Decoupling of environmental pressure from quality of life

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Case study topic

European groupwork on sustainable development

- Study to assess whether decoupling of environmental pressure from quality of life is taking place or not;
- Home countries of group members as study objects;
- Well chosen indicators:
    - Quality of life: Gross Domestic Product (GDP)
    - Environmental pressure: Fresh water abstraction, CO2 emissions and emissions of NOx, SOx and PM10 (transport sector)
- Show to which extent decoupling takes place in the EU;
- Underline the complexity of sustainable development;
- Wake the necessity of strict and well adapted policies now and in future.

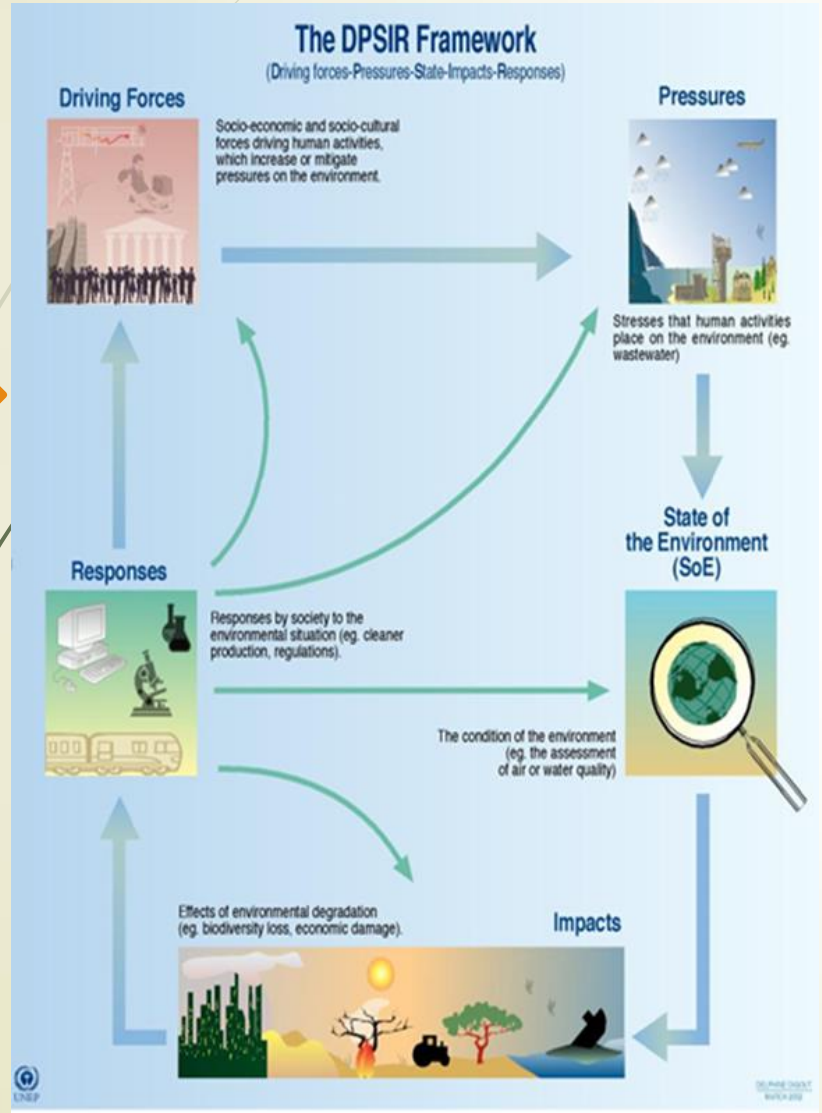
Central research question

- ✓ What do the indicators really show
- ✓ Can the chosen indicators reflect the environmental pressure and quality of life
- ✓ Is EU adequately represented by the selection of the five countries
- ✓ Can improved quality of life and sustainable economic growth go hand in hand
- ✓ Is decoupling possible in the societies and structures we live in

Research approach

- our work was held through secondary sources and it constitutes descriptive research
- usage of OECD's DPSIR framework and the decoupling factor (Kdec)

DPSIR framework:



Decoupling factor (Kdec):

To compare decoupling among countries we are referring to decoupling factor $K_{(dec)}$. The ratio of the value of the decoupling indicator at the end and the start of the 20 years given time period is defined as follows:

$$Kdec = 1 - \frac{\frac{Environmental\ Pressure\ at\ the\ end\ of\ period}{Driving\ Force\ at\ the\ end\ of\ period}}{\frac{Environmental\ Pressure\ at\ the\ start\ of\ period}{Driving\ Force\ at\ the\ start\ of\ period}}$$

If the ratio is more than 0 and less than 1, decoupling has occurred during the period – although it does not indicate by himself whether decoupling is absolute or relevant otherwise there is absence of decoupling.

Main findings – country comparison (1/5)

- To compare the selected countries we looked at different Environmental Pressure indicators and GDP as indicator for Quality of Life and determined the decoupling factor $k_{(dec)}$.

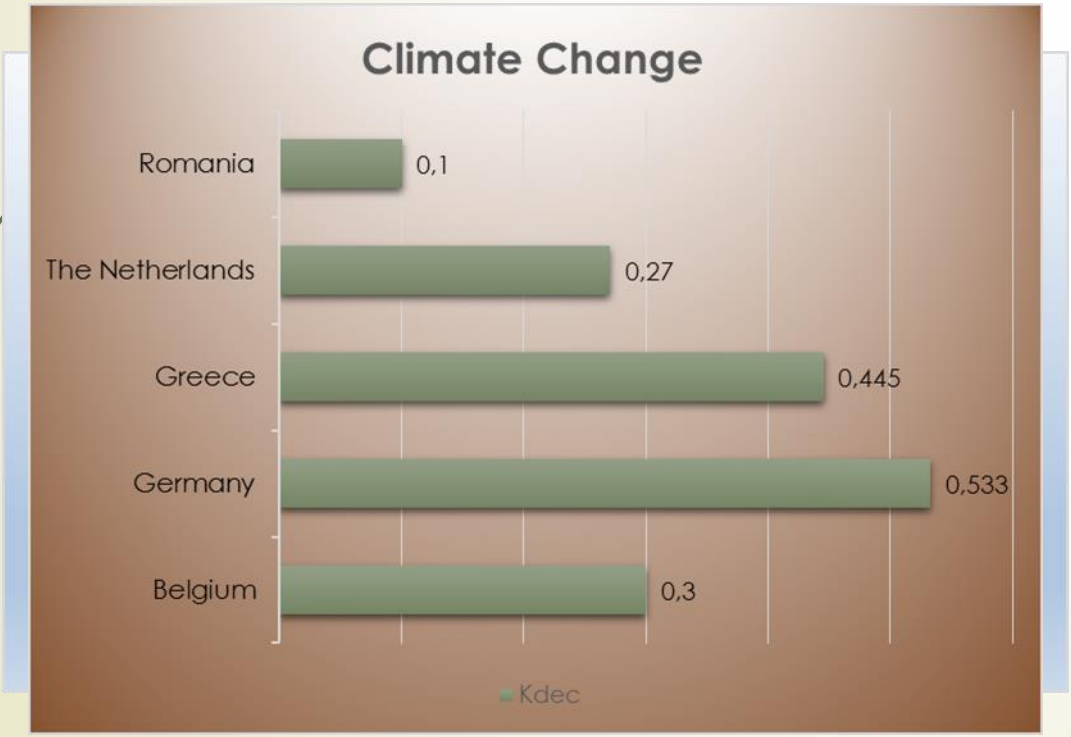
Quality of Life Indicator – GDP

- GDP not ideal as sole indicator for Quality of Life;
- Quality of Life indicators which go "Beyond GDP" are discussed, e.g. material living conditions, productive or main activity, health, education, leisure and social interactions, economic and physical safety, governance and basic rights, natural and living environment, overall experience of life;
- Nevertheless, for our case study, real GDP seemed to be a convenient and the best measurable indicator for Quality of Life;
- GDP partially indicates the living conditions of the population; reliable and continuous GDP data can be found in most countries for a long time period;

Main findings – country comparison (2/5)

- Decoupling has been detected in all countries for all indicators, but only Germany shows absolute decoupling for all 3 indicators.

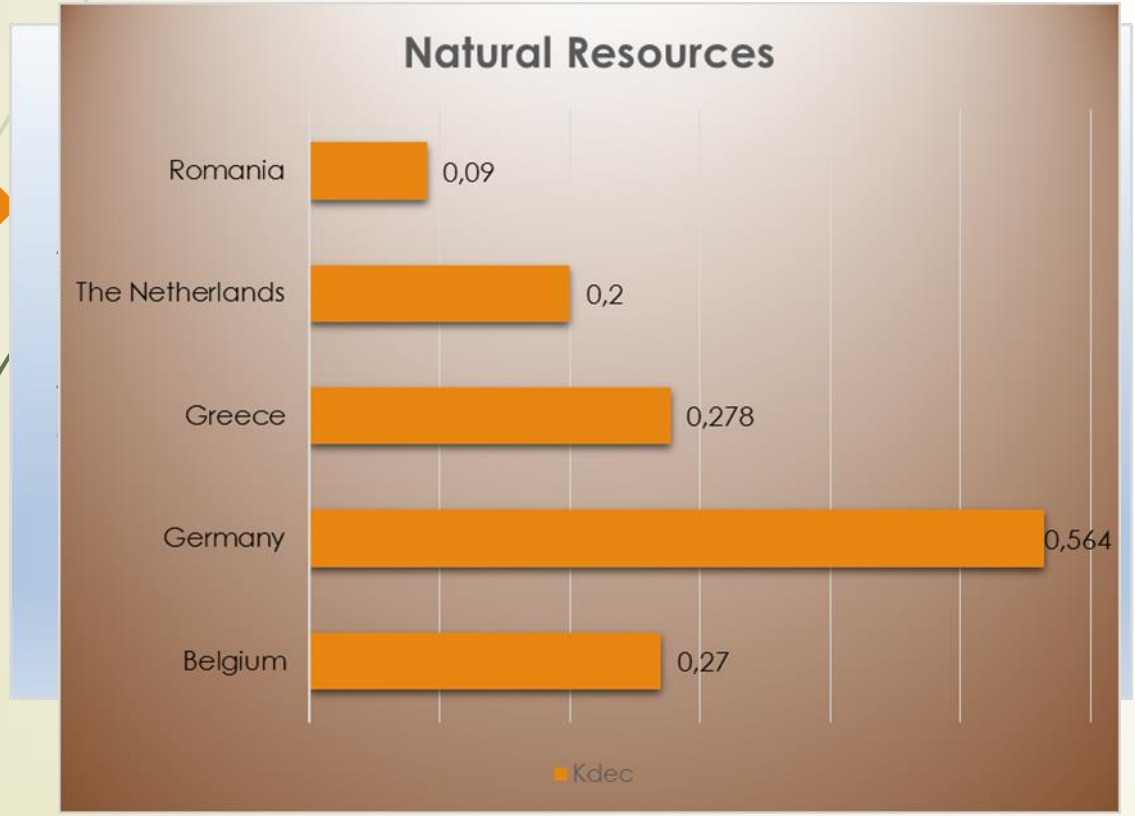
Indicator 1: Climate change
(by overall CO_2 emissions
data excluding LULUCF)



- Relative decoupling is achieved in four countries, absolute decoupling in Germany
- Increase in emissions can be explained by cold winters and more energy consumption for heating
- Decrease in emissions can be explained by measures in relation with Kyoto protocol, rise of energy prices or ecnomic slowdown – but reductions are mostly due to efforts in efficient energy production (gas-fired power plants, renewable energy)

Main findings – country comparison (3/5)

Indicator 2: Natural Resource Consumption
(represented by freshwater abstraction)



- Continous data set only for Belgium
- Low water stress in four countries, overexploited water sources in Belgium (due to densly population)
- Decrease in water use can be explained by water managment measures , more efficient techniques in water consuming industry (e.g. multiple use / use of recycled water), lower consumption of households, rise of water prices
- In most countries, the majority of water is used for cooling down power plants
- Only in Greece, the agricultural sector uses most of the abstracted water
- According to the EEA, European water consumption can be considered as sustainable in the long-term

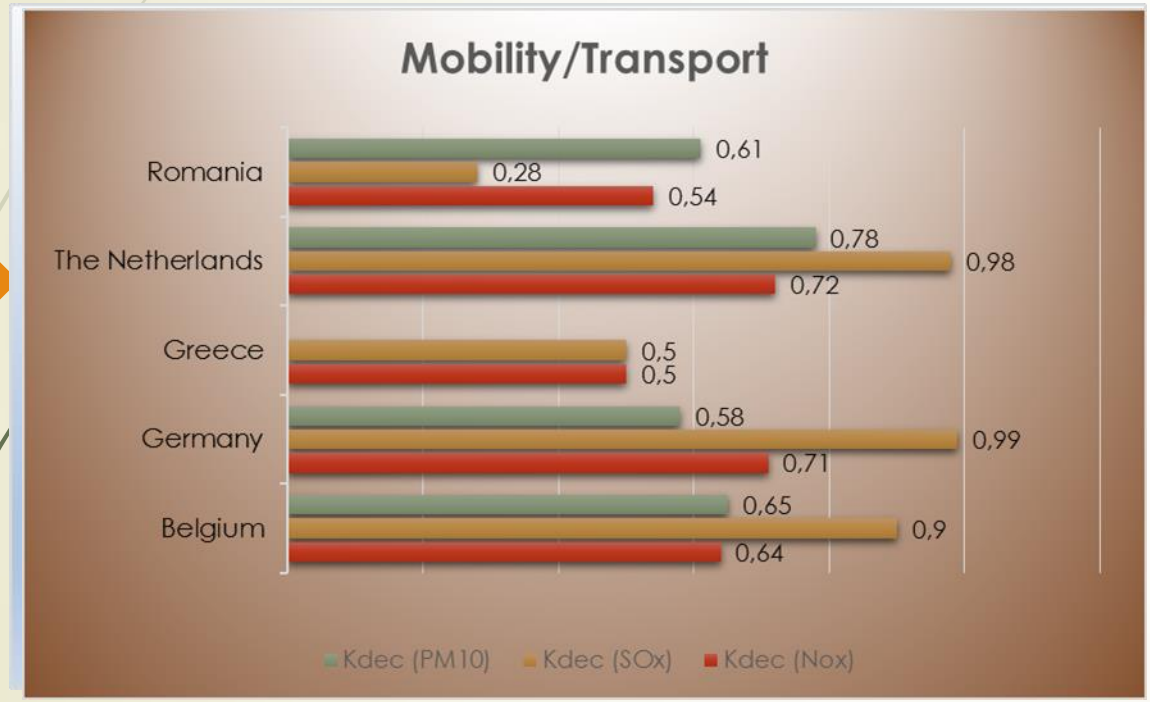
Main findings – country comparison (4/5)

Indicator 3 - Mobility/Transport
environmental pressure represented by a combination of NO_x, SO_x and PM10 emissions

- Transport is a major component of economic activity, both as a sector in itself and as a factor input to most other economic activities;
- Transport contributes to atmospheric pollution at local, regional and global level;
- Difficulties finding consistent, continuous data for all three mobility/transport indicators from 1990 to 2011 -> Belgium: SO_2 and NO_x data from all sectors (not just transport; PM10 data only for 1995, 2000, 2005, 2010 in Flanders); Germany (PM10 data not before 1995); Greece (no PM10 data) and Romania (SO_x data 2005-2009,PM10 data 2006-2010);

Main findings – country comparison (5/5)

Indicators 3 – Mobility/Transport
(represented by NO_x, SO_x and PM10 emissions)



- Absolute decoupling for the analyzed emissions in Belgium, the Netherlands and Germany;
- Relative decoupling in Greece and Romania.
- High decoupling factors for mobility/transport indicators in relation to GDP in all of the researched countries
- significant decrease in SO_2 emissions: for Belgium, the Netherlands and Germany SO_2 emissions decoupling factors of 0.9 or 0.99 – almost no SO_2 was emitted by traffic due to filter techniques and new in these countries;

- Policies, frameworks, guidelines for emission reduction: e. g. Helsinki Protocol, UNECE Protocol for the reduction of sulfur emissions, 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, as well as the NEC Directive.

The "DEC" team

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Conclusions

- ✓ Decoupling is taking place in the countries studied for all selected environmental pressure indicators;
- ✓ Decoupling can indicate movement to sustainable development, decoupling only is not suitable as parameter for SD;
- ✓ Decoupling in all countries studied for all environmental pressures;
- ✓ Only in Germany absolute decoupling for all indicators, i.e. pressure goes down;
- ✓ Other indicators for Quality of life (than GDP) should be studied
- ✓ EU-policies support decoupling;
- ✓ Existed statistical data gaps sometimes impede accurate analysis and that's why they should be covered.

Useability of group members' diversity

- None of the teammembers had experience on working with decoupling;
- Subject of research makes studying our own country possible and improved feasibility e.g. studying reports in own language and national statistics agencies;
- Tasks devided taking preferences and skills into account;
- Exchange our views and gain further knowledge.

Thank your for your attention!