

Synergy Analysis Method

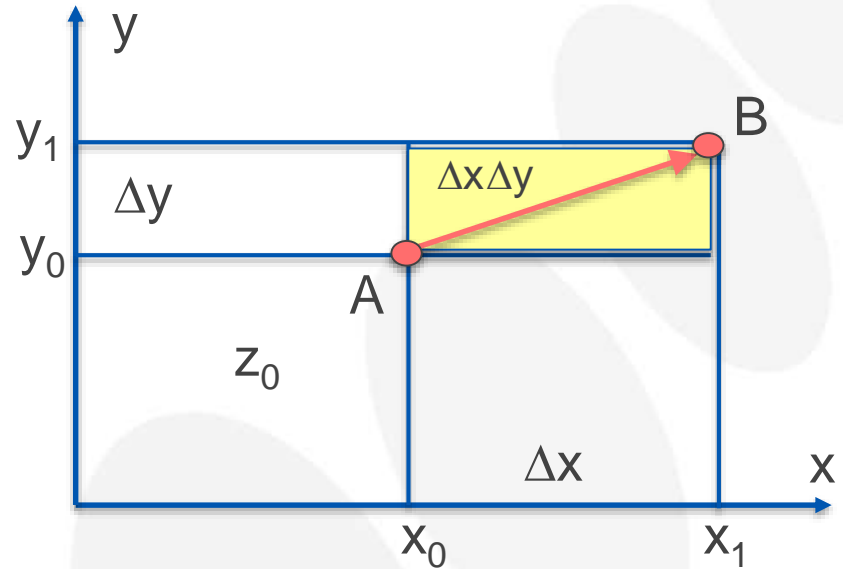
Synergy between different dimensions of sustainable development

DEEM training, Cambodia
September 2018

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Synergy Analysis Method

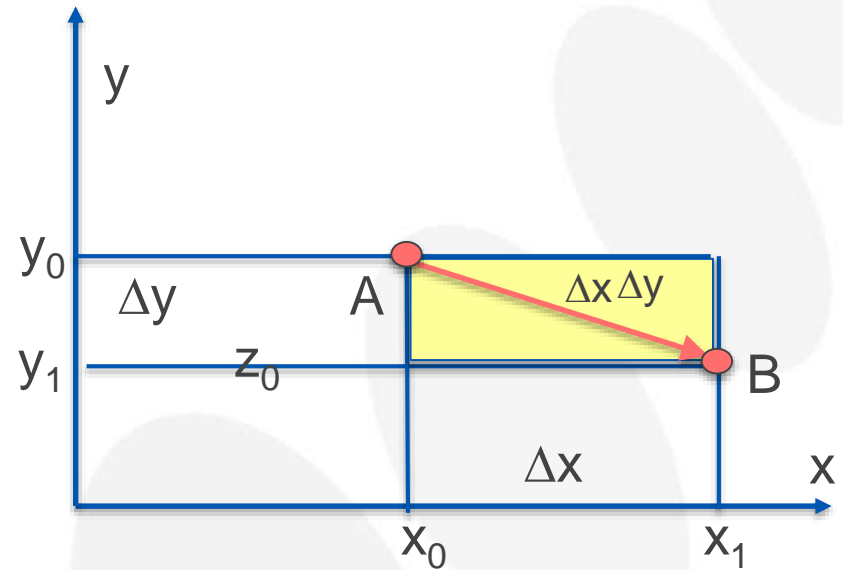
$$z = ax + by + cxy + d$$



$$\Delta z = a\Delta x + b\Delta y + c\Delta x\Delta y = y_0\Delta x + x_0\Delta y + \Delta x\Delta y$$

Synergy, which is joint impact of the variables, is determined by $\Delta x\Delta y$

Synergy Analysis Method



Negative synergy = trade-off

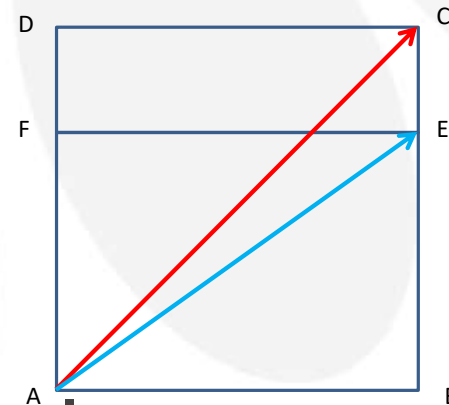
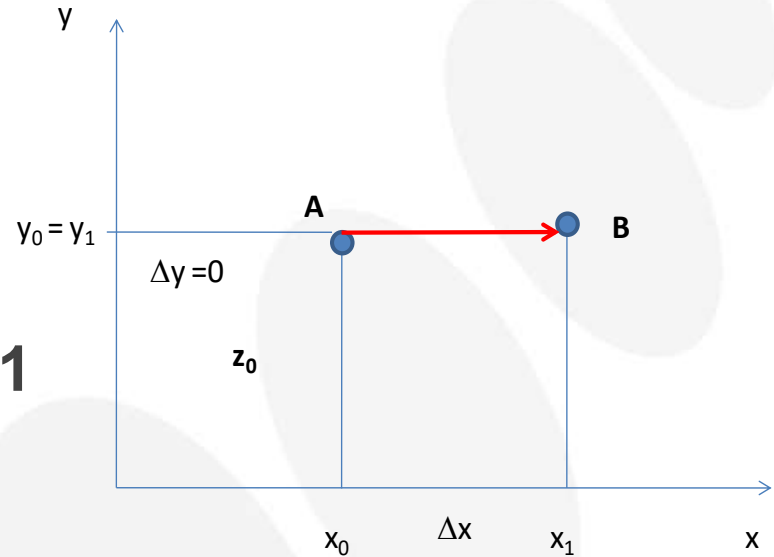
This is a case where the increase in one component decreases the other component determined by $-\Delta x \Delta y$

Synergy method

- Zero synergy = de-linking
- Variables have to be normalized, base year value = 1
- Synergy measure:

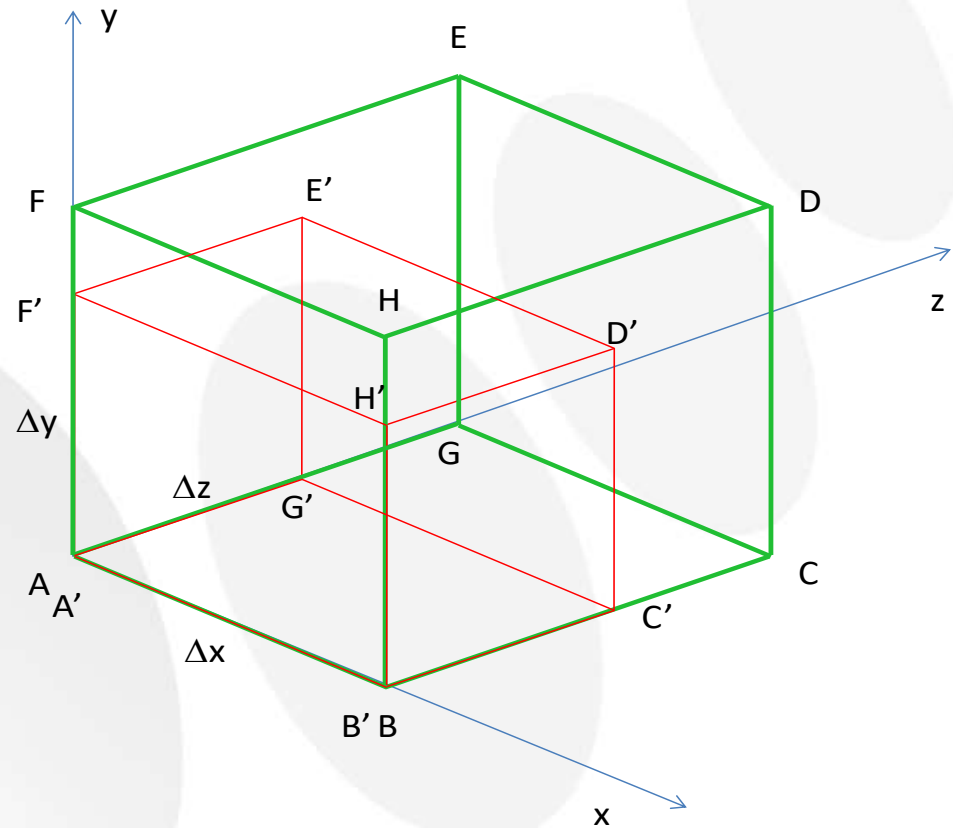
$$S = \frac{\Delta x}{\Delta y}$$

- Graphical measure
- It is a question of **Potential** synergy – not indicating causal relations



Synergy method

Synergy between
three trends

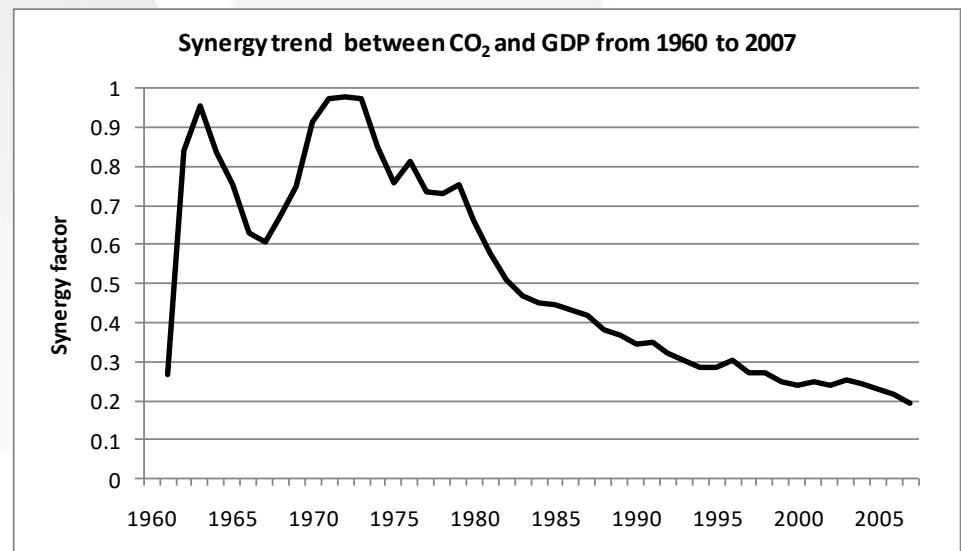
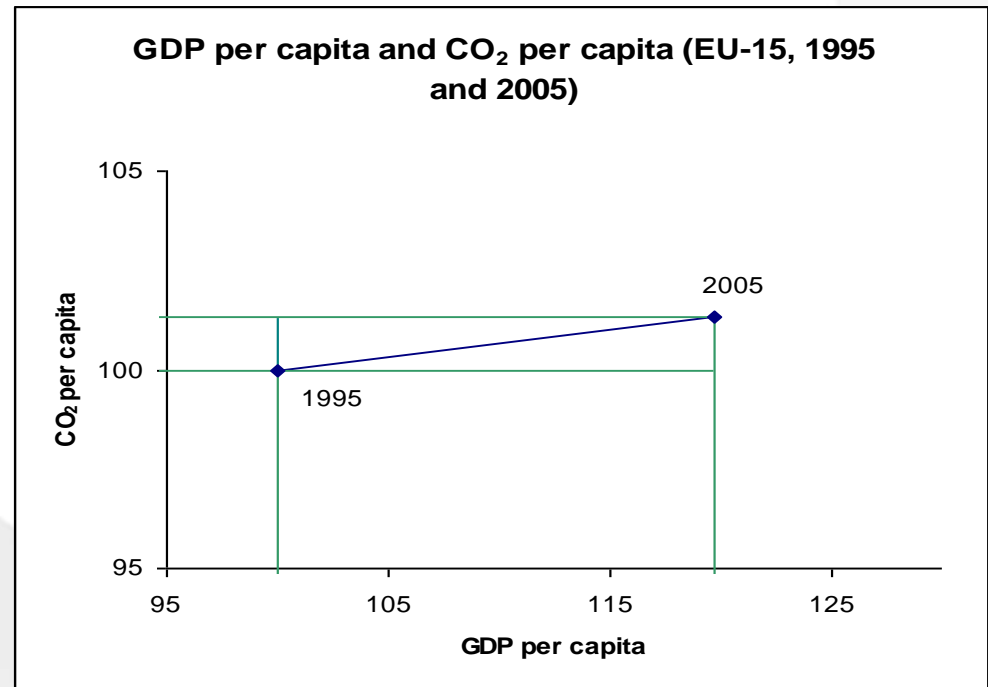


Example study of synergy

Example:
GDP and CO₂

WEAK SYNERGY

Longer time frame:

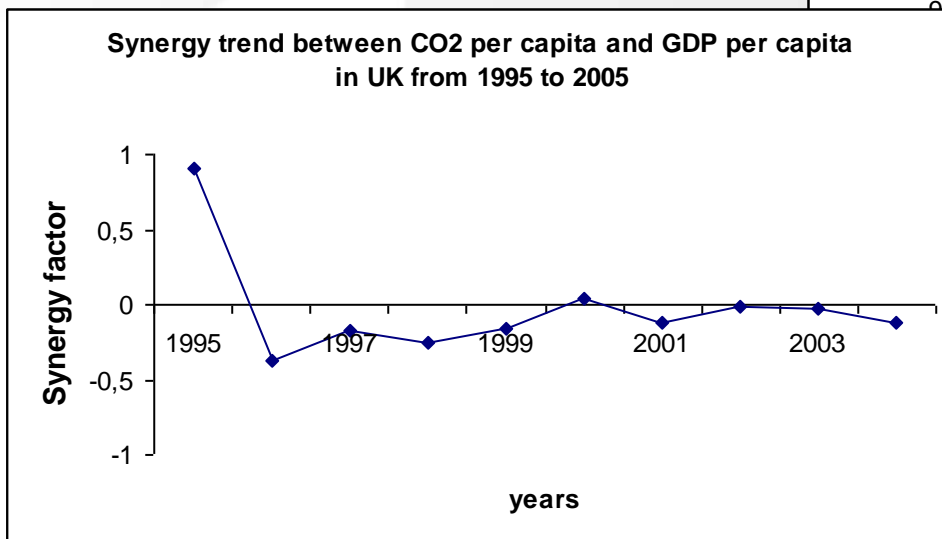
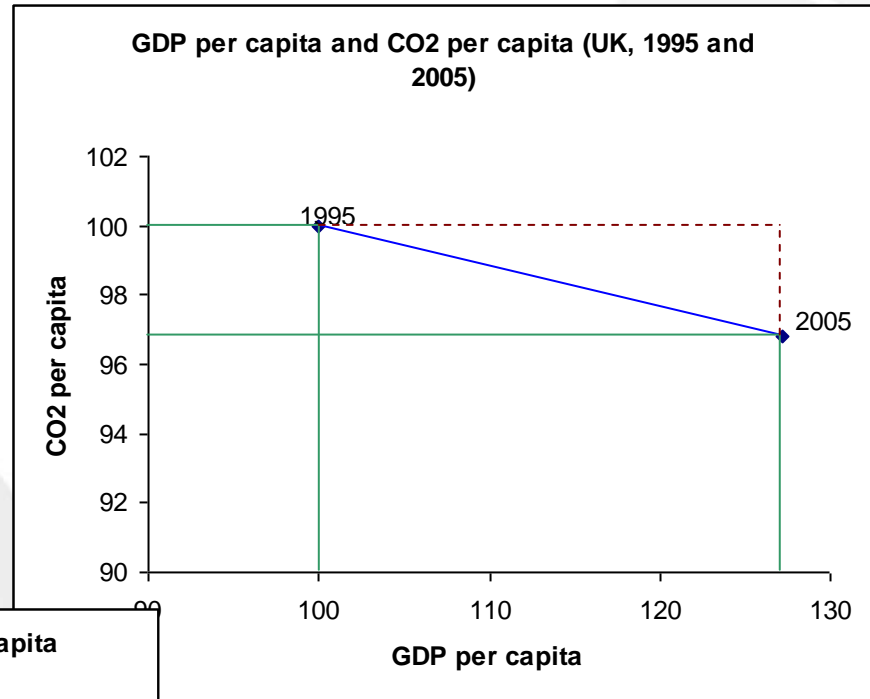


Example study of synergy

UK: GDP and CO₂

Trade-off

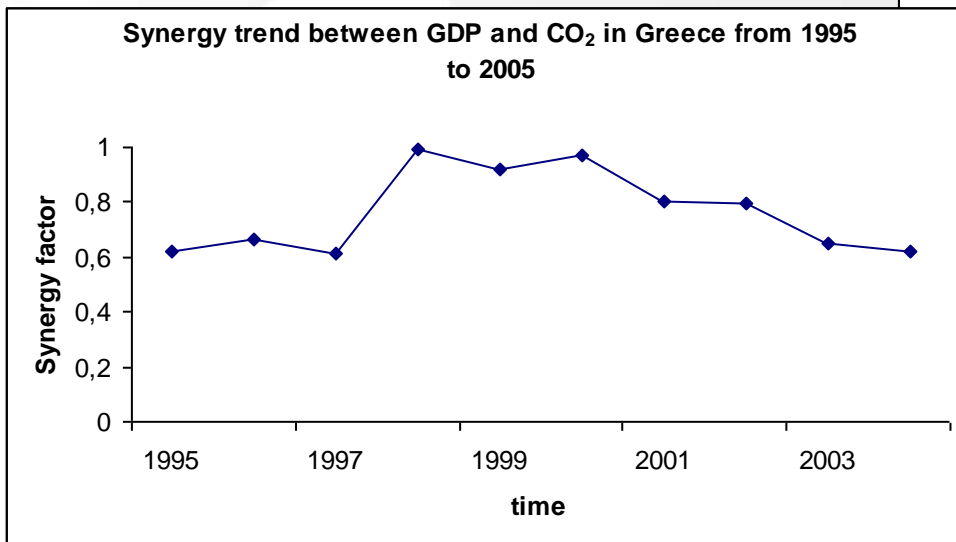
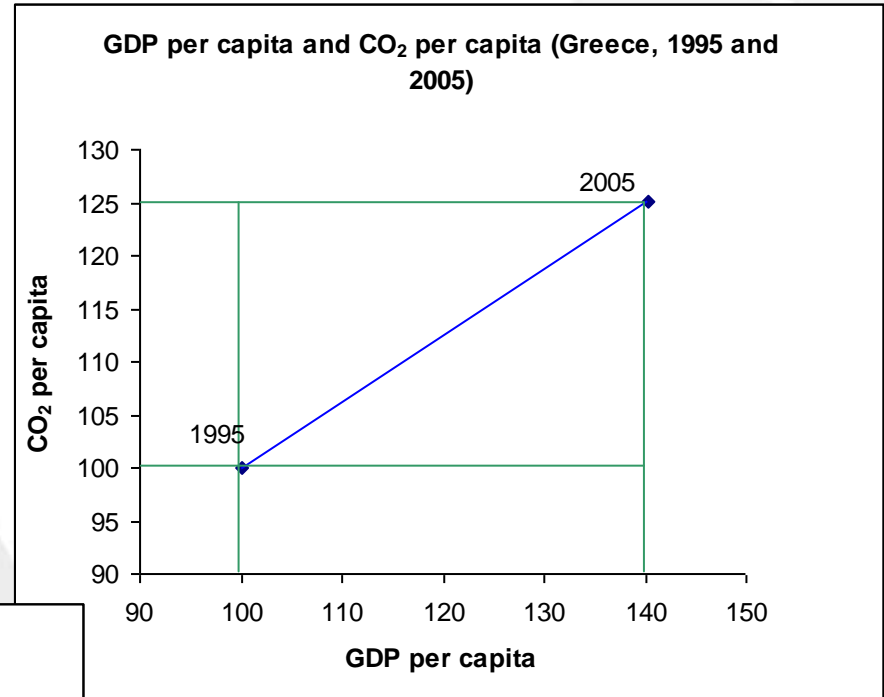
De-linking



Example study of synergy

Greece: GDP and CO₂

Strong synergy

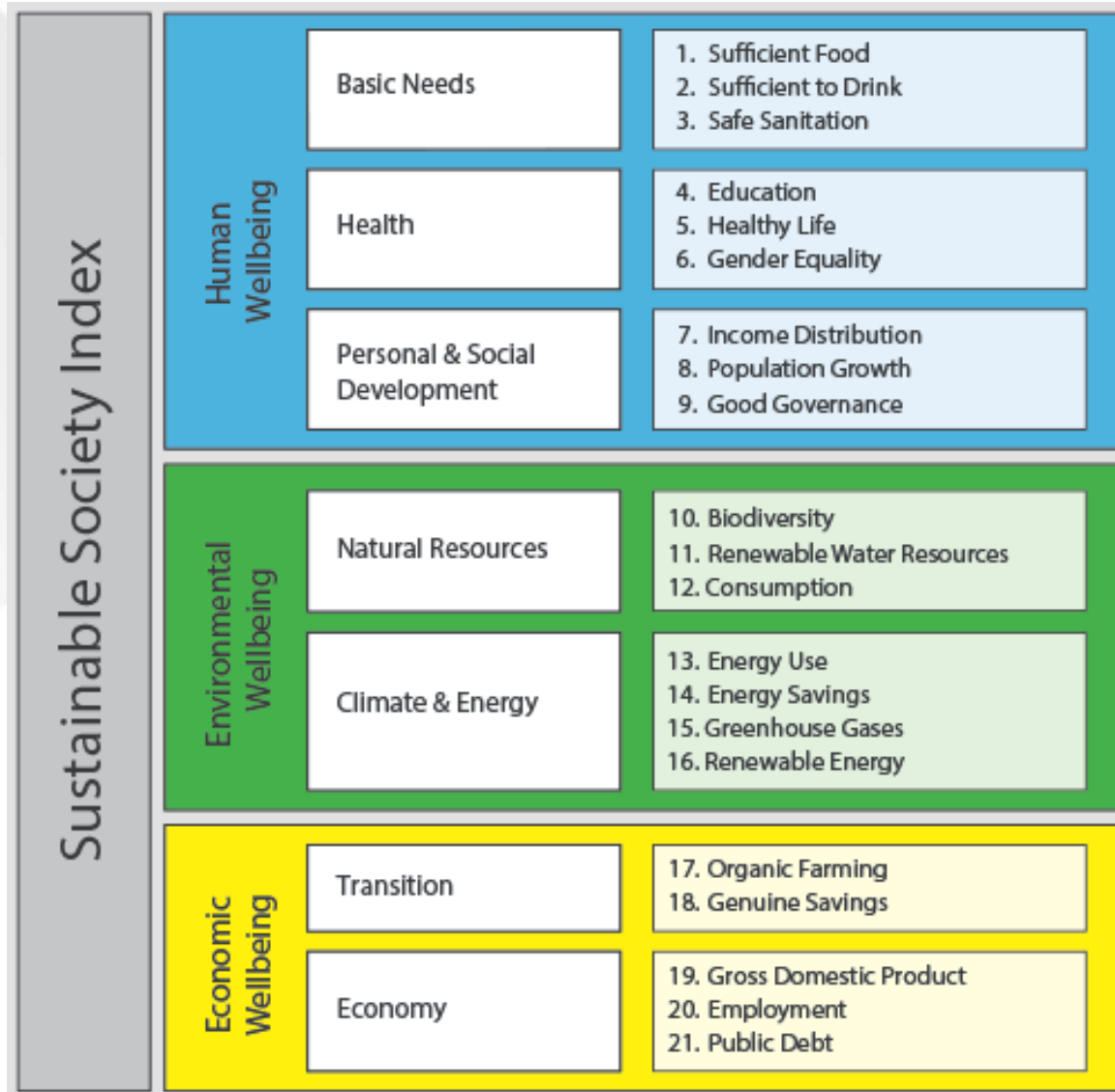


Analysis of synergy between **Fragile State Index** and **Sustainable Society Index**

- The **Fragile States Index** is an annual ranking of 178 nations based on their levels of stability and the pressures they face
 - highlights global political, economic and social pressures experienced by states
 - data from three primary sources is triangulated
 - twelve key political, social and economic indicators and over 100 sub-indicators
 - Fund for Peace

Sustainable Society Index

SSI



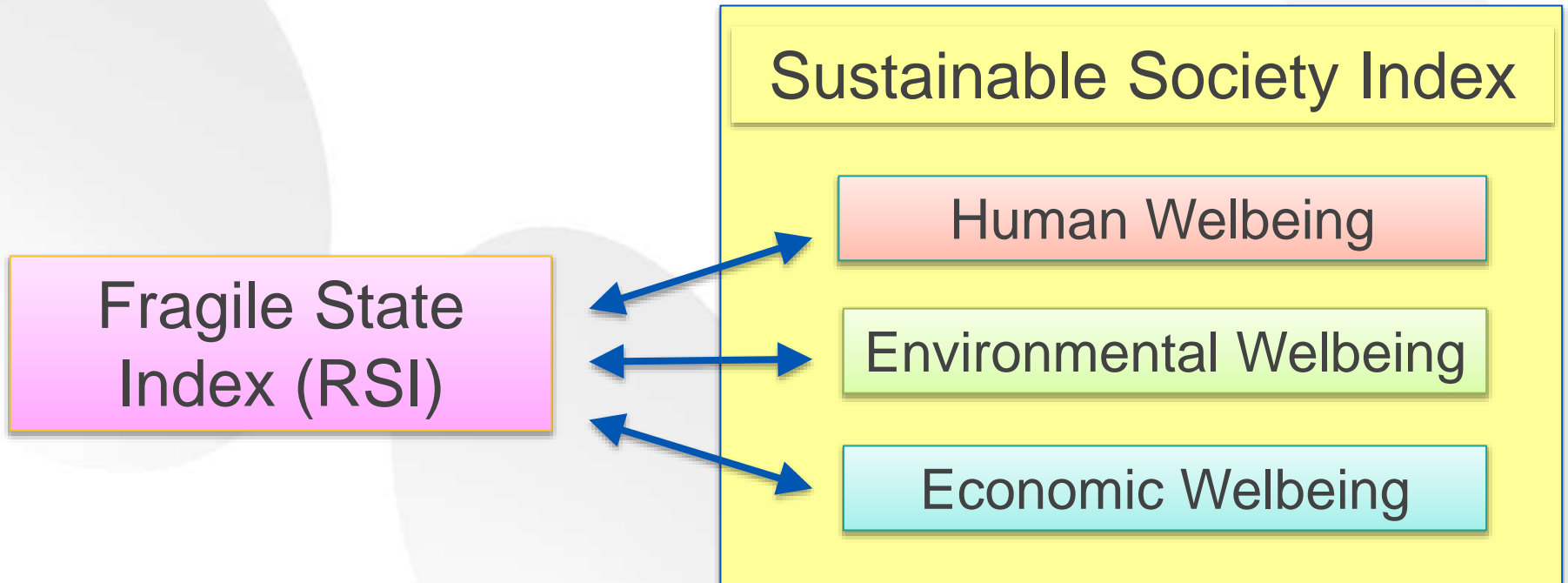
Synergy between Fragile State Index and Sustainable Society Index

- Fragile State Index (FSI) converted to Robust State Index (RSI) using

$$RSI = 140 - FSI$$

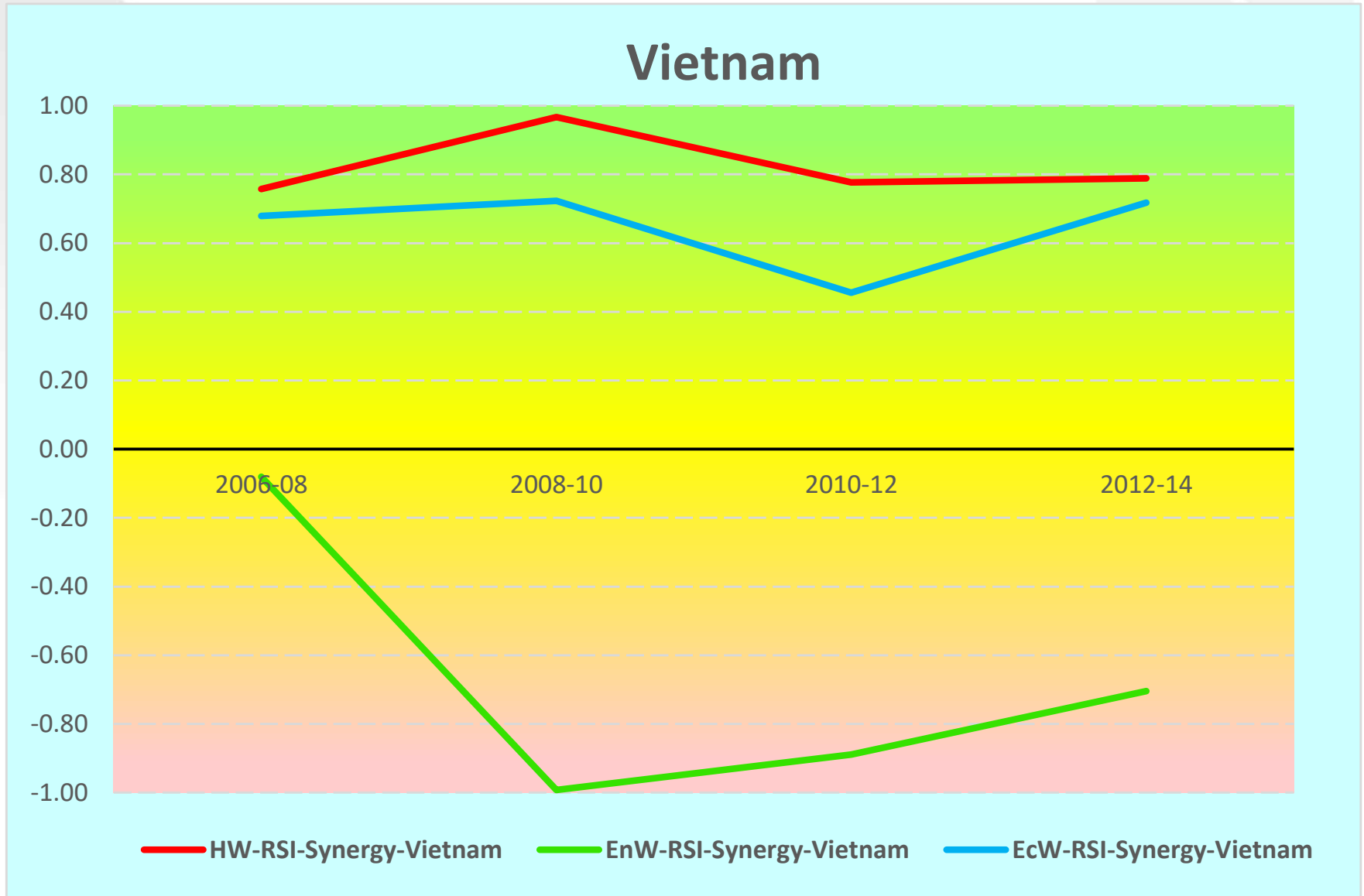
- Increase in RSI is positive
- Increase in SSI is positive

Synergy between



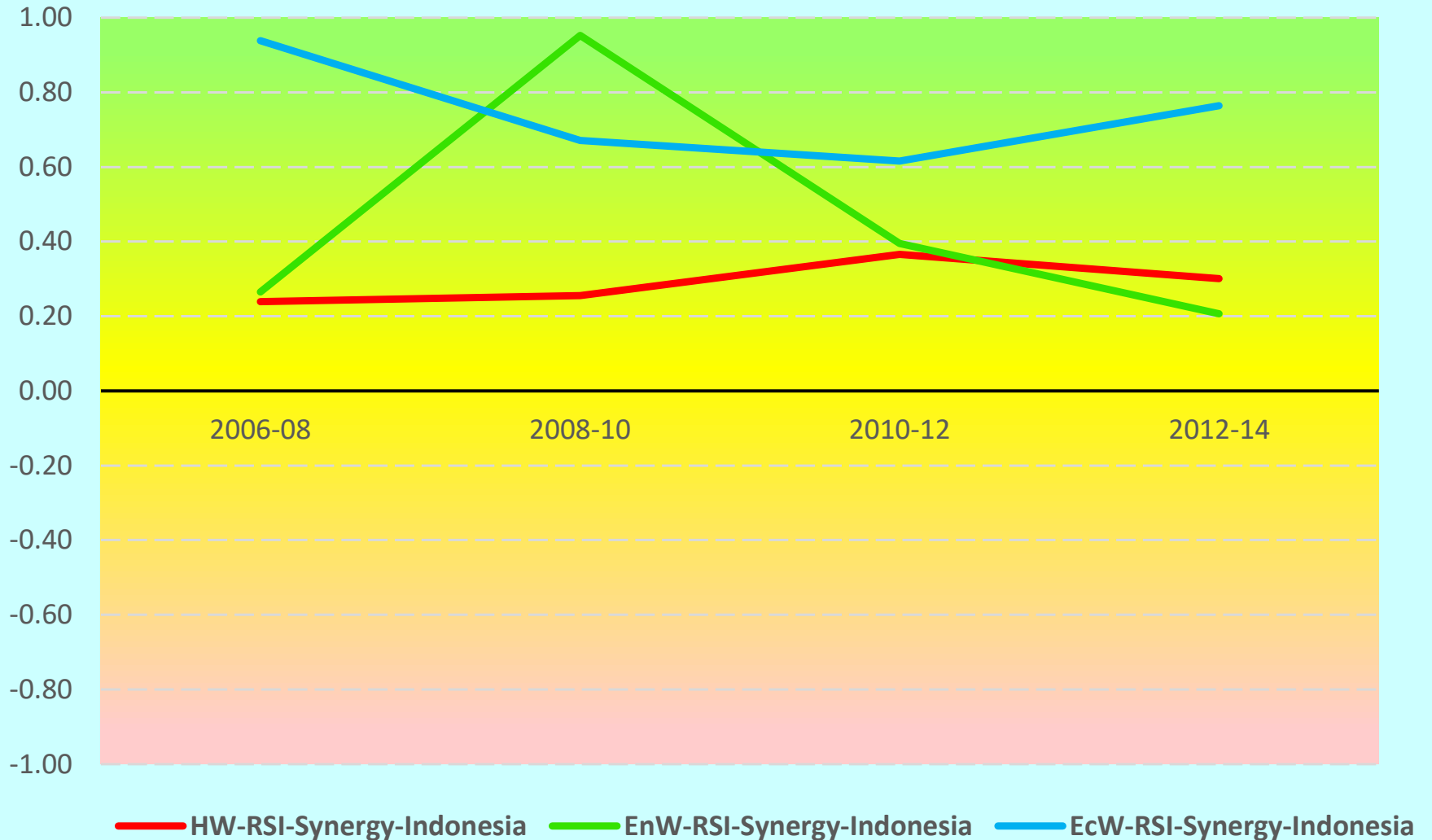
Index used was "inverse" of FSI
Robust State Index

Case study of Vietnam

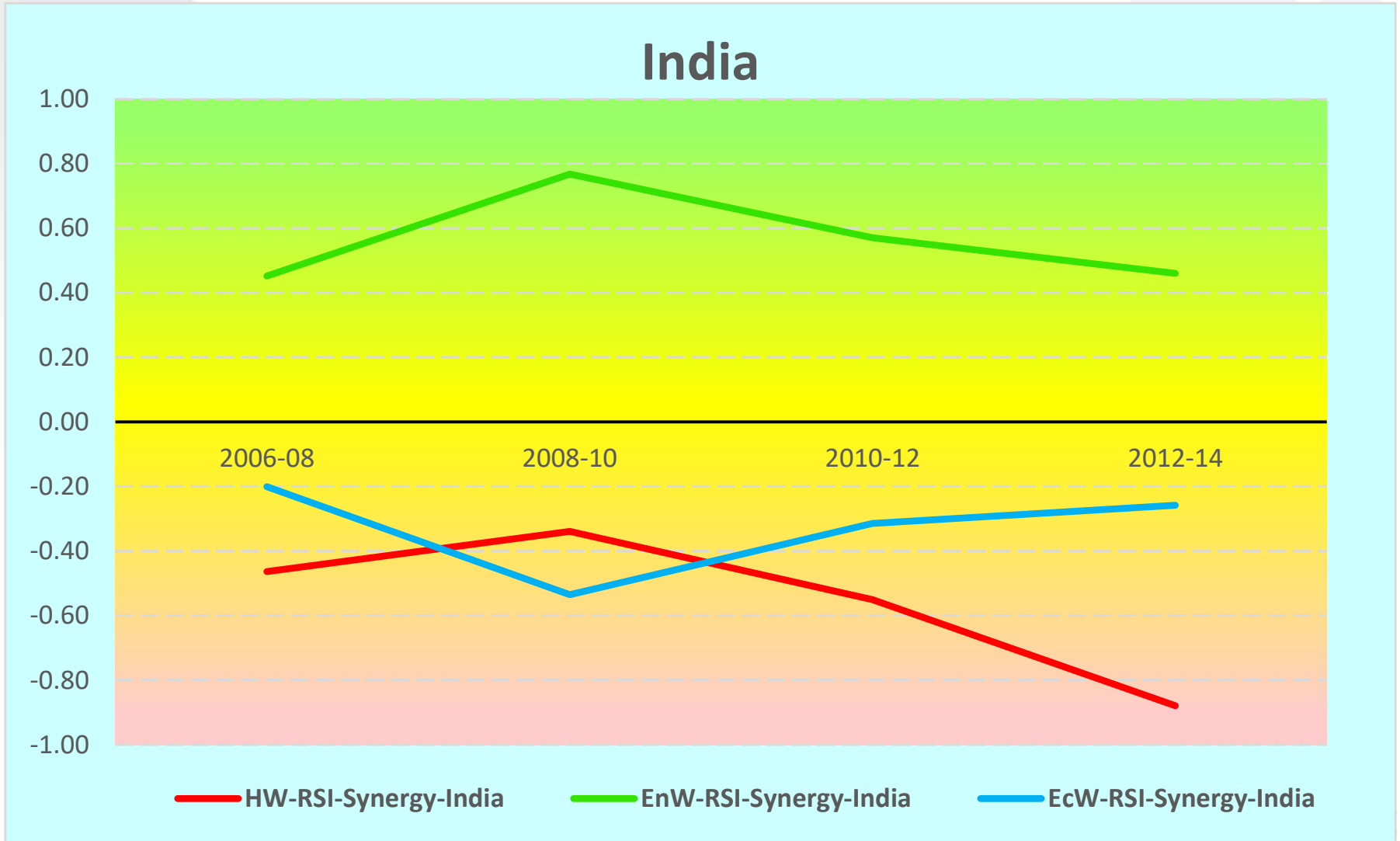


Case study of Indonesia

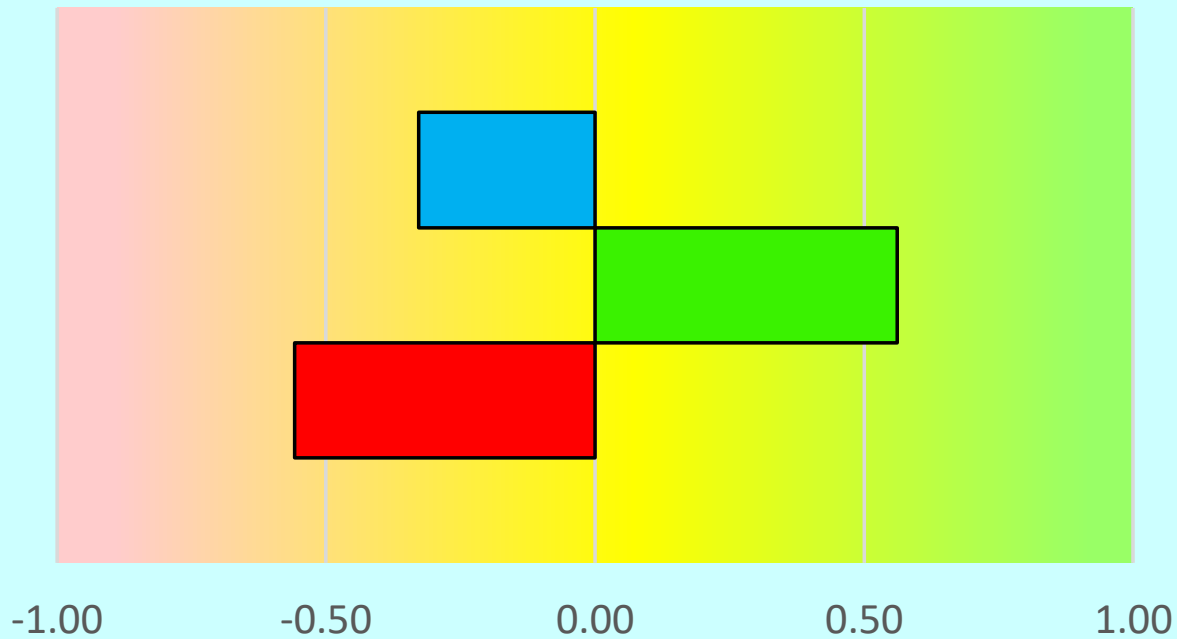
Indonesia



Case study of India



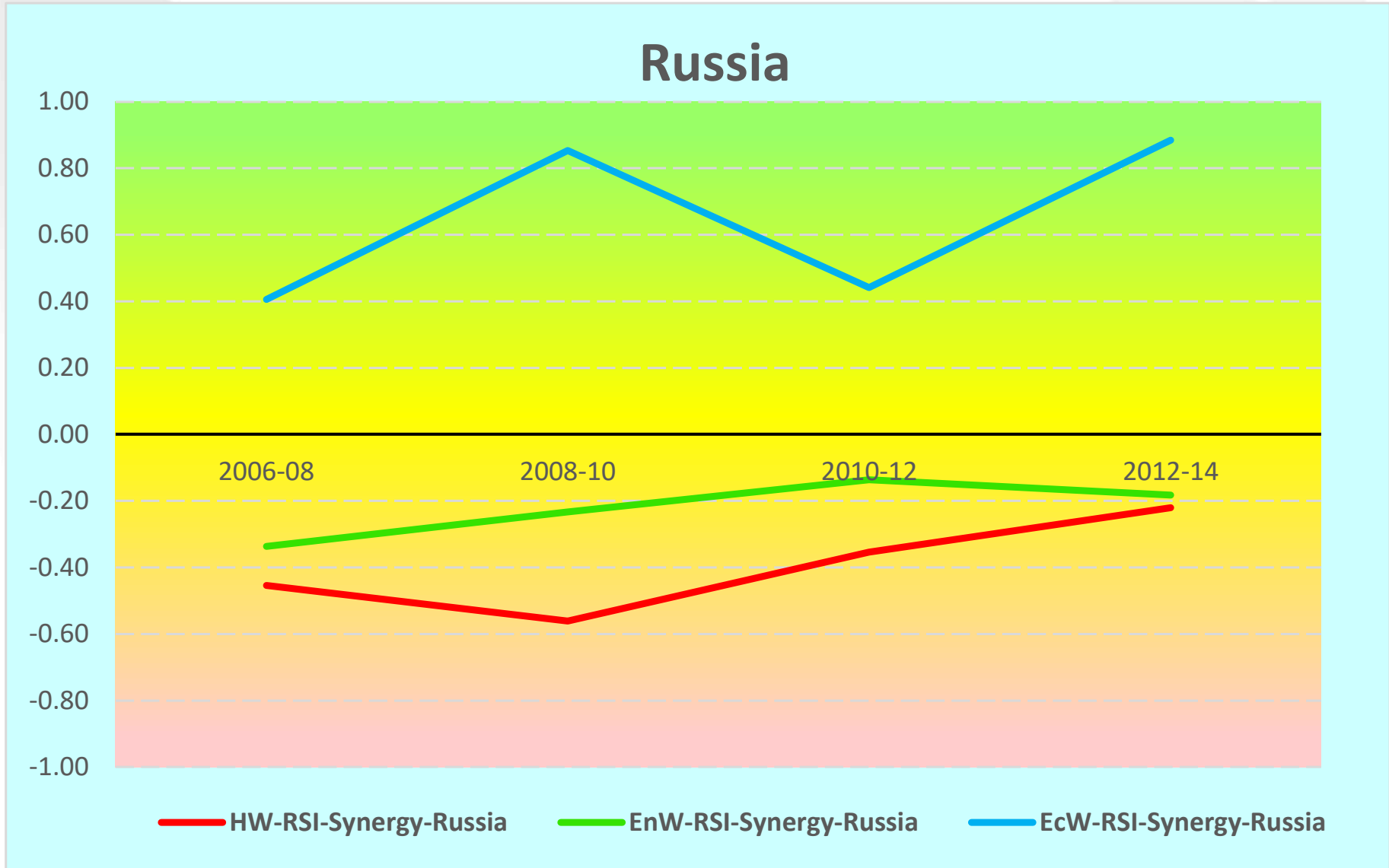
Case study of India



Average India

- EcW-RSI-Synergy-India
- EnW-RSI-Synergy-India
- HW-RSI-Synergy-India

Case study of Russia



Conclusions

- The new quantitative synergy assessment method provides possibilities to analyse synergies, trade-offs and de-linking between trends
- Provides a tool to analyse trends of different dimensions of sustainable development
- Provides a basis for comparative policy analysis
- Provides a measure of **potential** synergy – does not indicate causality

Conclusions cont.

- Synergy method can be utilized for assessing wicked problems if suitable data is available
- Indicator data related to wicked, complex and interlinked issues, such as sustainability, is available, but often it is not possible to have long time series data
- The properties of data may be problematic: data should be "cumulative" - not annual change data

Thank you



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