Inter-linkages between the Bioeconomy concept and the SDGs:
Insights from the European Union and French cases

Bioeconomy and its trade-offs towards meeting the SDGs and the Paris Agreement

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Research questions and Methodology

R1- To which dimensions of SD does the 2018 EU Bioeconomy strategy contribute to?

R2- What are the points of synergies and conflicts between bioeconomy-related SDG targets?

Research questions and Methodology

R1- To which dimensions of SD does the 2018 EU Bioeconomy strategy contribute to?

Operational form of the 2018 EU bioeconomy strategy:

Framework for sustainability assessment:

The 2018 Action plan ⟷ The UN-SDGs

A1- The Action plan contributes to reaching:

53 SDG targets

distributed across **12/17 SDGs**

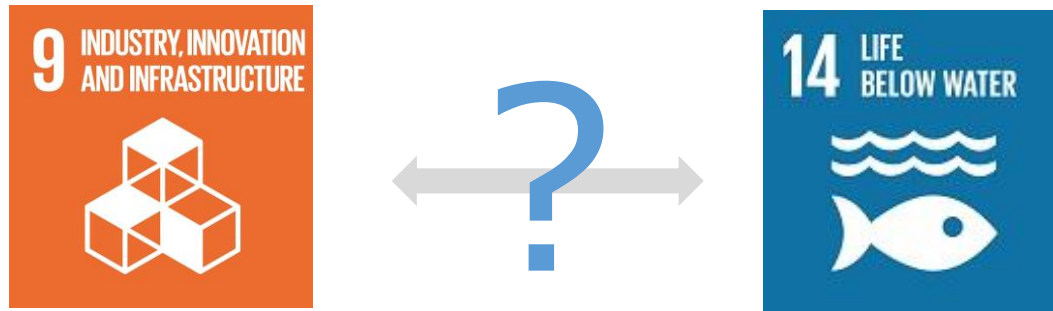**53** BE related **SDG indicators** (1990-2018)

0-9 indicator / SDG

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Research questions and Methodology

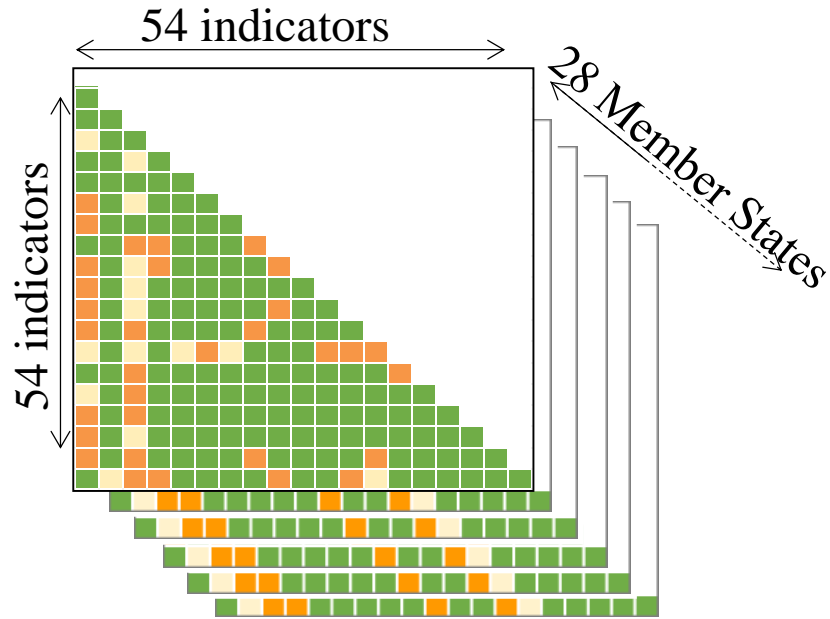**R2- What are the points of synergies and conflicts between bioeconomy-related SDG targets?**

- Ex-post statistical analysis: Spearman's correlation test
- Comparison of the EU and the French cases

Methodology R2. Correlation analysis

R2- What are the points of synergies and conflicts between bioeconomy-related SDG targets?

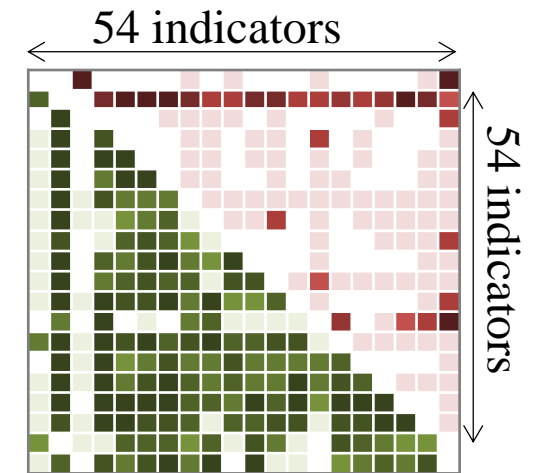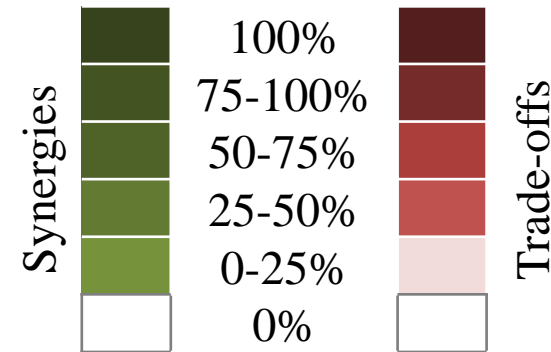**1- Spearman's correlation tests on 28 MS**

Significant **pair-wise correlations** (p-value <0.05) based on 3+ data points classified as:

- Synergy — if ρ > 0.6
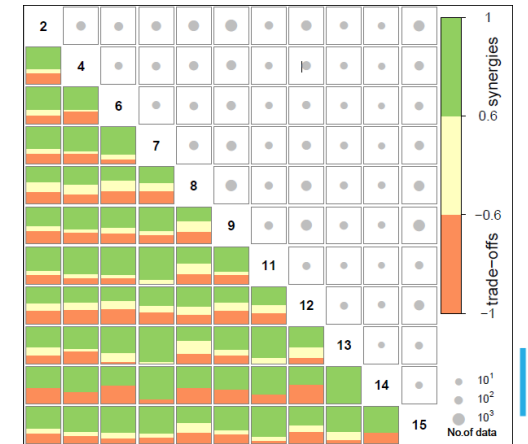- Not classified — if -0.6 ≤ ρ ≤ 0.6
- Trade-off — if ρ < -0.6

2- EU28 aggregates (%)

- At indicator level:

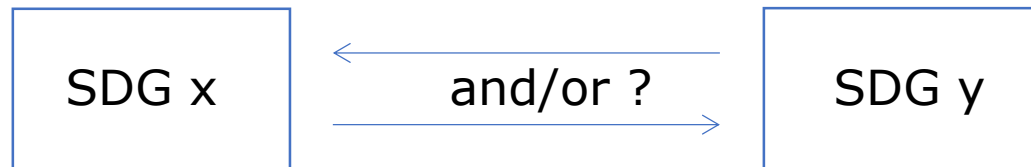| Synergies		Trade-offs
	100%	
	75-100%	
	50-75%	
	25-50%	
	0-25%	
	0%	

- At SDG level

- % Synergies
- % Not classified
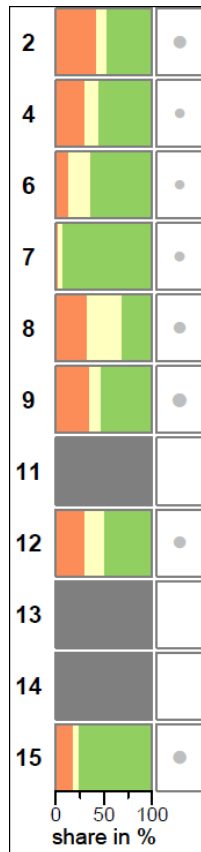- % Trade-offs
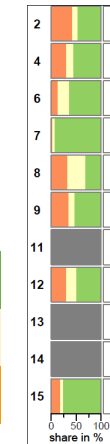
Limitations

Methodological limitations

- Quantitative methodology reduces subjectivity but conclusions influenced by data availability and quality

- Extra-national effects are not captured

- Granularity: Official SDG indicators do not capture dynamics in bio-based value chains

- Indication on the strength of the correlation (ρ) but not on the directionality of the relation

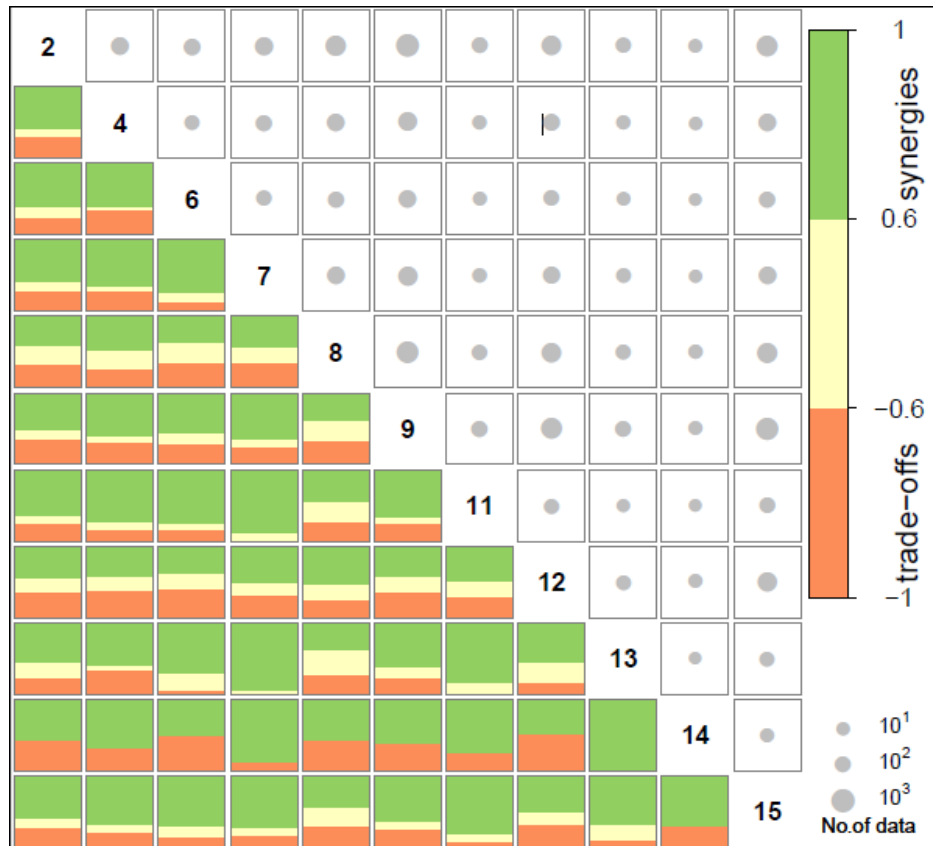| SDG x	and/or ?	SDG y

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Results R2 – European Union

R2- What are the points of synergies and conflicts between bioeconomy-related SDG targets?

Intra-SDGs   Inter-SDGs

A2- % SYN > % TO in 59/63 SDG pairs

➔ **Synergies largely dominate over trade-offs** (1990-2018)

Results R2 – European Union

R2- What are the points of synergies and conflicts between bioeconomy-related SDG targets?

Top 10 SDG pairs

Synergies	Rank	Trade-offs
7 AFFORDABLE AND CLEAN ENERGY — 13 CLIMATE ACTION	1	14 LIFE BELOW WATER — 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
7 AFFORDABLE AND CLEAN ENERGY — 7 AFFORDABLE AND CLEAN ENERGY	2	2 ZERO HUNGER — 2 ZERO HUNGER
7 AFFORDABLE AND CLEAN ENERGY — 11 SUSTAINABLE CITIES AND COMMUNITIES	3	6 CLEAN WATER AND SANITATION — 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
7 AFFORDABLE AND CLEAN ENERGY — 14 LIFE BELOW WATER	4	14 LIFE BELOW WATER — 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
11 SUSTAINABLE CITIES AND COMMUNITIES — 13 CLIMATE ACTION	5	14 LIFE BELOW WATER — 2 ZERO HUNGER
11 SUSTAINABLE CITIES AND COMMUNITIES — 15 LIFE ON LAND	6	14 LIFE BELOW WATER — 8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES — 6 CLEAN WATER AND SANITATION	7	6 CLEAN WATER AND SANITATION — 8 DECENT WORK AND ECONOMIC GROWTH
11 SUSTAINABLE CITIES AND COMMUNITIES — 4 QUALITY EDUCATION	8	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — 2 ZERO HUNGER
7 AFFORDABLE AND CLEAN ENERGY — 6 CLEAN WATER AND SANITATION	9	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE — 12 RESPONSIBLE CONSUMPTION AND PRODUCTION
15 LIFE ON LAND — 15 LIFE ON LAND	10	7 AFFORDABLE AND CLEAN ENERGY — 8 DECENT WORK AND ECONOMIC GROWTH

*Correlations based on more than 10 significant correlations and more than 100 pairs of data pairs. It excludes SDG 13 x SDG 14 and SDG 6 x SDG 14

A2- **Synergies** concentrated with SDGs

SDG 7-**Clean energy**,

SGD 11-**Recycling**,

SDG 15-**Life on land.**

Trade-offs list more scattered
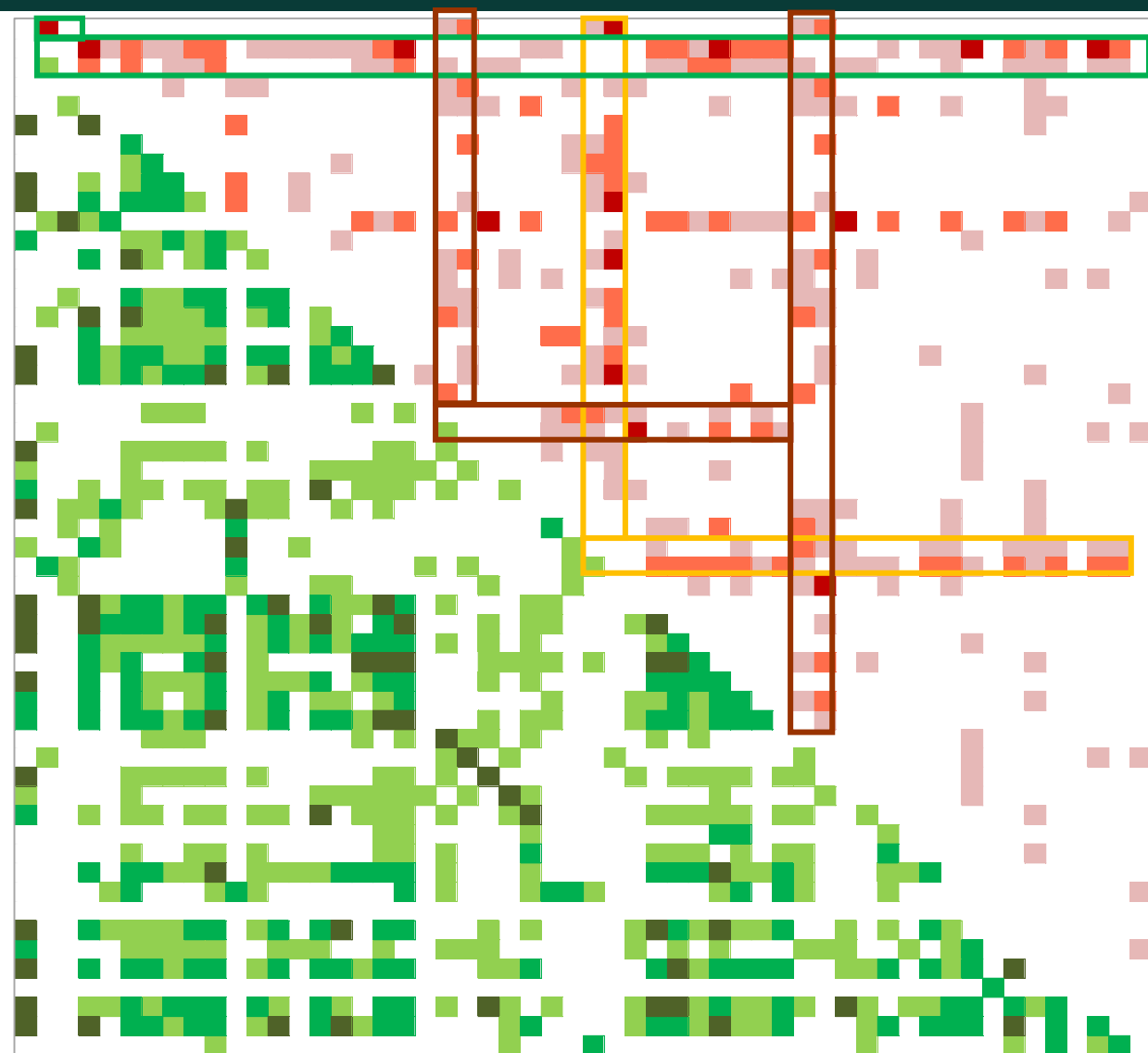
SDG 2-**Agriculture**,

SDG 9-**Industry**,

SDGs 8 and 12-**Material Consumption**

%TO>%SYN for only 2 SDG pairs

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Results R2 - EU   vs.   FR

Preliminary conclusions

Common features:

- Synergies dominate over trade-offs

  ➔ Maintenance of the wide range of EU policy instruments in place in these domains

    can bring many co-benefits

  ➔ Withdrawal of policy instruments

    might stop progress

    or entail the degradation of the targeted indicator and the ones associated with it

- Hotspot of trade-off: SDG 9-**Industry** *(intrinsic challenge?)*

  % Manufacturing value added in GDP & % Manufacturing jobs in total jobs

    ➔ Technical and technological innovations

    ➔ Integration of circular and 'cascading principles'

Preliminary conclusions

Distinct hotspots of trade-offs:

Specific **EU** trade-offs *(FR strength?)*:

▪ SDG 2-**Agriculture**

Agro-biodiversity at risk

Agriculture orientation index

▪ SDGs 8 and 12-**Biomass Consumption**

DMC wood and DMC crop residues

- Change in practices
- Technical and technological innovations
- Integration of circular and 'cascading principles'
- Change in Europeans' consumption behaviour

Specific **FR** trade-offs *(FR weaknesses)*:

▪ SDG 4-**Quality education**

Employment rates of recent graduates

▪ SDG 8-**Decent work**

Long-term unemployment rate

- Labour policies
- Economic orientations (decoupling labour market dynamics with social and env. pressures)

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Thank you for your attention!

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