



TULEVAISUUDEN
TUTKIMUSKESKUS

Analysis of Green Development using Sustainability Window method for ASEAN countries

**DEEM training, Cambodia
September 2018**

**Jyrki Luukkanen and Jari Kaivo-oja
Finland Futures Research Centre
University of Turku**

Contents

- **What is Sustainability Window (SuWi) analysis**
- **Strong and Weak sustainability**
- **Indicators of development**
- **SuWi dynamics**
- **Efficiency Gap analysis**
- **ASEAN examples and comparisons**
- **Conclusions**

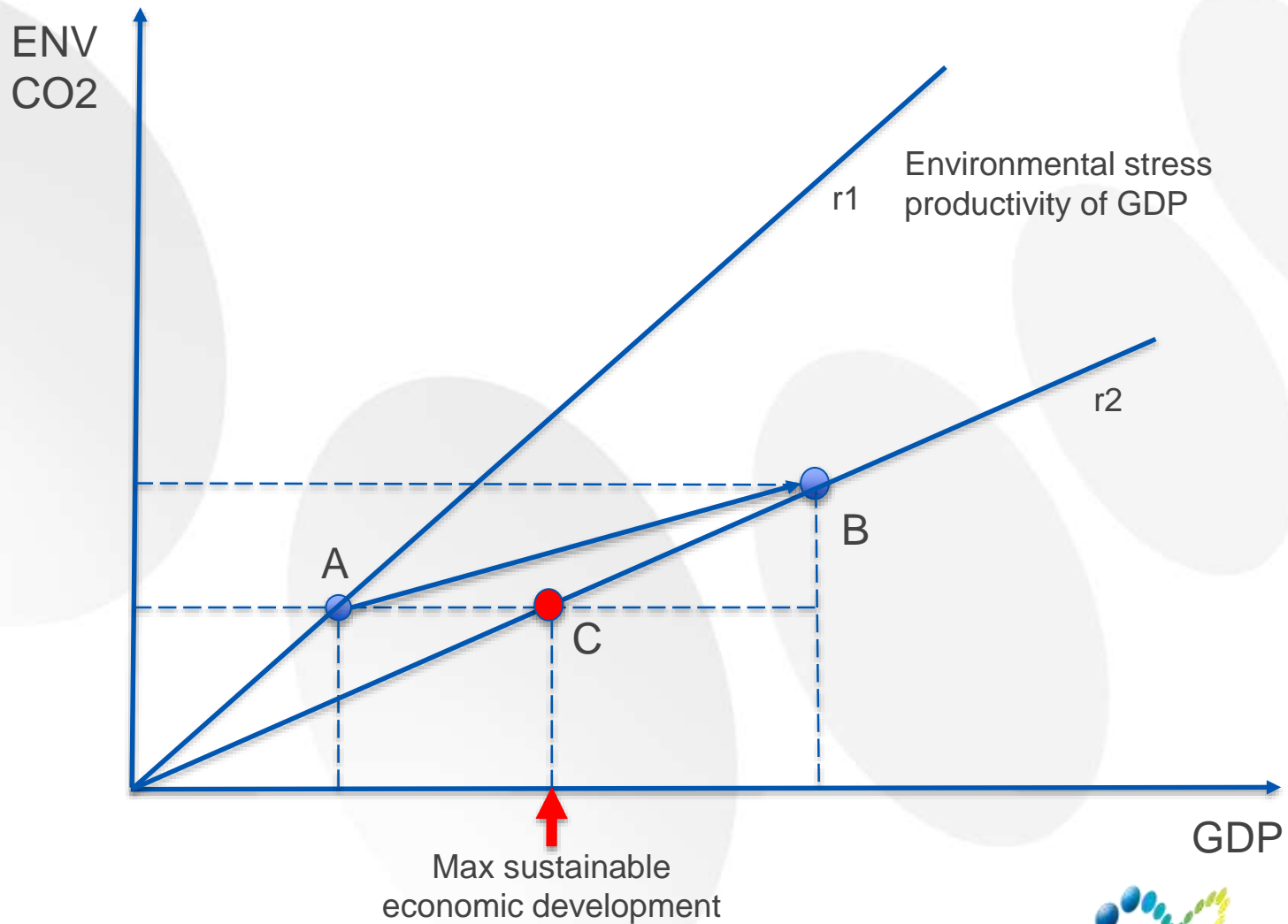
Sustainability Window

- **Sustainability Window analysis is based on so called ASA (Advanced Sustainability Analysis) approach**
- **ASA approach analyses sustainability simultaneously in all three dimensions (environmental, social and economic)**
- **ASA analysis is based on quantitative analysis of indicators describing the development in the three dimensions**

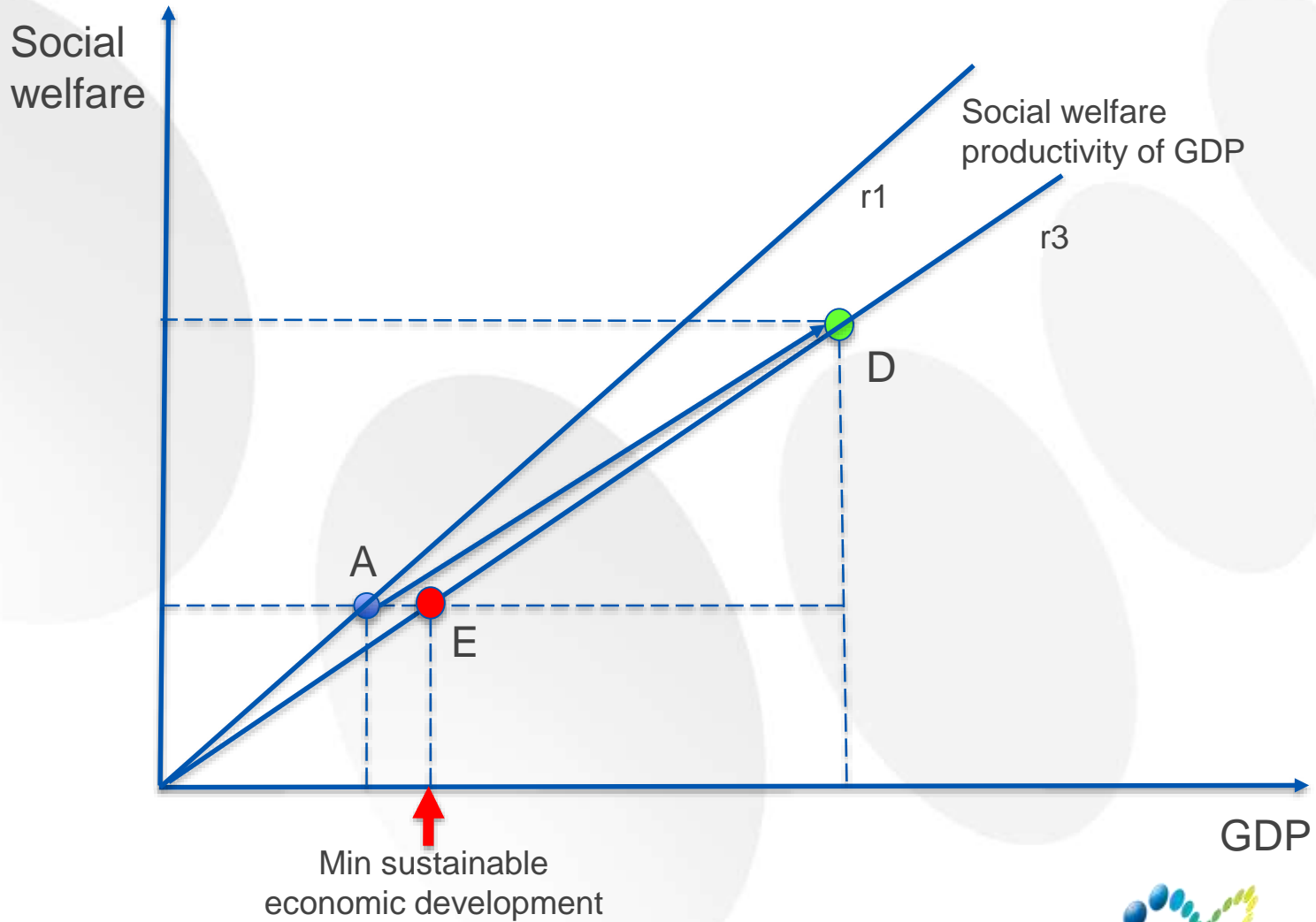
Sustainability Window

- Sustainability Window analysis indicates:
 - **Maximum economic** development in order to keep the **environmental** development within the sustainability boundaries
 - **Minimum economic** development to maintain sustainability of the **social** development
- Maximum and minimum economic development define the Sustainability Window within which the development is sustainable in regard the chosen indicators

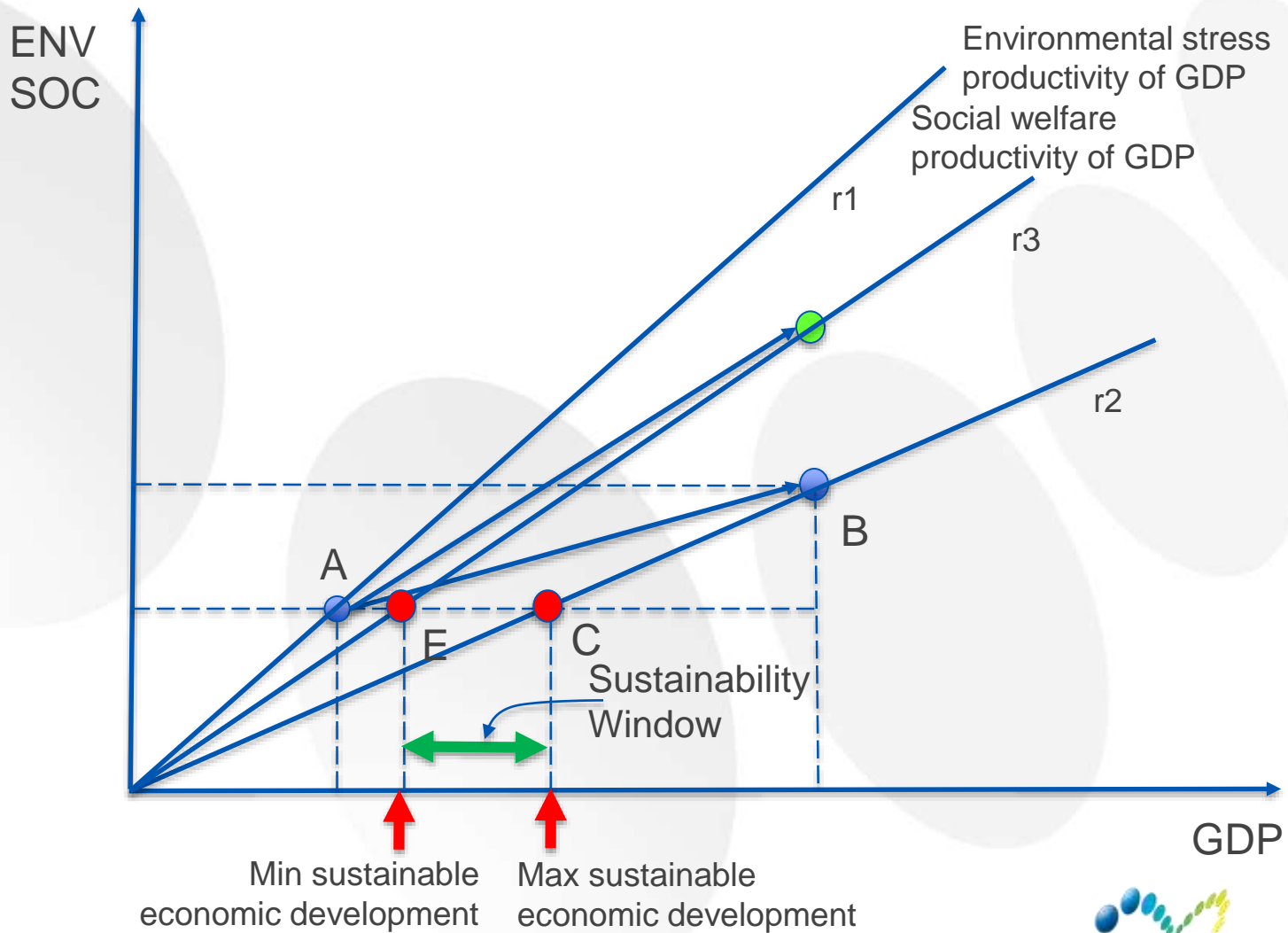
SuWi analysis - Environment



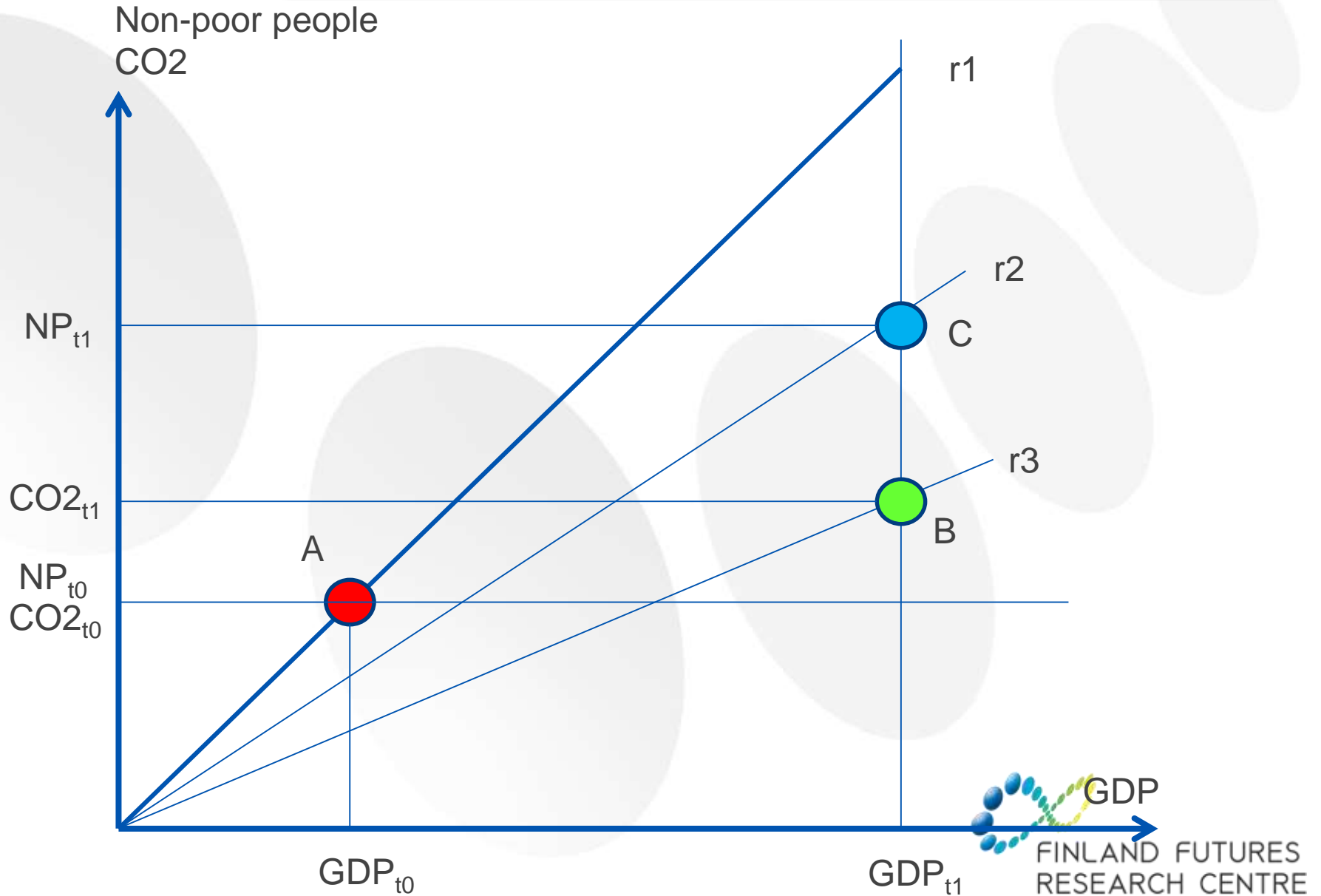
SuWi analysis - Social



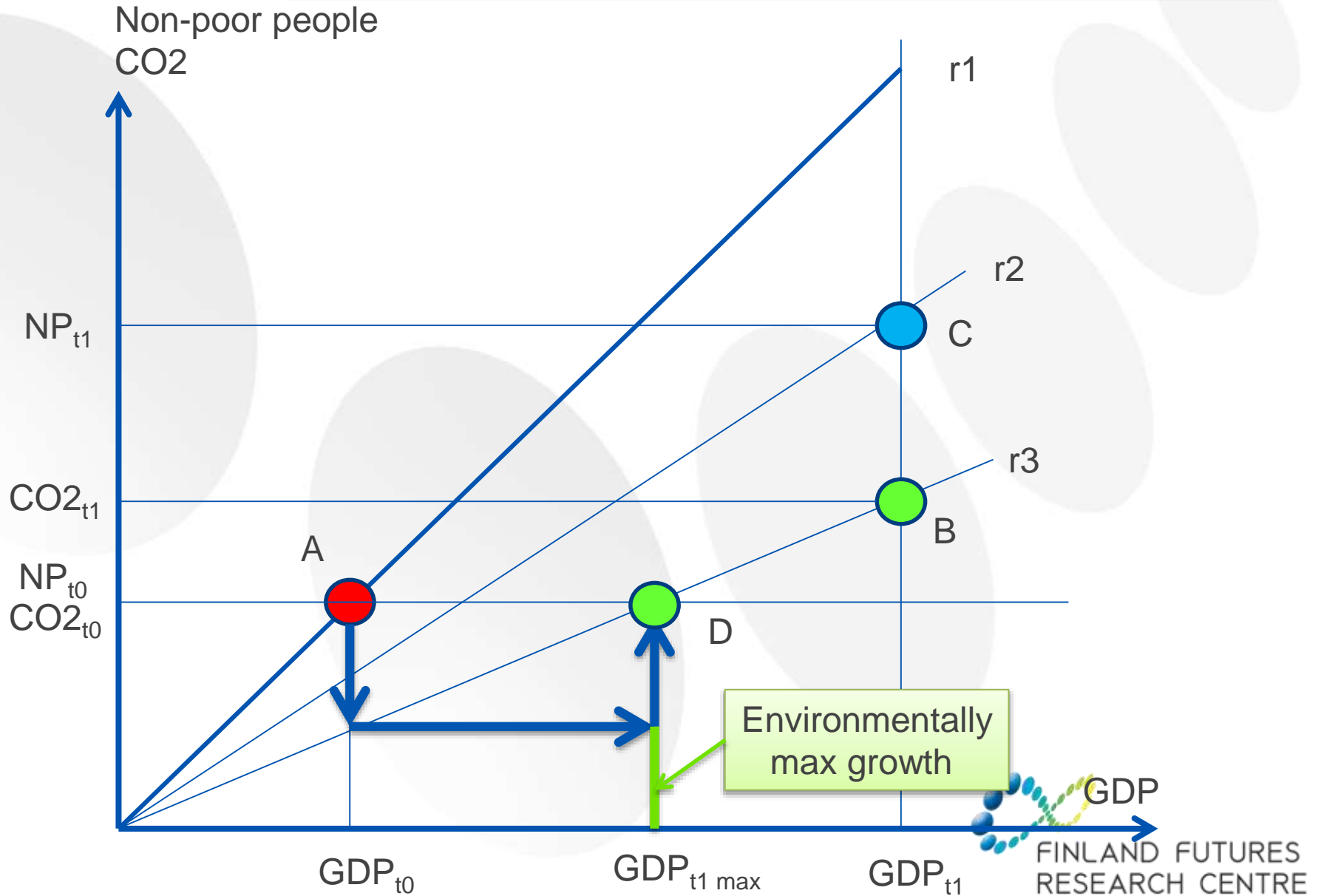
SuWi analysis



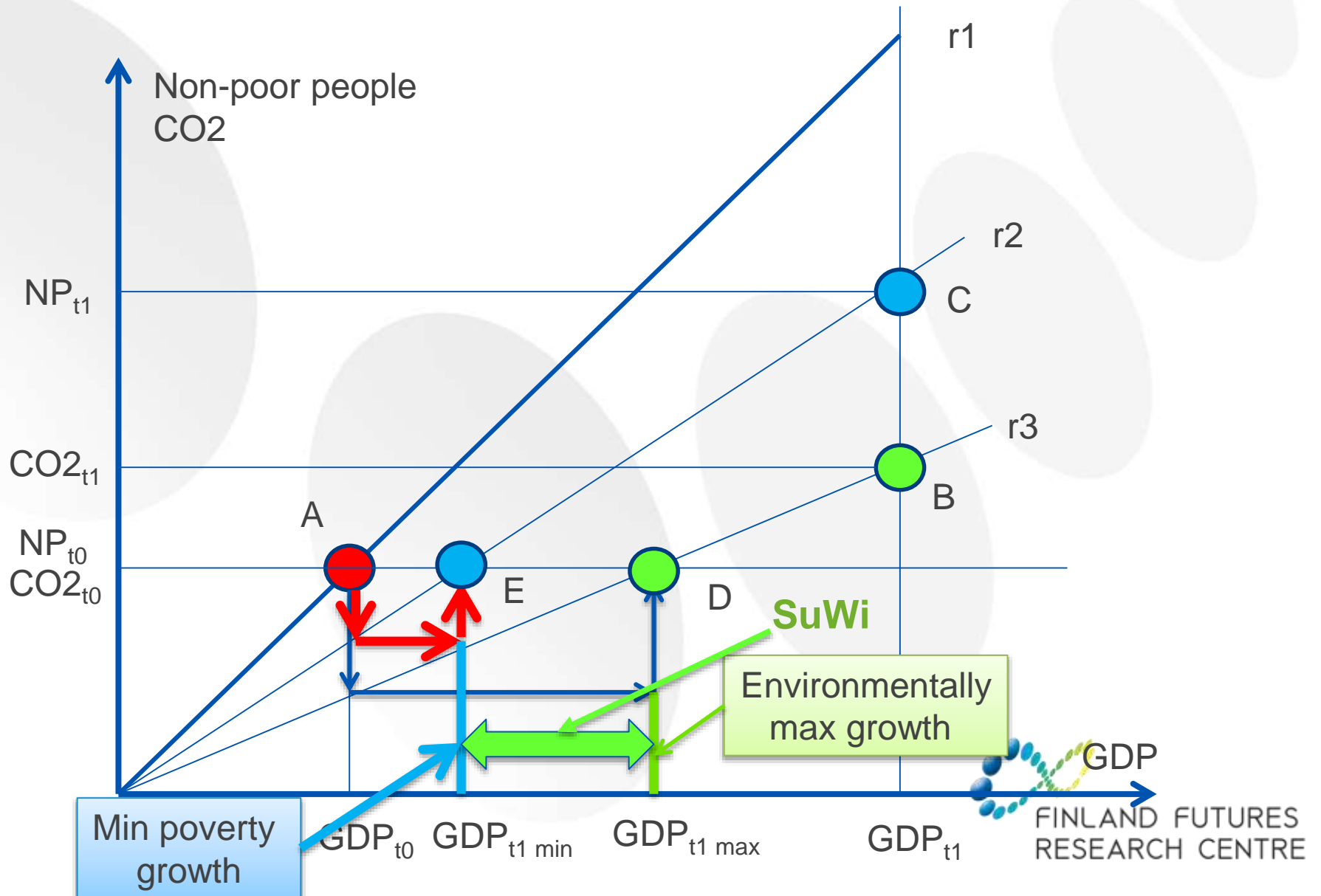
SuWi for GDP, CO₂ and Non-poor people



SuWi for GDP and CO₂



SuWi for GDP and Non-poor people



Sustainability Window

- **Strong** sustainability and **Weak** sustainability
- Strong sustainability in environmental sense means that environmental stress (e.g. CO₂ emissions) should not increase
- Weak sustainability means that the **intensity** of environmental stress (Env.Stress/GDP) should not increase
- Sustainability Window for Strong and Weak sustainability
- Different indicators to describe social, environmental and economic development

Sustainability Window

SuWi
Analyses
serve
reaching
the SDGs
in
the long
run



Sustainability Window

- Case study of different ASEAN countries
- Social indicators:
 - Environmental indicators
 - Economic indicator

Sufficient food
Healthy life years
Social inclusion
Sufficient drink
Gender equity
Income distribution
Good governance
Education

CO2 emissions
Consumption (Global hectares)
Energy use
Sanitation

GDP

Sustainability Window

- Indicators from Sustainable Society Index (SSI) and World Bank database
- Indicators for years 2006 – 2016
- Cross checking sustainability with combinations of different indicators
- Calculating both Strong and Weak Sustainability Window
- Result:
 - Existence of Strong and Weak SuWi
 - Real GDP within Strong or Weak SuWi
 - Different years



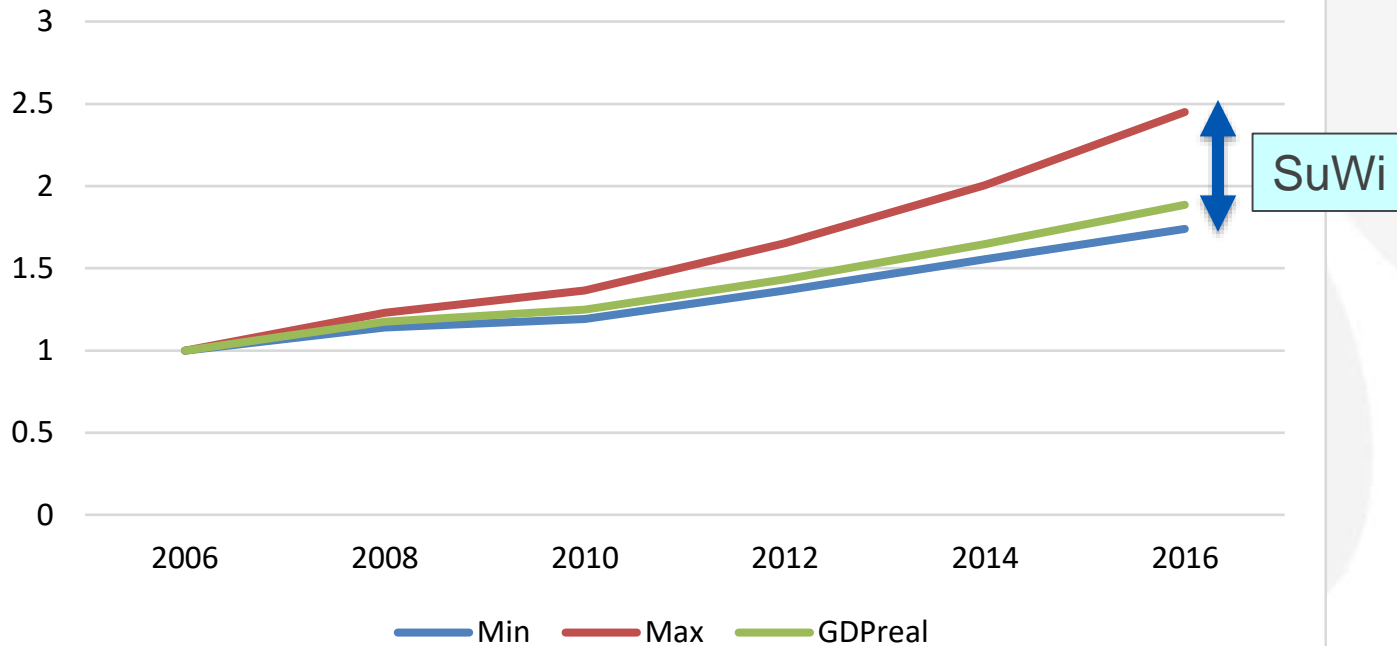
Sustainability Window indicators

- A limitation in the selection of SuWi indicators is that they should be
 - Absolute, and
 - Able to grow unlimitedly.
- This limitation excludes indicators such as rankings or percentage shares, which cannot grow past a logical upper limit.

Dynamics of Weak Sustainability Window in Cambodia

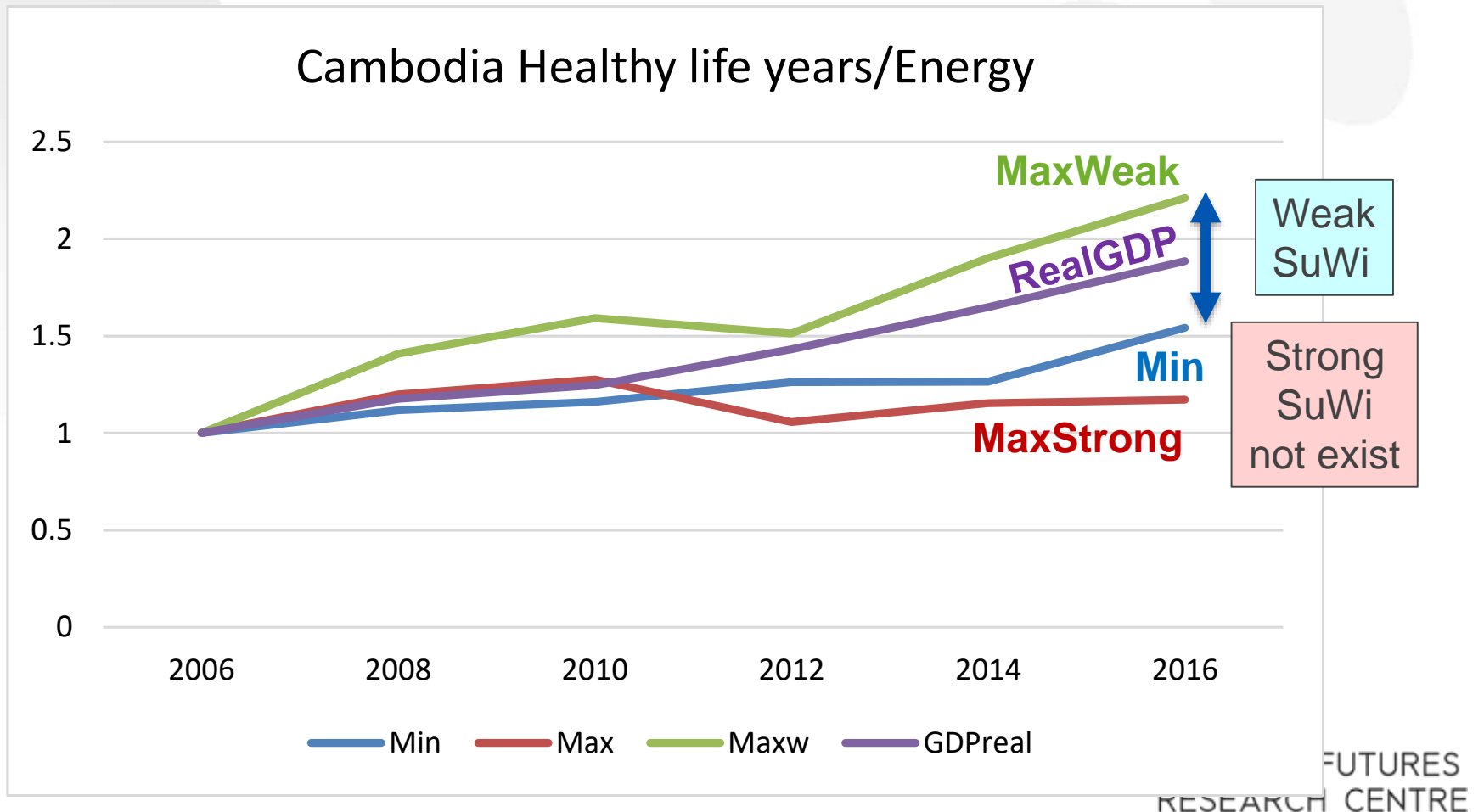
Sustainability Window trend in Cambodia

Cambodia Food/Sanitation

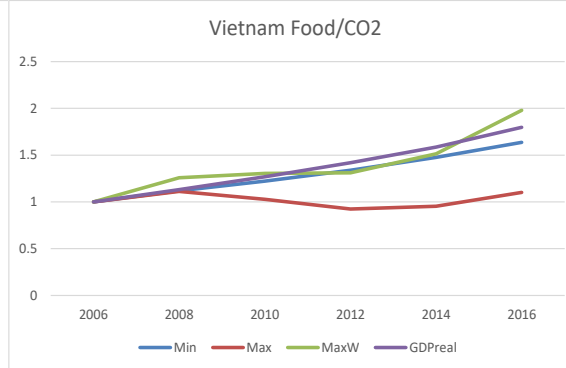
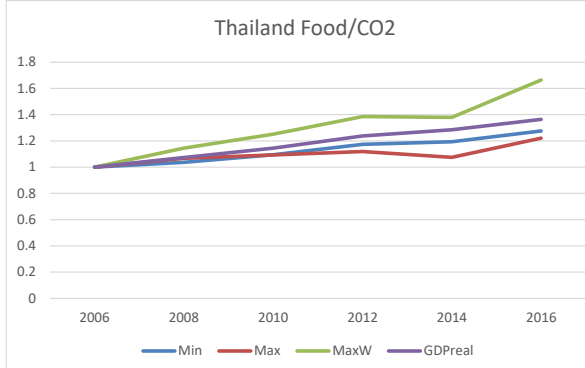
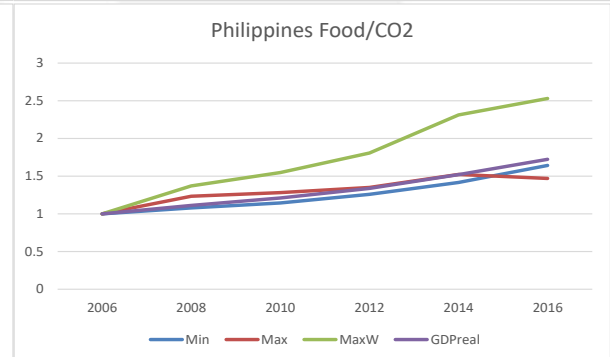
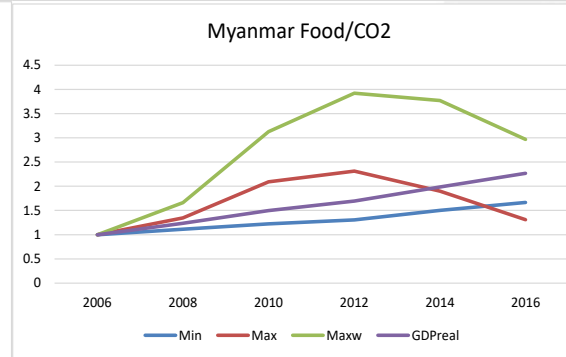
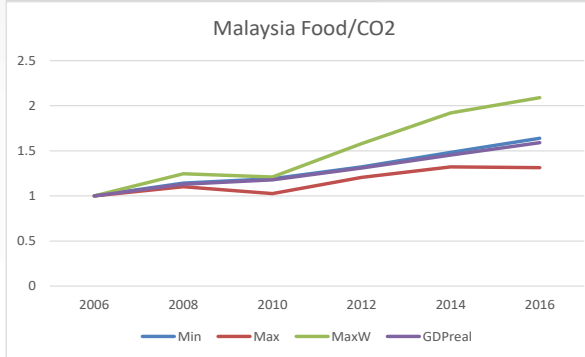
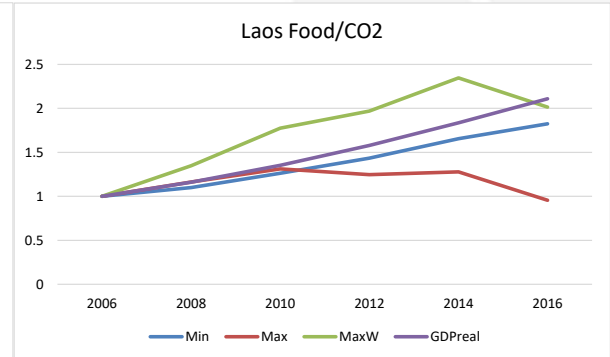
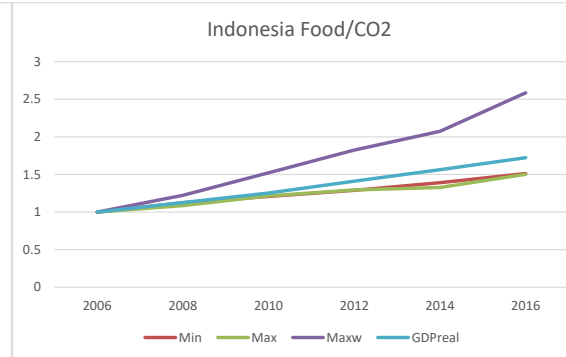
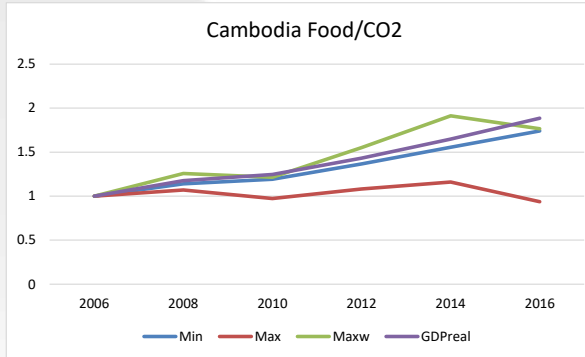


Dynamics of Sustainability Window

- Example of SuWi development for Cambodia using Healthy Life Years and Energy as indicators

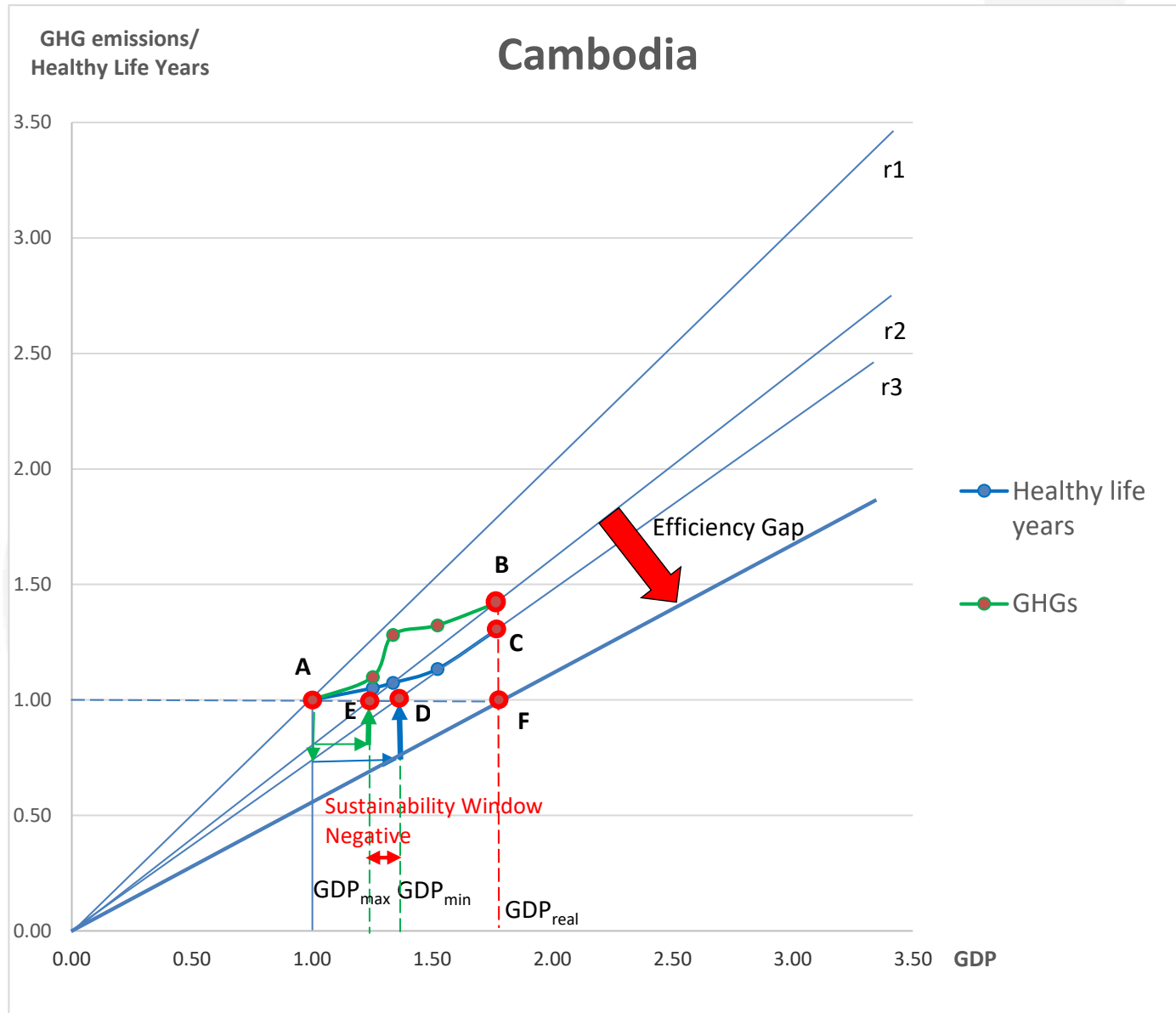


Sustainability Window trends



Efficiency Gap analysis

Efficiency Gap analysis using Strong Sustainability Window analysis for Laos using 'GHG emissions' as the environmental indicator, 'Healthy Life Years' as the social indicator and GDP as the economic indicator.



Groupwork for Sustainability Window analysis

- Select suitable data for calculation of Sustainability Window for different countries
- Carry out analysis using different indicators
- The low and high limits of Sustainability Window can be calculated in the following way when the data has been normalized (base year data values = 1):

$$SW_{low_{t0-t1}} = \frac{\frac{econ_{t1}}{econ_{t0}}}{\frac{well_{t1}}{well_{t0}}}$$

$$SW_{high_{t0-t1}} = \frac{\frac{econ_{t1}}{econ_{t0}}}{\frac{env_{t1}}{env_{t0}}}$$

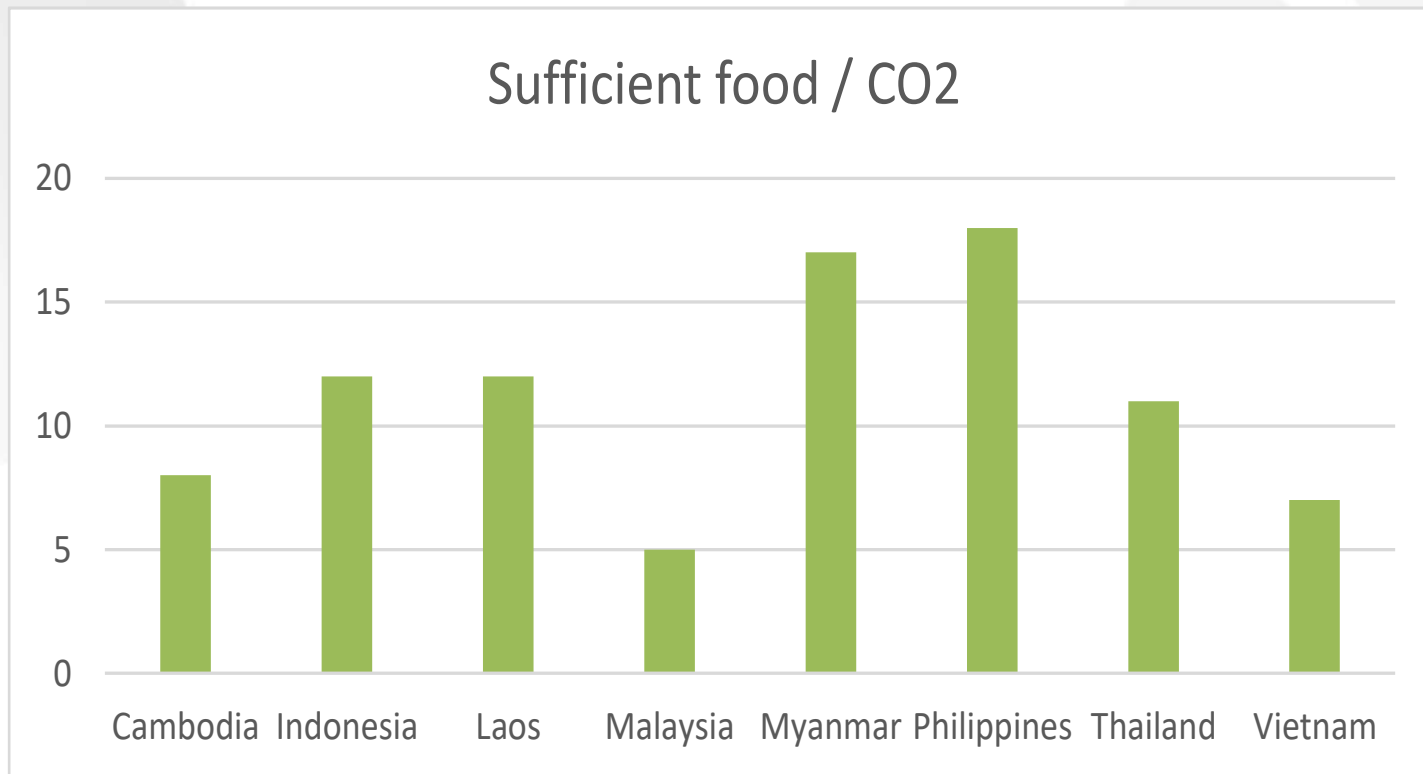
- *econ* is economic indicator, *well* is social indicator
- *env* is environmental indicator
- *t0* is the base year, and *t1* is the year of analysis
- For the Sustainability Window to exist:

SW_{high} has to be larger than SW_{low}

**Write a small
report of the
results**

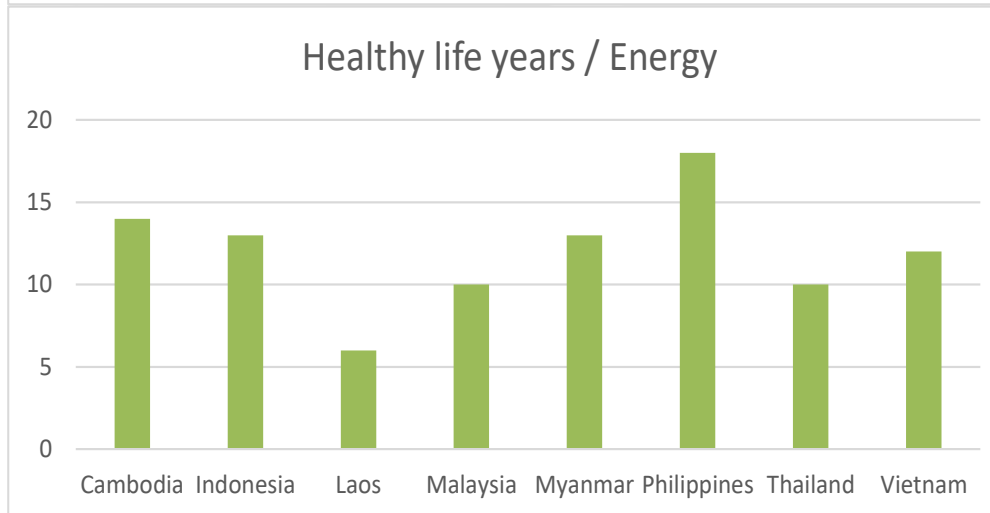
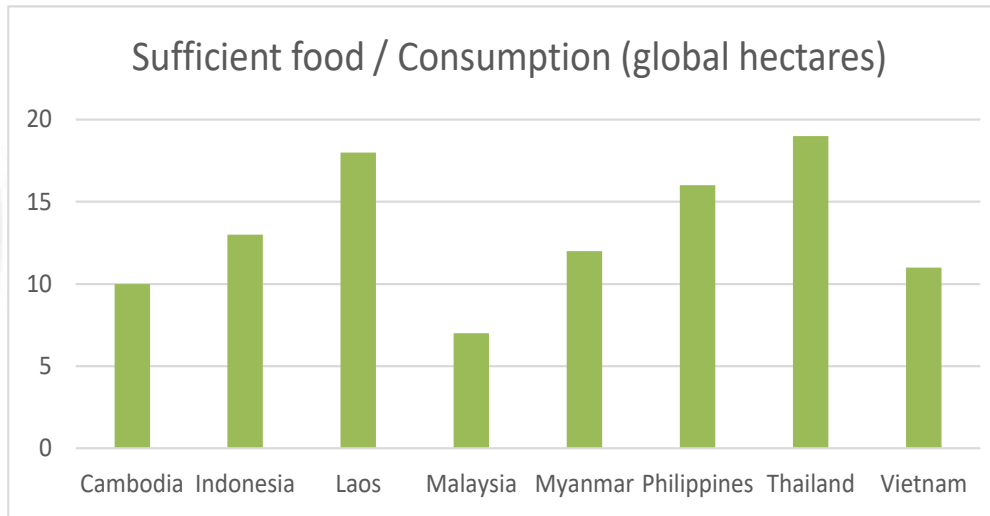
Sustainability Window

Comparison of ASEAN countries using Sufficient food and CO₂ emissions as indicators



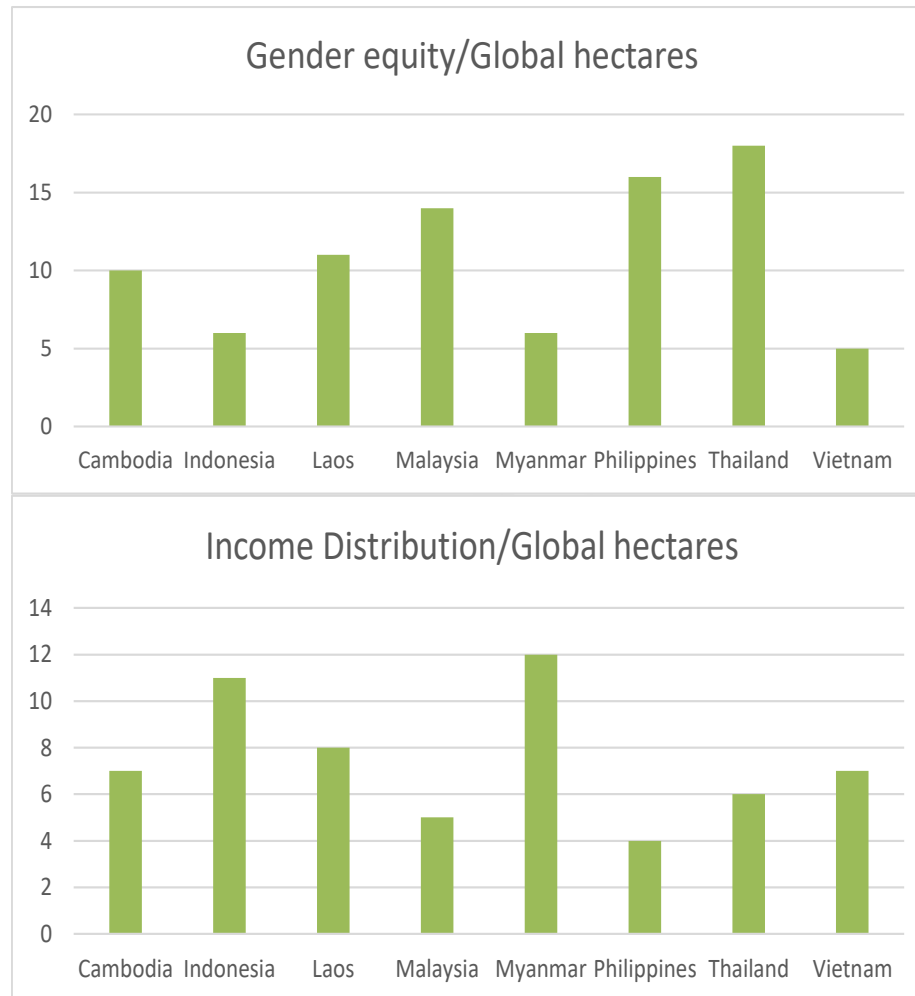
Sustainability Window

Comparison of ASEAN countries using Sufficient Food vs. Consumption of Global hectares and Healthy Life Years vs. Energy as indicators



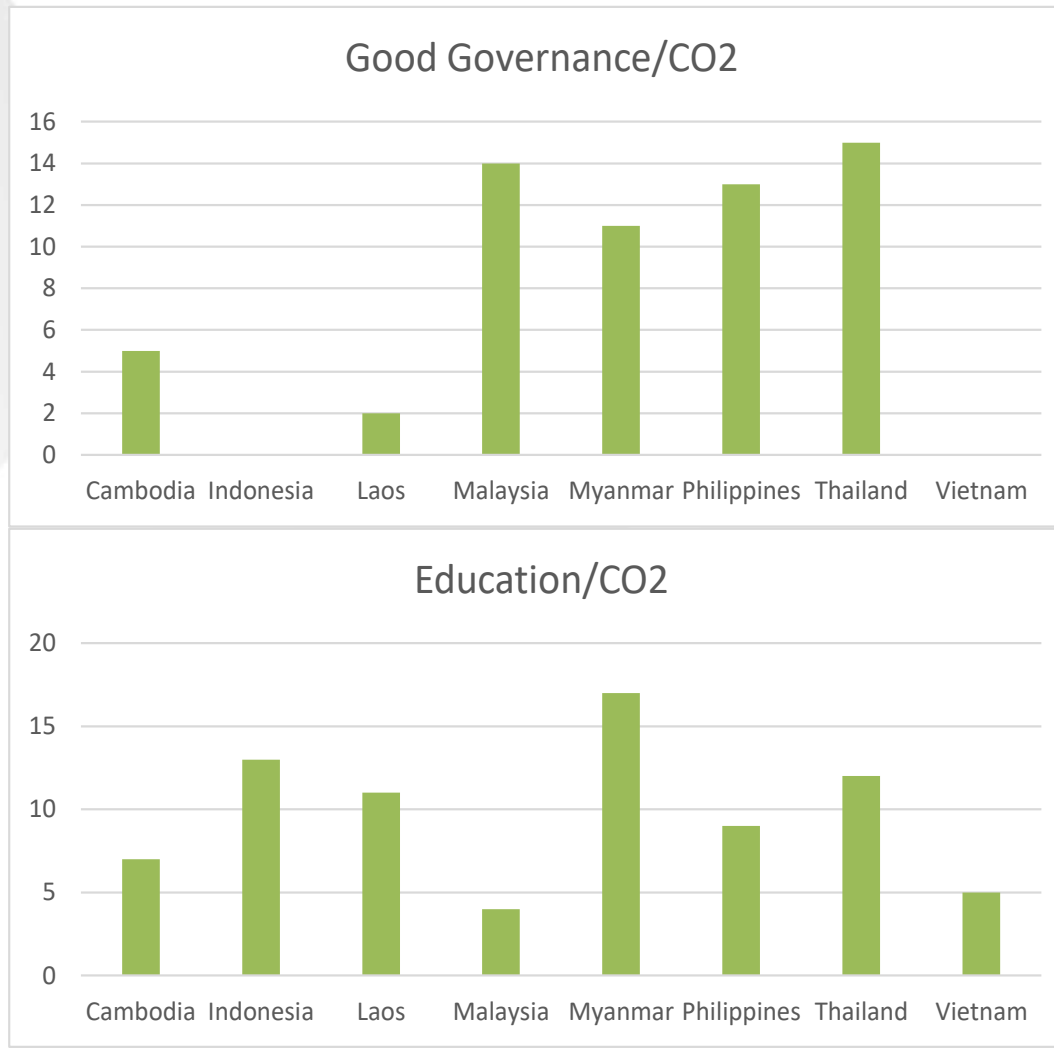
Sustainability Window

Comparison of ASEAN countries using Gender Equity and Income Distribution vs. Consumption of Global hectares as indicators



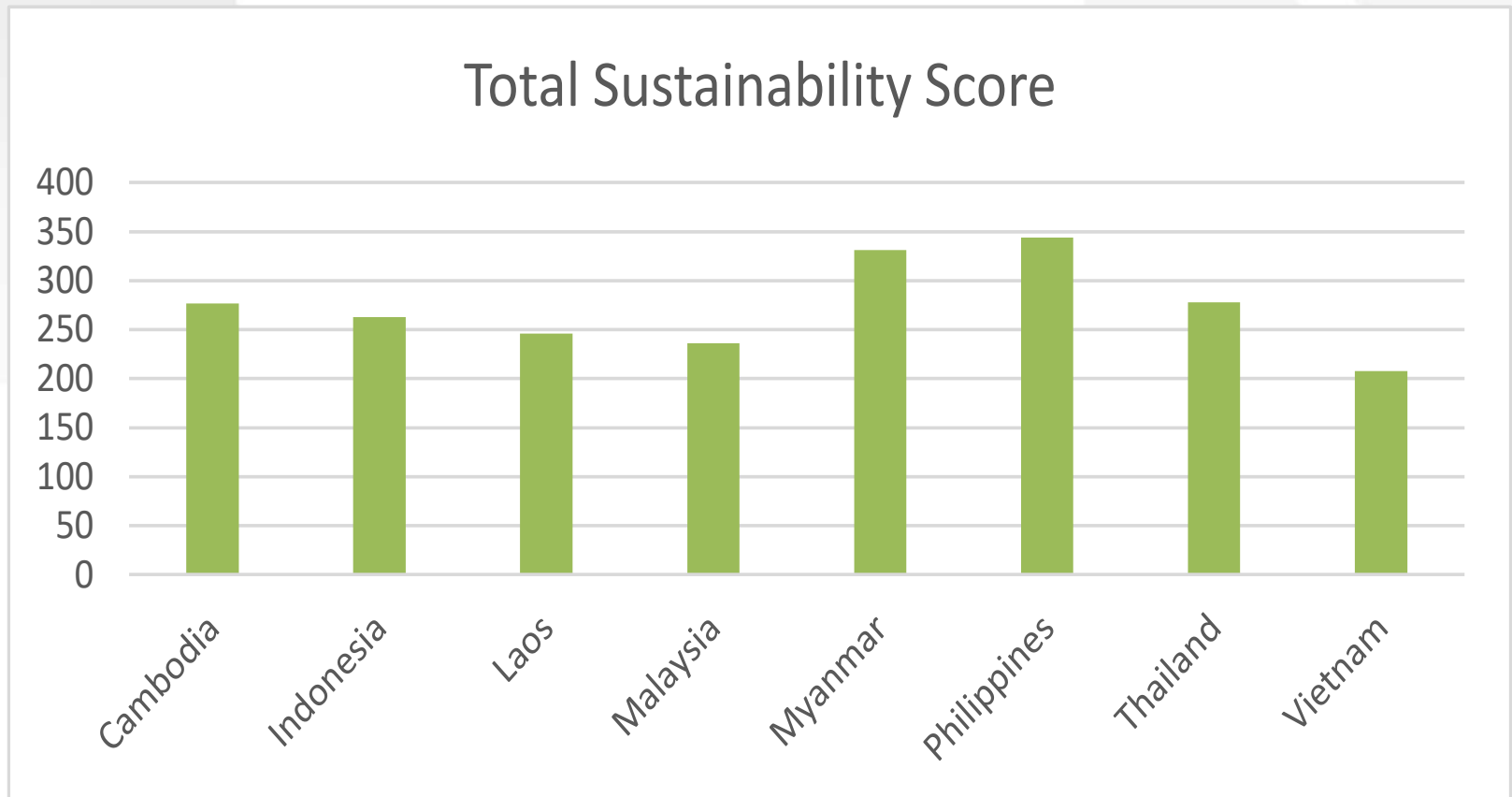
Sustainability Window

Comparison of ASEAN countries using Good Governance and Education vs. CO2 emissions as indicators



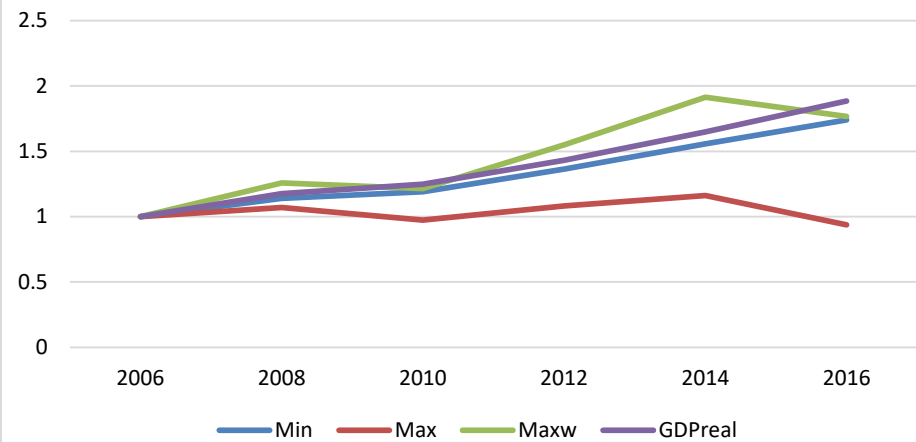
Total SuWi analysis

Total Sustainability Score for the ASEAN countries showing the aggregated indicator for the measured indicator pairs

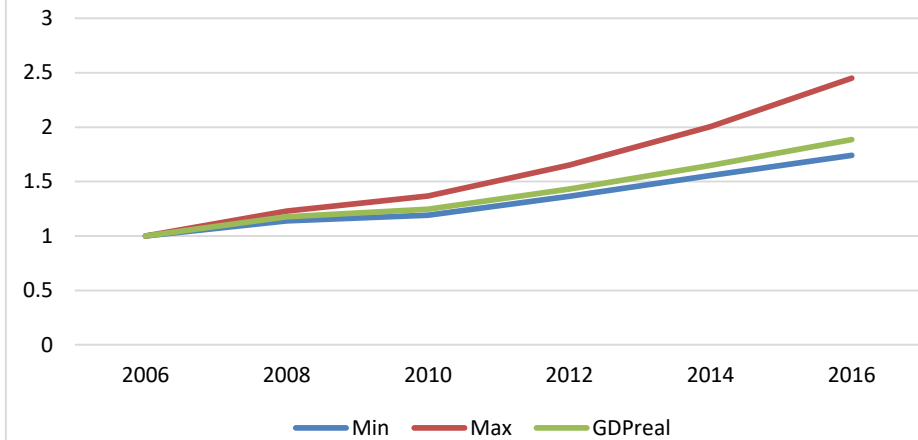


Cambodia Sustainability Window for Sufficient Food vs. different environmental indicators

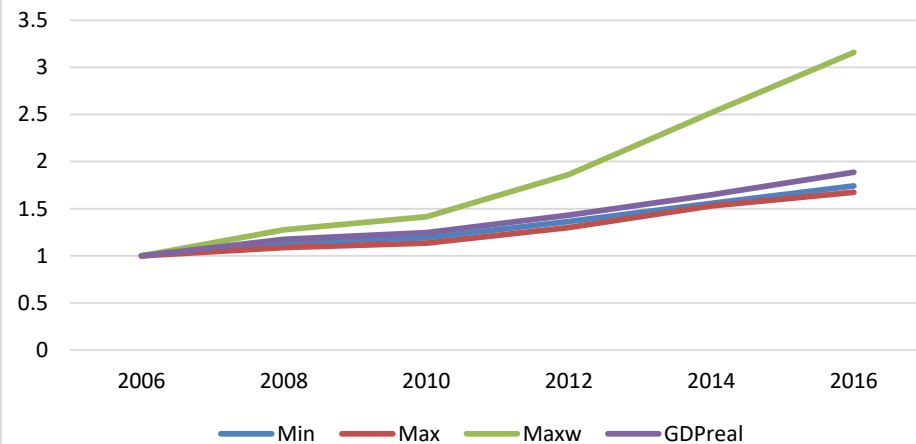
Cambodia Food/CO2



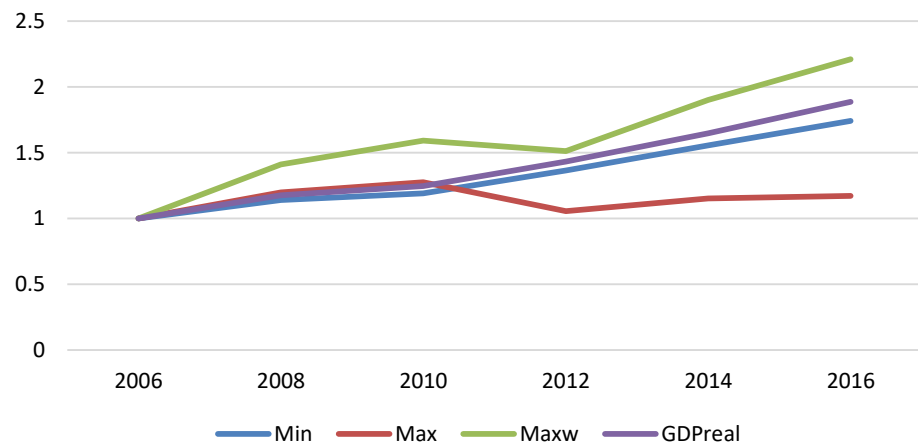
Cambodia Food/Sanitation



Cambodia Food/Consumption

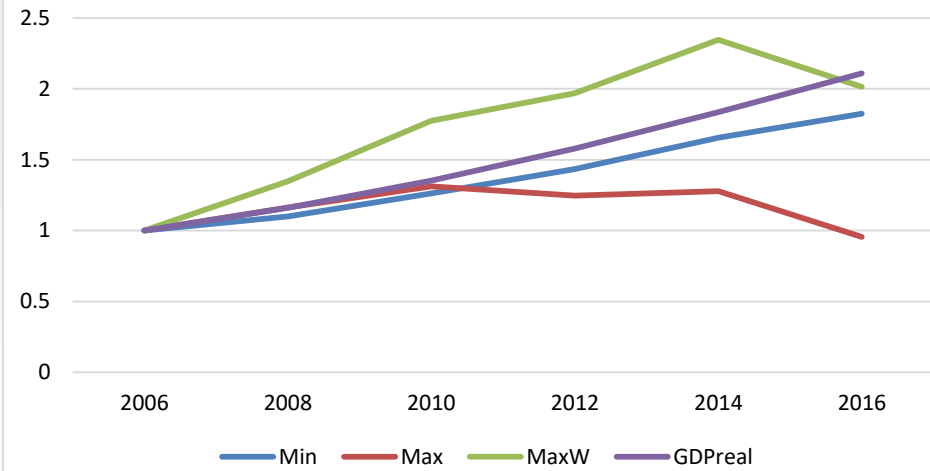


Cambodia Food/Energy

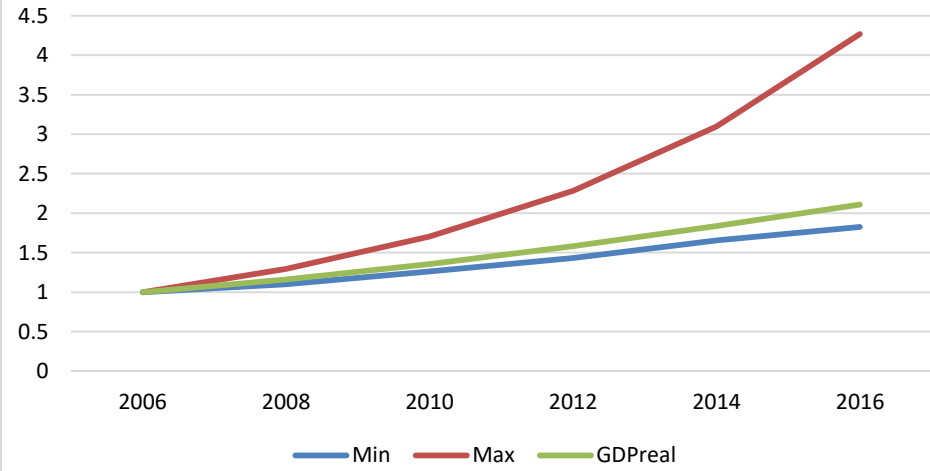


Laos Sustainability Window for Sufficient Food vs. different environmental indicators

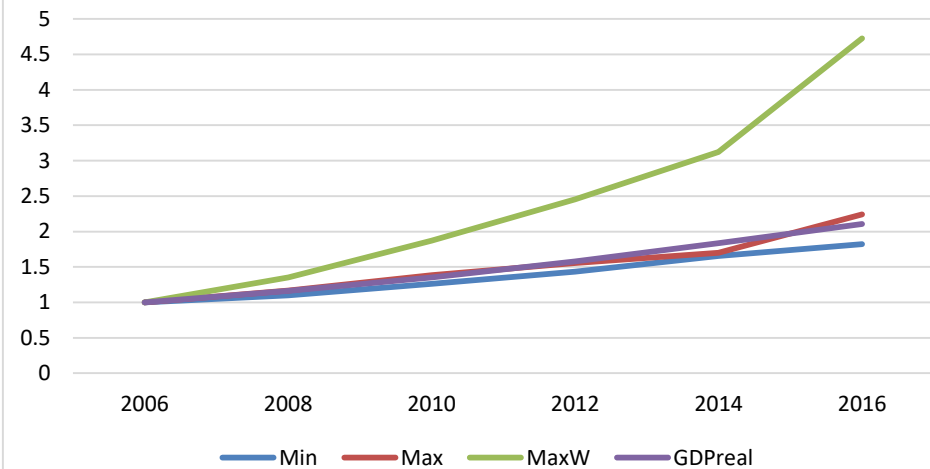
Laos Food/CO2



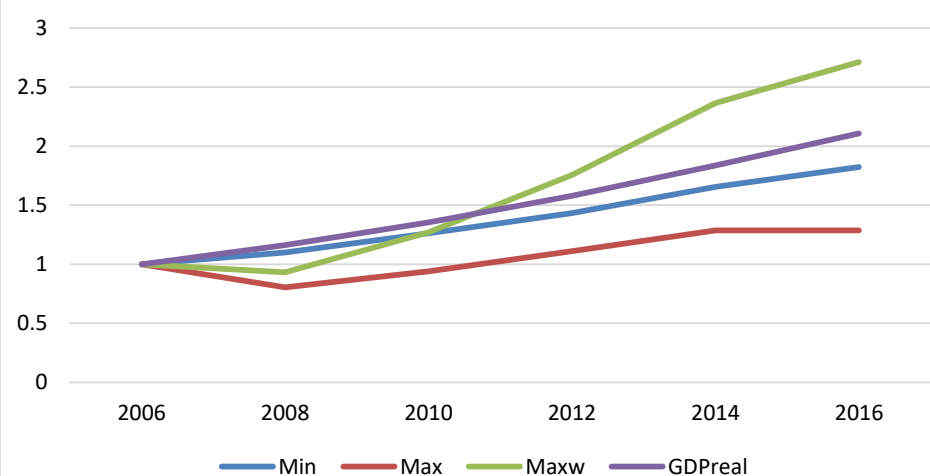
Laos Food/Sanitation



Laos Food/Consumption



Laos Food/Energy



Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

		Sufficient food / CO2			
		Existence of SuWi		Real GDP in SuWi	
		Strong	Weak	Real Strong	Real weak
Cambodia	2006				
Cambodia	2008	0	1	0	1
Cambodia	2010	0	1	0	0
Cambodia	2012	0	1	0	1
Cambodia	2014	0	1	0	1
Cambodia	2016	0	1	0	0
Indonesia	2006				
Indonesia	2008	0	1	0	1
Indonesia	2010	1	1	0	1
Indonesia	2012	1	1	0	1
Indonesia	2014	0	1	0	1
Indonesia	2016	0	1	0	1
Laos	2006				
Laos	2008	1	1	1	1
Laos	2010	1	1	0	1
Laos	2012	0	1	0	1
Laos	2014	0	1	0	1
Laos	2016	0	1	0	0

		Sufficient food / CO2			
		Existence of SuWi		Real GDP in SuWi	
		Strong	Weak	Real Strong	Real weak
Cambodia	2006	0	1	0	1
Cambodia	2008	0	1	0	0
Cambodia	2010	0	1	0	1
Cambodia	2012	0	1	0	1
Cambodia	2014	0	1	0	1
Cambodia	2016	0	1	0	0
Indonesia	2006	0	1	0	1
Indonesia	2008	1	1	0	1
Indonesia	2010	1	1	0	1
Indonesia	2012	0	1	0	1
Indonesia	2014	0	1	0	1
Indonesia	2016	0	1	0	1
Laos	2006	1	1	1	1
Laos	2008	1	1	0	1
Laos	2010	0	1	0	1
Laos	2012	0	1	0	1
Laos	2014	0	1	0	1
Laos	2016	0	1	0	0
Malaysia	2006	0	1	0	0
Malaysia	2008	0	1	0	0
Malaysia	2010	0	1	0	0
Malaysia	2012	0	1	0	0
Malaysia	2014	0	1	0	0
Malaysia	2016	0	1	0	0
Myanmar	2006	1	1	1	1
Myanmar	2008	1	1	1	1
Myanmar	2010	1	1	1	1
Myanmar	2012	1	1	1	1
Myanmar	2014	1	1	0	1
Myanmar	2016	0	1	0	1
Philippines	2006	1	1	1	1
Philippines	2008	1	1	1	1
Philippines	2010	1	1	1	1
Philippines	2012	1	1	1	1
Philippines	2014	1	1	1	1
Philippines	2016	0	1	0	1
Thailand	2006	1	1	0	1
Thailand	2008	0	1	0	1
Thailand	2010	0	1	0	1
Thailand	2012	0	1	0	1
Thailand	2014	0	1	0	1
Thailand	2016	0	1	0	1
Vietnam	2006	0	1	0	1
Vietnam	2008	0	1	0	1
Vietnam	2010	0	1	0	0
Vietnam	2012	0	1	0	0
Vietnam	2014	0	1	0	0
Vietnam	2016	0	1	0	1



Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

Food sufficiency and environmental indicators

	Base year 2006	2008	2010	2012	2014	2016
Cambodia						
Sufficient food / CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	1	0
Sufficient food/Consumption (global hectares)	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Sufficient food / Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Sufficient food / Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	1	1

Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

		Cambodia				
Healthy life years / CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	1	0
Healthy life years / Global hectares	Strong SuWi exists	0	0	1	1	1
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Healthy life years / Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Healthy life years / Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	1	1
Social inclusion / CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	0
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	0	0	1	1	0
Social inclusion / Global hectares	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	0	1	1	1	1
Social inclusion / Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	1	0	0	0
	GDP in Weak SuWi	0	1	1	1	1
Social inclusion / Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	1	1	1	1

Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

Sufficient drink / CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	1	0
Sufficient drink / Global hectares	Strong SuWi exists	1	1	1	1	1
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Sufficient drink / Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Sufficient drink / Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	1	1
Gender equity/CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	0
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	1	0
Gender equity/Global hectares	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Gender equity/Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	1	1
Gender equity/Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	1	1

Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

Income Distribution/CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	0	0
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	0	0
Income Distribution/Global hectares	Strong SuWi exists	0	1	0	0	0
	Weak SuWi exists	1	1	1	0	0
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	0	0
Income Distribution/Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	0	0
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	0	0
Income Distribution/Sanitation	Strong SuWi exists	1	1	1	0	0
	GDP in Strong SuWi	1	1	1	0	0
Cambodia						
Good Governance/CO2	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	0	1	1	0
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	0	1	0	0
Good Governance/Global hectares	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	0	0
Good Governance/Energy	Strong SuWi exists	1	1	0	0	0
	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	0	0	0
	GDP in Weak SuWi	1	1	1	0	0
Good Governance/Sanitation	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	0	0

Example: Existence of Strong and Weak SuWi and whether Real GDP is within SuWi

	Cambodia					Indonesia					Laos							
Education/CO2	Strong SuWi exists	0	0	0	0	0	Strong SuWi exists	0	1	1	0	1	Strong SuWi exists	1	0	0	0	0
	Weak SuWi exists	1	1	1	1	0	Weak SuWi exists	1	1	1	1	1	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0	GDP in Strong SuWi	0	0	0	0	0	GDP in Strong SuWi	1	0	0	0	0
	GDP in Weak SuWi	1	0	1	1	0	GDP in Weak SuWi	1	1	1	1	1	GDP in Weak SuWi	1	1	1	1	0
Education/Global hectares	Strong SuWi exists	0	0	0	0	0	Strong SuWi exists	1	1	1	1	1	Strong SuWi exists	1	1	1	0	1
	Weak SuWi exists	1	1	1	1	1	Weak SuWi exists	1	1	1	1	1	Weak SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	0	0	0	0	0	GDP in Strong SuWi	0	0	0	0	0	GDP in Strong SuWi	1	1	0	0	1
	GDP in Weak SuWi	1	1	1	1	1	GDP in Weak SuWi	1	1	1	1	1	GDP in Weak SuWi	1	1	1	1	1
Education/Energy	Strong SuWi exists	1	1	0	0	0	Strong SuWi exists	1	1	1	1	1	Strong SuWi exists	0	0	0	0	0
	Weak SuWi exists	1	1	1	1	1	Weak SuWi exists	1	1	1	1	1	Weak SuWi exists	0	0	1	1	1
	GDP in Strong SuWi	1	1	0	0	0	GDP in Strong SuWi	0	1	0	0	0	GDP in Strong SuWi	0	0	0	0	0
	GDP in Weak SuWi	1	1	1	1	1	GDP in Weak SuWi	1	1	1	1	1	GDP in Weak SuWi	0	0	1	1	1
Education/Sanitation	Strong SuWi exists	1	1	1	1	1	Strong SuWi exists	1	1	1	1	1	Strong SuWi exists	1	1	1	1	1
	GDP in Strong SuWi	1	1	1	1	1	GDP in Strong SuWi	1	1	1	1	1	GDP in Strong SuWi	1	1	1	1	1

Sufficient food / CO2

Sufficient food / Consumption (global hectares)

Sufficient food / Sanitation

Sufficient food / Energy

Existence of SuWi

Real GDP in SuWi

		Existence of SuWi		Real GDP in SuWi		Sufficient food / Consumption (global hectares)				Sufficient food / Sanitation		Sufficient food / Energy			
		Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Cambodia	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1
Cambodia	2008	0	1	0	0	0	1	0	1	1	1	1	1	1	1
Cambodia	2010	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Cambodia	2012	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Cambodia	2014	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Cambodia	2016	0	1	0	0	0	1	0	1	1	1	0	1	0	1
Indonesia	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Indonesia	2008	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Indonesia	2010	1	1	0	1	0	1	0	1	1	1	1	1	1	1
Indonesia	2012	1	1	0	1	1	1	0	1	1	1	1	1	0	1
Indonesia	2014	0	1	0	1	1	1	0	1	1	1	1	1	0	1
Indonesia	2016	0	1	0	1	1	1	0	1	1	1	1	1	0	1
Laos	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Laos	2008	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Laos	2010	1	1	0	1	1	1	1	1	1	1	0	1	0	0
Laos	2012	0	1	0	1	1	1	0	1	1	1	0	1	0	1
Laos	2014	0	1	0	1	1	1	0	1	1	1	0	1	0	1
Laos	2016	0	1	0	0	1	1	1	1	1	1	0	1	0	1
Malaysia	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Malaysia	2008	0	1	0	0	0	1	0	0	1	0	0	1	0	0
Malaysia	2010	0	1	0	0	0	1	0	0	1	0	0	1	0	0
Malaysia	2012	0	1	0	0	1	1	0	0	1	0	0	1	0	0
Malaysia	2014	0	1	0	0	0	1	0	0	1	0	0	1	0	0
Malaysia	2016	0	1	0	0	1	1	0	0	1	0	0	1	0	0
Myanmar	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Myanmar	2008	1	1	1	1	0	1	0	1	1	1	1	1	0	1
Myanmar	2010	1	1	1	1	0	1	0	1	1	1	1	1	1	1
Myanmar	2012	1	1	1	1	0	1	0	1	1	1	1	1	1	1
Myanmar	2014	1	1	0	1	0	1	0	1	1	1	1	1	1	1
Myanmar	2016	0	1	0	1	1	1	1	1	1	1	1	1	0	1
Philippines	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Philippines	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Philippines	2010	1	1	1	1	0	1	0	1	1	1	1	1	1	1
Philippines	2012	1	1	1	1	0	1	0	1	1	1	1	1	1	1
Philippines	2014	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Philippines	2016	0	1	0	1	1	1	1	1	1	1	1	1	0	1
Thailand	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Thailand	2008	1	1	0	1	1	1	0	1	1	0	0	1	0	1
Thailand	2010	0	1	0	1	1	1	1	1	1	0	0	1	0	1
Thailand	2012	0	1	0	1	1	1	1	1	1	0	0	1	0	1
Thailand	2014	0	1	0	1	1	1	1	1	1	0	0	1	0	1
Thailand	2016	0	1	0	1	1	1	1	1	0	0	0	1	0	1
Vietnam	2006	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Vietnam	2008	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Vietnam	2010	0	1	0	1	0	1	0	1	1	1	0	1	0	1
Vietnam	2012	0	0	0	0	0	1	0	1	1	1	0	1	0	1
Vietnam	2014	0	1	0	0	0	1	0	1	1	1	0	1	0	1
Vietnam	2016	0	1	0	1	1	1	0	1	1	1	1	1	1	1

	Sufficient food / CO2				Sufficient food / Consumption (global hectares)				Sufficient food / Sanitation		Sufficient food / Energy				Healthy life years / CO2				Healthy life years / Global hectares				Healthy life years / Sanitation				Healthy life years / Energy								
	Existence of SuWi		Real GDP in SuWi		Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Real Strong	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong
Cambodia	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	0	0	1	1	0	0	0	0	
Cambodia	2008	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	
Cambodia	2010	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	
Cambodia	2012	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Cambodia	2014	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Cambodia	2016	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2008	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2010	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2012	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2014	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Indonesia	2016	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2010	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2012	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2014	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Laos	2016	0	1	0	0	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2006	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2008	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2010	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2012	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2014	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Malaysia	2016	0	1	0	0	0	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2008	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2010	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2012	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2014	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Myanmar	2016	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2010	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2012	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2014	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Philippines	2016	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2008	1	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2010	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2012	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2014	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Thailand	2016	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2006	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2008	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2010	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2012	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2014	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1
Vietnam	2016	0	1	0	1	0	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1

		Social inclusion / CO2				Social inclusion / Global hectares				Social inclusion / Sanitation		Social inclusion / Energy				Sufficient drink / CO2				Sufficient drink / Global hectares				Sufficient drink / Sanitation		Sufficient drink / Energy					
		Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Weak	Real Strong	Real weak	Strong	Real Strong	Strong	Real Strong	Strong	Weak	Real Strong	Real weak
Cambodia	2006	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	1	0	1	0	1	1	1	1	1	1	1	1	1	
Cambodia	2008	0	1	0	0	1	1	0	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	
Cambodia	2010	1	1	0	0	1	1	0	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	
Cambodia	2012	1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	0	1	
Cambodia	2014	1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	0	1	1	1	1	1	1	1	1	0	1	0	1	1	
Cambodia	2016	0	1	0	0	1	1	0	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	0	1	0	1	1	
Indonesia	2006																														
Indonesia	2008														1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	
Indonesia	2010													1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Indonesia	2012													1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Indonesia	2014													1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Indonesia	2016													1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Laos	2006																														
Laos	2008	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	
Laos	2010	1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0	0	
Laos	2012	1	1	0	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	1	0	1	0	1	1	
Laos	2014	1	1	0	1	1	1	0	1	1	1	1	1	0	1	0	1	1	1	1	0	1	1	1	1	0	1	0	1	1	
Laos	2016	0	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	1	1	1	1	1	1	1	0	1	0	1	1	
Malaysia	2006																														
Malaysia	2008														1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	
Malaysia	2010													1	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	
Malaysia	2012													1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	
Malaysia	2014													1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	
Malaysia	2016													1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	
Myanmar	2006																														
Myanmar	2008														1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Myanmar	2010													1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	
Myanmar	2012													1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Myanmar	2014													1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	1	
Myanmar	2016													1	1	0	1	1	1	1	0	1	1	1	1	1	1	0	1	1	
Philippines	2006																														
Philippines	2008	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Philippines	2010	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	
Philippines	2012	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	
Philippines	2014	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Philippines	2016	1	1	0	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	
Thailand	2006																														
Thailand	2008														1	1	0	1	1	1	0	1	1	1	1	1	0	1	0	1	
Thailand	2010													1	1	0	1	1	1	1	0	1	1	1	1	0	1	0	1	1	
Thailand	2012													1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	1	1	
Thailand	2014													1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	1	1	
Thailand	2016													1	1	0	1	1	1	1	1	1	1	1	1	0	1	0	1	1	
Vietnam	2006																														
Vietnam	2008														1	1	0	1	1	1	0	1	1	1	1	1	1	0	1	1	
Vietnam	2010													0	1	0	1	1	1	0	1	1	1	1	1	0	1	0	1	1	
Vietnam	2012													0	1	0	0	1	1	1	0	1	1	1	1	0	1	0	1	1	
Vietnam	2014													0	1	0	0	1	1	1	0	1	1	1	1	0	1	0	1	1	
Vietnam	2016													0	1	0	1	1	1	0	1	1	1	1	1	0	1	1	1	1	

ASA and Sustainability Window analyses

- **Data sources:**
- World Bank Databank
<http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators>
- Fragile States Index (Fund for Peace)
<http://fsi.fundforpeace.org/rankings-2016>
- Sustainable Society Index <http://www.ssfindex.com/>
- Human Development Index
<http://hdr.undp.org/en/content/human-development-index-hdi>

Conclusions

- Sustainability Window (SuWi) analysis can be utilized for simultaneous analysis of development in the three different dimensions of sustainability (social (including cultural), environmental and economic)
- SuWi provides an efficient tool for comparative analysis
- SuWi provides information of the dynamics of sustainability
- SuWi can be used as pre-planning analysis of sustainability transitions
- SuWi analysis is dependent on the availability of **reliable indicator** data of development

Thank you



Jyrki Luukkanen & Jari Kaivo-oja
Finland Futures Research Centre
University of Turku

jyrki.luukkanen@utu.fi **jari.kaivo-oja@utu.fi**

sdfutures.fi