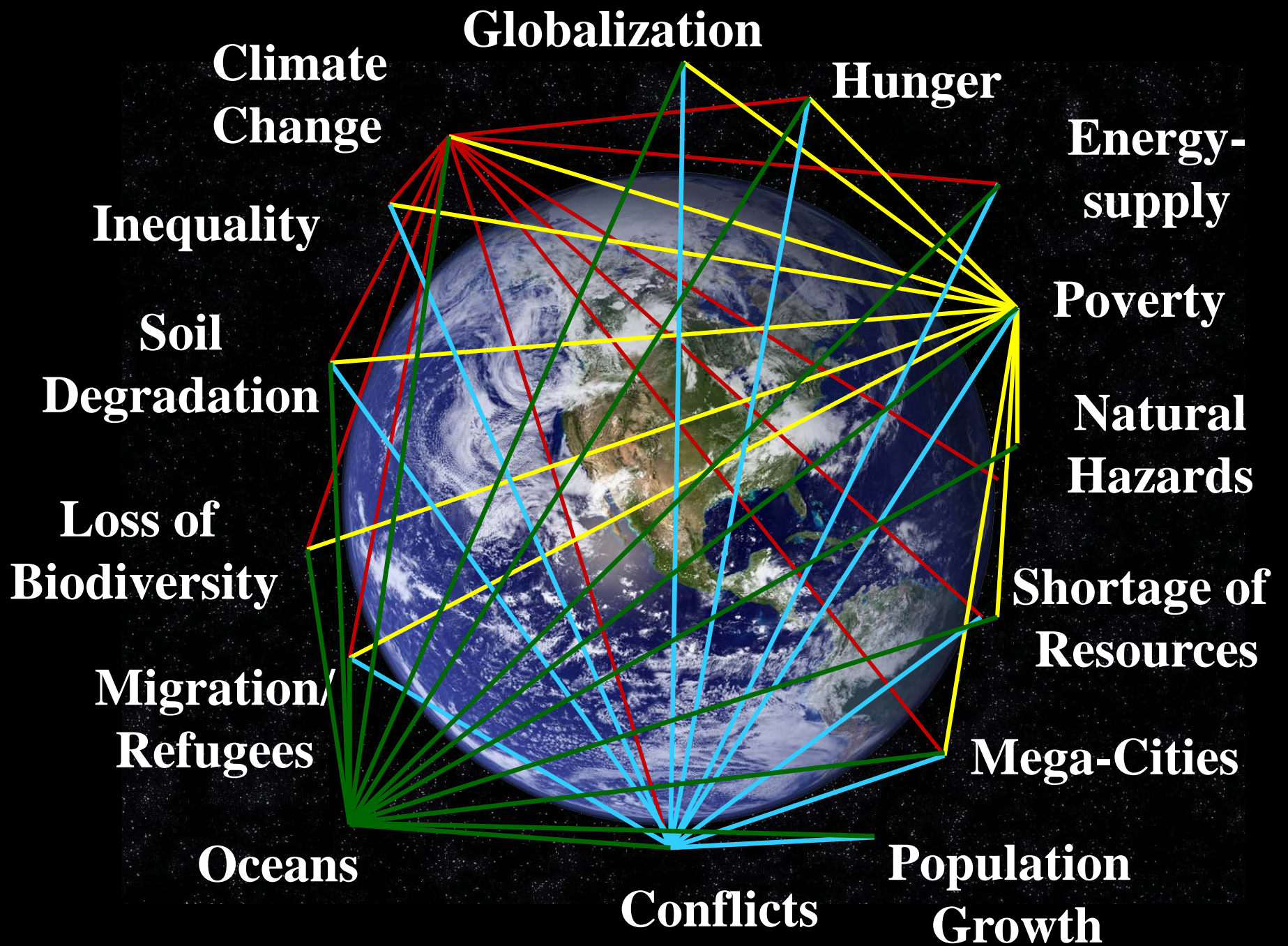
**Oceans**

**Conflicts**

**Population  
growth**

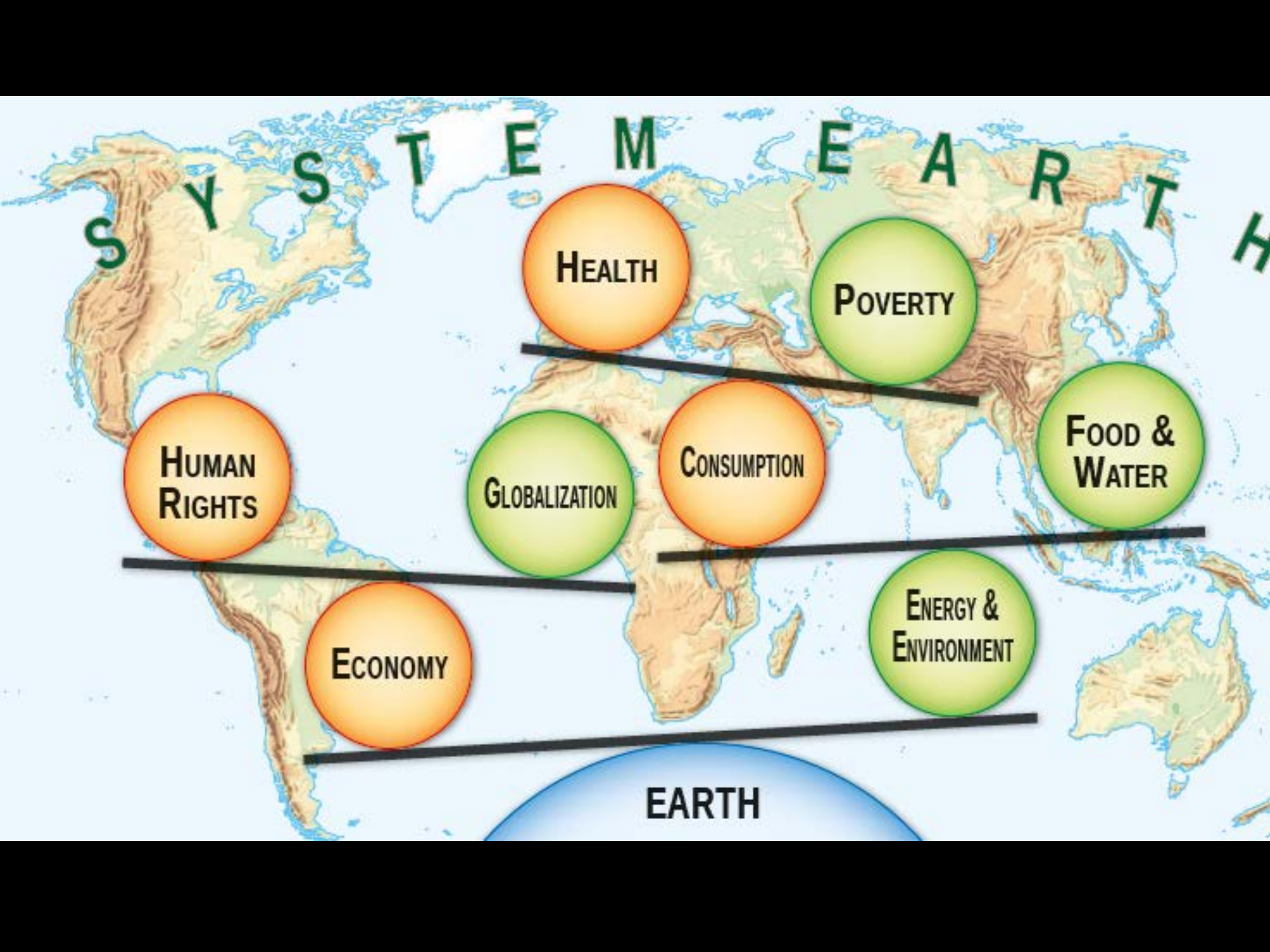














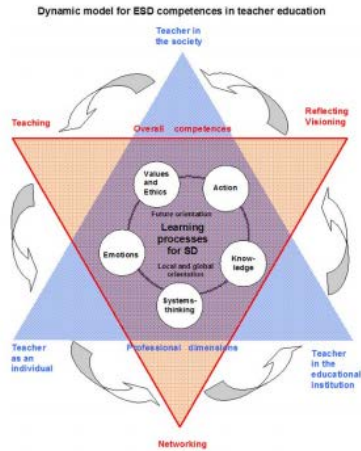


**„A complex world, needs complex thinking !“**

# Impact on Teacher Training

## Competencies for ESD (Education for Sustainable Development) teachers

*A framework to integrate ESD in the curriculum of teacher training institutes.*



United Nations Decade of Education for Sustainable Development (2005-2014)

## Guidelines and Recommendations for Reorienting Teacher Education to Address Sustainability

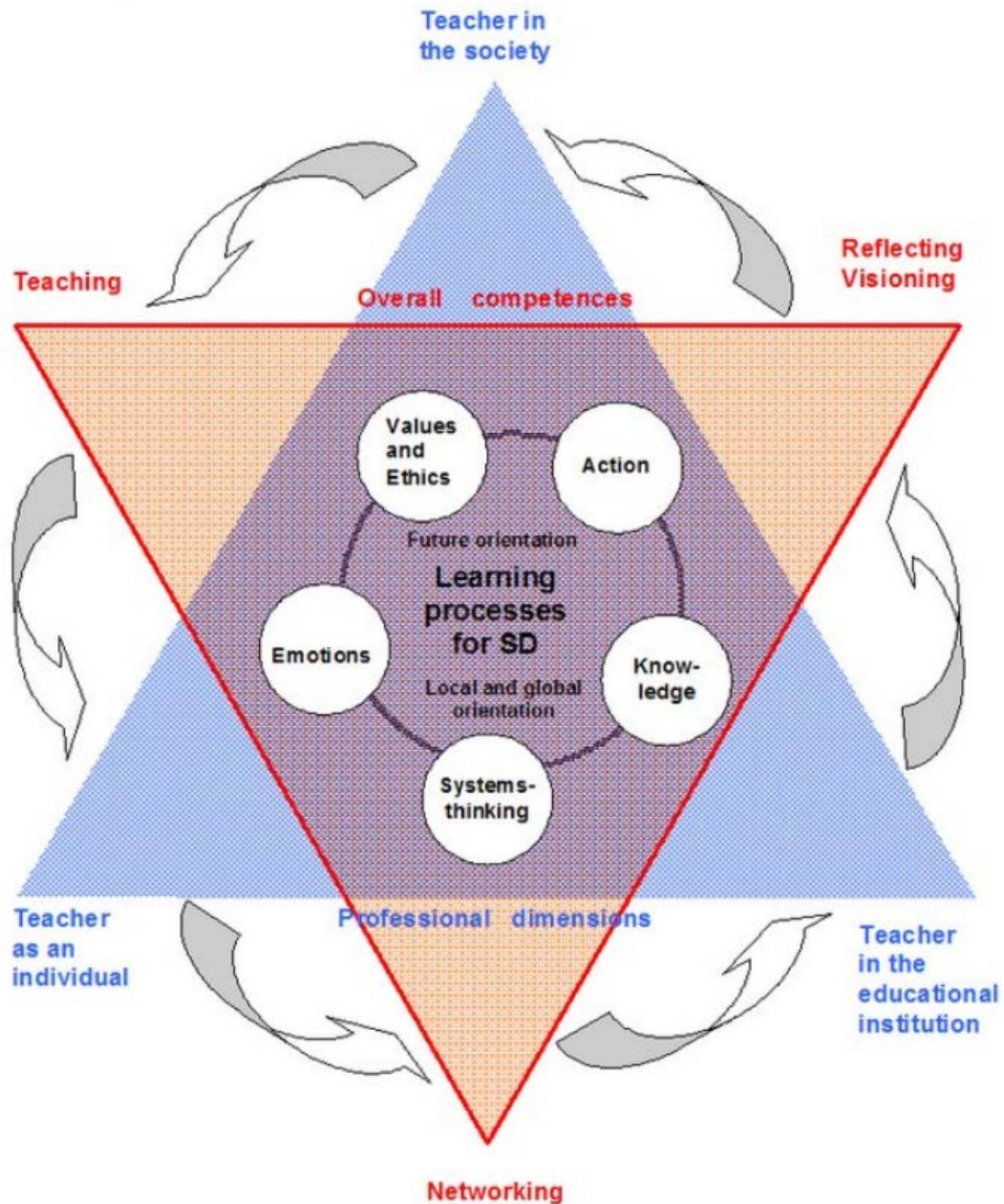


Comenius 2.1 project 118277-CP-1-2004-BE-Comenius-C2.1

Education for Sustainable Development in Action  
Technical Paper N° 2 - 2005  
UNESCO Education Sector



# Dynamic model for ESD competences in teacher education







# Die Ziele für nachhaltige Entwicklung

## Sustainable Development Goals (SDG)



# Sustainable Development Goals (SDG)



- Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

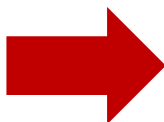
# Sustainable Development Goals (SDG)

4 質の高い教育を  
みんなに



- Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

# 4 QUALITY EDUCATION



TARGETS	INDICATORS
<p><b>4.1</b> By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes</p>	<p><b>4.1.1</b> Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex</p>
<p><b>4.2</b> By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education</p>	<p><b>4.2.1</b> Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex</p> <p><b>4.2.2</b> Participation rate in organized learning (one year before the official primary entry age), by sex</p>
<p><b>4.3</b> By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university</p>	<p><b>4.3.1</b> Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex</p>
<p><b>4.4</b> By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship</p>	<p><b>4.4.1</b> Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill</p>
<p><b>4.5</b> By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations</p>	<p><b>4.5.1</b> Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated</p>
<p><b>4.6</b> By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy</p>	<p><b>4.6.1</b> Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex</p>
<p><b>4.7</b> By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development</p>	<p><b>4.7.1</b> Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment</p>



# 4 QUALITY EDUCATION



## TARGETS

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## INDICATORS

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**4.2.2** Participation rate in organized learning (one year before the official primary entry age), by sex

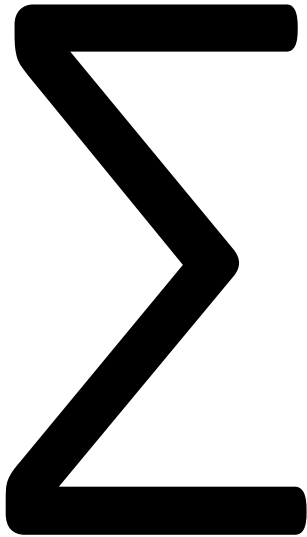
2030年までに、持続可能な開発と持続可能なライフスタイル、人権、ジェンダー平等、平和と非暴力の文化、グローバル市民、および文化的多様性と文化が持続可能な開発にもたらす貢献の理解などの教育を通じて、すべての学習者が持続可能な開発を推進するための知識とスキルを獲得できるようにする。

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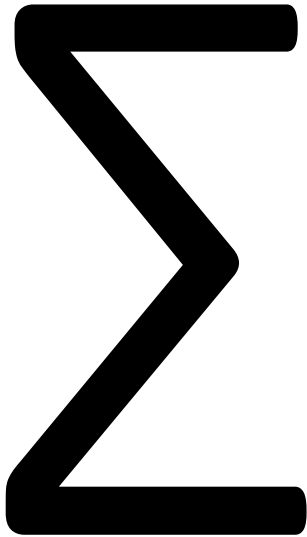
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# Education for Sustainable Development



- future oriented
- action oriented
- creative
- solution oriented
- handling complexity
- systemic thinking
- competencies oriented
- ...

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**Ability to act individually in the sense  
of a common sustainable development**

Curriculum Framework

# Education for Sustainable Development



Bundesministerium für  
Wissenschaftliche Zusammenarbeit  
und Erhellung

Cornelsen

KMK  
KULTUSMINISTER  
KONFERENZ



Education for

Sustainable Development Goals

Learning Objectives



Ed  
20



## TEXTBOOKS FOR SUSTAINABLE DEVELOPMENT

A GUIDE TO EMBEDDING



ESD  
EXPERT  
NET

# TEACHING SUSTAINABLE DEVELOPMENT GOALS

On behalf of



Coordinated by





## Box 1.1. Key competencies for sustainability

**Systems thinking competency:** the abilities to recognize and understand relationships; to analyse complex systems; to think of how systems are embedded within different domains and different scales; and to deal with uncertainty.

**Anticipatory competency:** the abilities to understand and evaluate multiple futures – possible, probable and desirable; to create one's own visions for the future; to apply the precautionary principle; to assess the consequences of actions; and to deal with risks and changes.

**Normative competency:** the abilities to understand and reflect on the norms and values that underlie one's actions; and to negotiate sustainability values, principles, goals, and targets, in a context of conflicts of interests and trade-offs, uncertain knowledge and contradictions.

**Strategic competency:** the abilities to collectively develop and implement innovative actions that further sustainability at the local level and further afield.

**Collaboration competency:** the abilities to learn from others; to understand and respect the needs, perspectives and actions of others (empathy); to understand, relate to and be sensitive to others (empathic leadership); to deal with conflicts in a group; and to facilitate collaborative and participatory problem solving.

**Critical thinking competency:** the ability to question norms, practices and opinions; to reflect on own one's values, perceptions and actions; and to take a position in the sustainability discourse.

**Self-awareness competency:** the ability to reflect on one's own role in the local community and (global) society; to continually evaluate and further motivate one's actions; and to deal with one's feelings and desires.

**Integrated problem-solving competency:** the overarching ability to apply different problem-solving frameworks to complex sustainability problems and develop viable, inclusive and equitable solution options that promote sustainable development, integrating the above-mentioned competences.

# Key Competences (E)SD UNESCO 2017

- Critical thinking competence
- System thinking competence
- Anticipatory competence
- Normative competence
- Integrated problem solving competence
- Strategic competence
- Collaboration competence
- Self awareness competence

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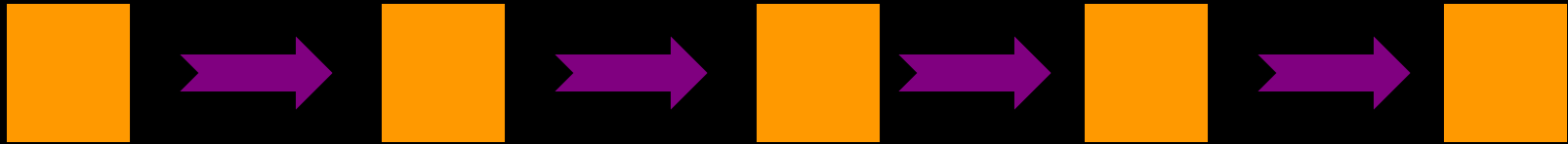
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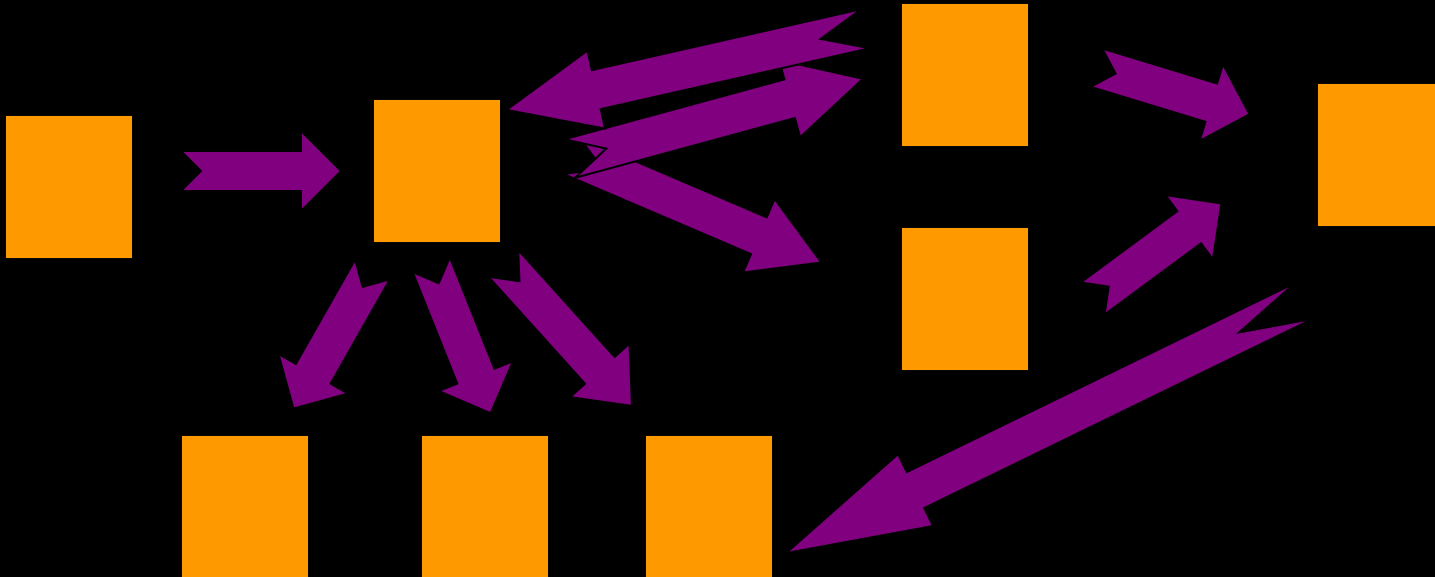
# „A complex world needs complex thinking“



Linear thinking

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Complex thinking





# Systemic competence

is the ability to describe a complex part of reality as a system, to reconstruct and to model it and to be able to give explanations on the base of that model, to generate outlooks as well as options to act, and to be able to judge and to realize.

Frischknecht-Tobler, Nagel, Seyboldt (Hrsg.) Systemdenken. Bern 2008, S. 20  
and Uphues/Rempfler 2011, S. 24

How to develop  
systemic competence in  
Geography lessons?

Suggestion 1

Moving Game



# Moving game

1. Form of circle of 12-20 person

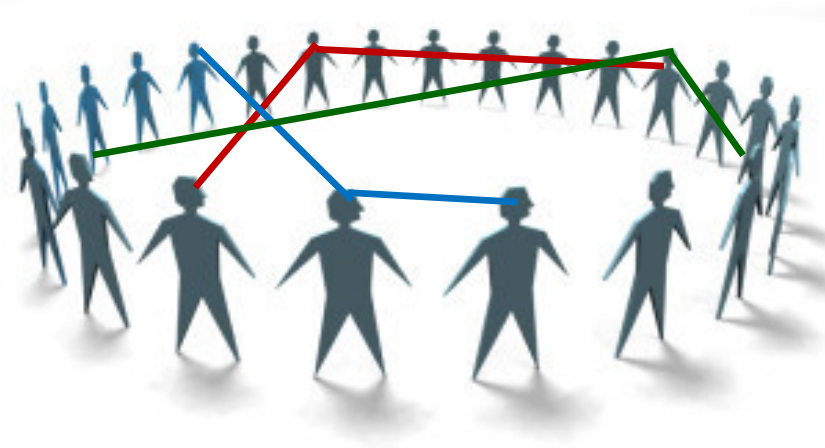


# Moving game

1. Form of circle of 12-20 person
2. Each person identifies two persons without informing them



# Moving game



1. Form of circle of 12-20 person
2. Each person identifies two persons without informing them
3. Start: each person has to keep equidistance to the two persons he/she identified



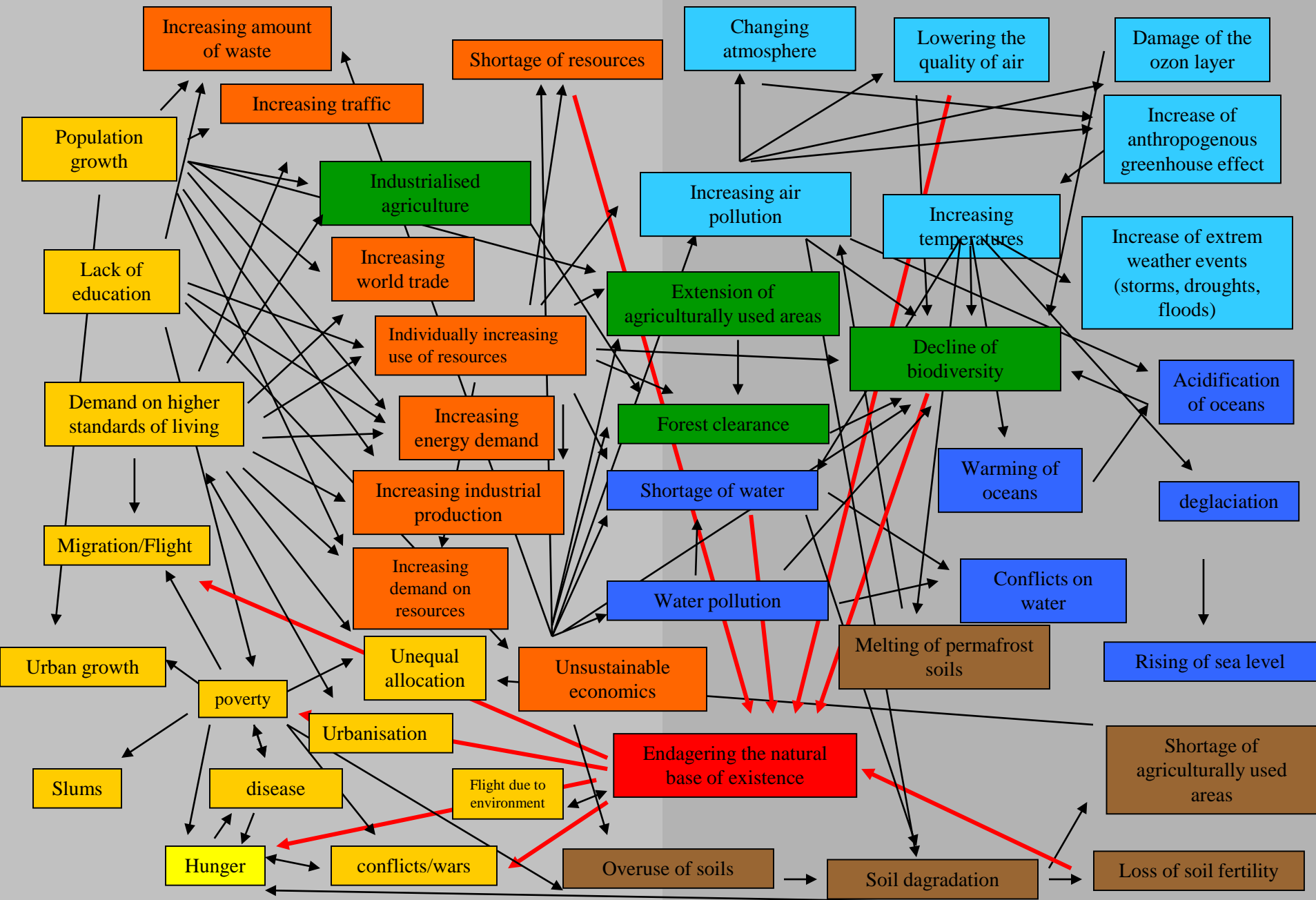




Suggestion 2

Animated Concept Map

# Net of global challenges



**Explain the coimpact and interdependency of various global challenges  
In the context of the shown reality in Mopipi, Botswana.**



Mopipi, Botswana

Suggestion 3

Mystery



# What is a mystery?

- Learning method
- strengthens systemic thinking

# What is a mystery?

- Learning method
- strengthens systemic thinking
  
- story
- question
- cards

# Mystery - Geschichte

Jayashree loves the sweet and sour taste of fresh cashew apples, when they turn their colour into red and signal, that they are ripe. But this is also the time, when she has to work very hard, because it is harvest time near Goa and families are harvesting the ripe fruits all around and sell the cashew after drying to the nearby cashew-factories. Much more than harvesting Jayshree would like to go to school instead, but she knows, that this is impossible, because they all have to work together since this is the only way, how the family can cope with the hard conditions. She just became 14 and that means, that she soon will follow her mother and her elder sisters to work in the nearby cashew-factory.

Laura feels lost in front of the huge shelf of the local supermarket. Next weekend she will become 15 and wants to get some extraordinary and very delicious snacks for her birthday party. But what to take of that immense offer? Some time ago her parents had some very nice stuff, some pale nuts – that is, what she is looking for. She also remembers, that her mother said these are no nuts, but kernel though everybody talks about nuts. No idea, what the difference might be, Laura thinks and continues to scan the shelf. The name was something with “c”. “Caso” or something like that. Then she detects a package of „cashew“ and recognizes them as wanted snack. Oh, they are very expensive: 4 € per package. But down there, there are much cheaper ones, only 1,50€ per can. Which one should I take? „I take one each.“ Laura thinks and heads for the cashpoint.

It does not happen very often, that Aleeke's relatives come over from Mozambique to Ubombo, his village in the eastern part of South Africa. But when it happens it always turns out to become very interesting since they do have a lot of news to tell. This time his Uncle Pakka reports, that for some years a lot of Mozambiquian farmers cultivate more and more cashew-trees, because the harvest is easily and well to be sold. “That might also be a good idea for you”, he continues “The climate and the quality of soils in this part of South Africa are alike to the conditions in Southern Mozambique”. Aleeke's thoughts were racing. If we would grow cashew, we would earn money, he and his brothers and sisters could go to school and even the outstanding debts at hospital could be paid. “Let’s grow cashew!” Aleeke shouts. “That could be the solution of all our problems!!”

These are „Nuez de la India“, that means „Indian nuts“, explains Ernesto’s father while taking out a small tin out of his pocket. He knows about Ernesto’s interest in extraordinary food and had therefore for this gift. “But this is not all.” he continues “This kind of “Nuez de la India” were not available some time ago. See, what is written here: „commerciado justo“. That means this is a fair trade product. That means, that the farmers in India, Africa or also here in Mexico get much more income for their work and harvest compared with the usual conditions of the world market. Even in the United States, where a lot of these kernels are consumed, you hardly find this special offer. Ernesto is enthusiastic since he likes the taste of the kernels very much and absolutely wants to know more about these strangely shaped “Nuez de la India”.

Only because Laura decides to buy cheap cashew Jayshree cannot go to school. And only because Ernesto’s father decided to buy fair trade cashew Aleeke sees the solution of all economic problems of his family.

Is it like that?

The big „supermercados“, the supermarkets, in most of the Mexican cities offer a wide range of food and snacks. Among these there are also cashew, which partly come from the country itself but which are mainly imported from other countries. Recently even fair trade products in general and cashew in particular are offered.



7

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DEPARTMENT OF AGRICULTURE, FORESTRY AND FISHERIES

help proper cultivation, the Ministry points out, that the provinces of South Africa, like Mpumalanga or KwaZulu-Natal meet the climate conditions needed for the successful cultivation of cashew trees.




14

**BMZ** Federal Ministry for Economic Cooperation and Development

The German “Federal Ministry for Economic Cooperation and Development” declares development projects with quite a number of African countries. One of these projects is the “African Cashew Initiative” (ACI). The ACI is a cooperation project between the German Federal Government and the governments of Ghana, Benin, Togo and other between 300.000 cashew was and still is in the focus of the ACI. This again would improve the income and better the living conditions of the cashew-farmers.



3

The global production of cashew increases in the past 25 years. Obviously the world market grows continuously and is still getting bigger. More and more cashew are wanted and more and more are produced.



5

is a wide offer of fair traded cashew, by example



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9

# What is a mystery?

- Learning method
- strengthens systemic thinking
  
- story
- question
- cards
- reconstruction













