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SUSTAINABLE
RESILIENT
EU FARMING
SYSTEMS



Participatory assessment of sustainability and resilience of EU farming systems.

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173rd EAAE-seminar

26 September 2019

Bucharest, Roumania

Organizations: 1: Plant Production Systems, Wageningen University, the Netherlands; 2: Business Economics, Wageningen University, the Netherlands; 3: UMR SADAPT, INRA, AgroParisTech, Université Paris-Saclay, 75005, Paris, France; 4: Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Germany; 5: Research Centre for the Management of Agricultural and Environmental Risks (CEIGRAM), Universidad Politécnica de Madrid, Spain; 6: Agricultural and Farm Development, Institute for Agricultural and Fisheries Research (ILVO), Belgium; 7: Countryside and Community Research Institute, University of Gloucestershire, UK; 8: Institute of Agricultural Economics, Romania; 9: Institute of Rural and Agricultural Development, Polish Academy of Sciences, Poland; 10: Department of Economics, Sveriges Lantbruksuniversitet, Sweden; 11: Department of Natural Resources Economics, University of National and World Economy, Bulgaria; 12: Department of Agricultural and Forestry Sciences, Università degli Studi della Toscana, Italy

SURE-Farm framework

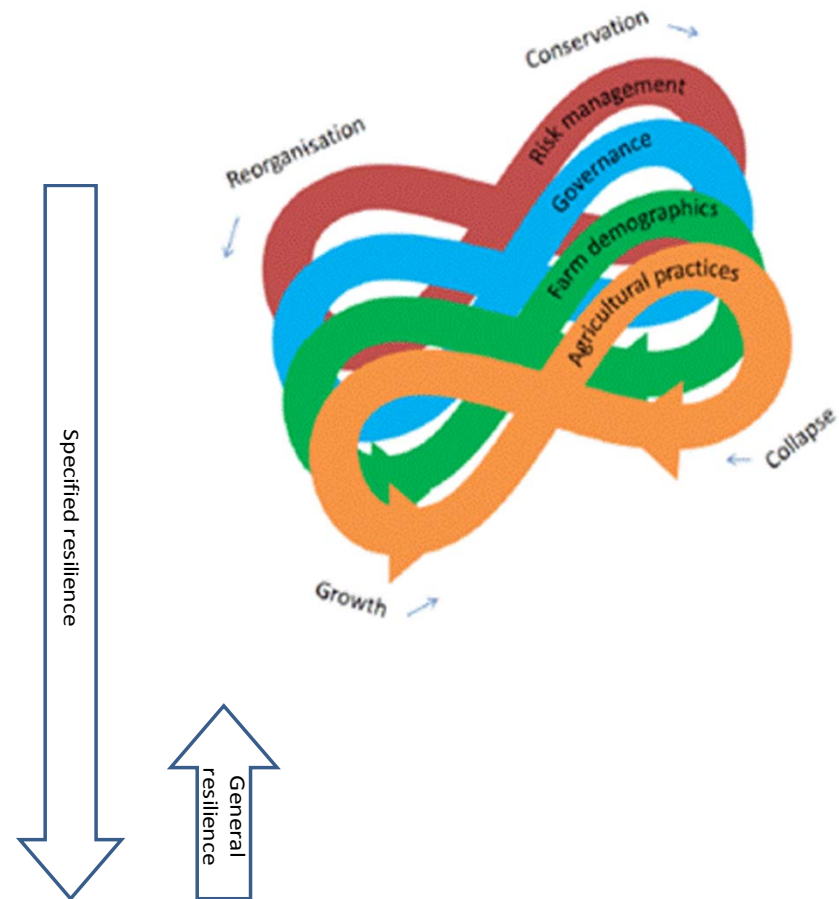
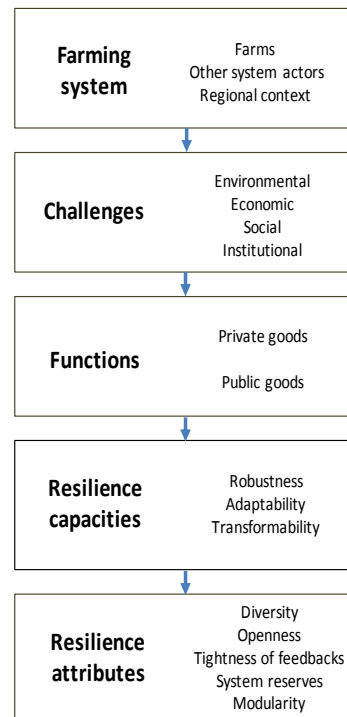
1. Resilience *of what?*

2. Resilience *to what?*

3. Resilience *for what purpose?*

4. What *resilience capacities?*

5. What *enhances* resilience?



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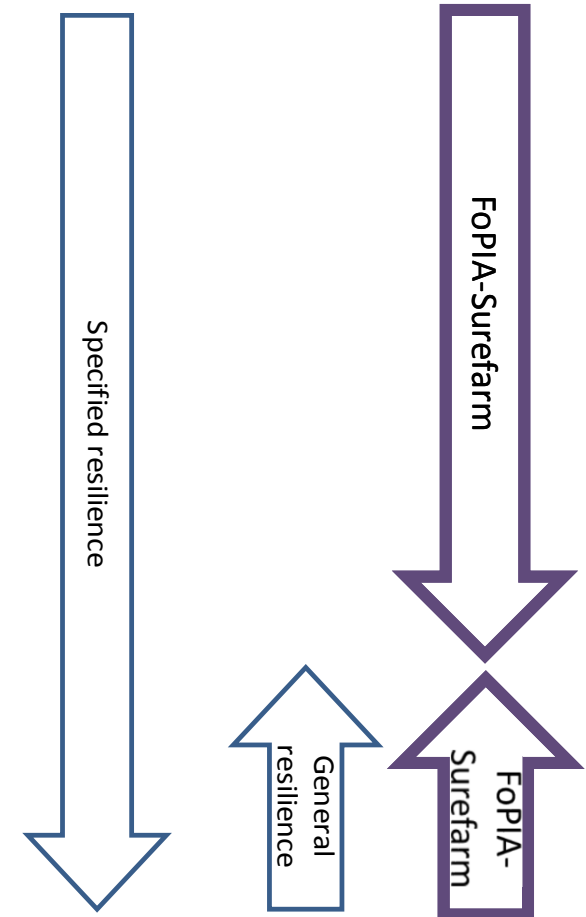
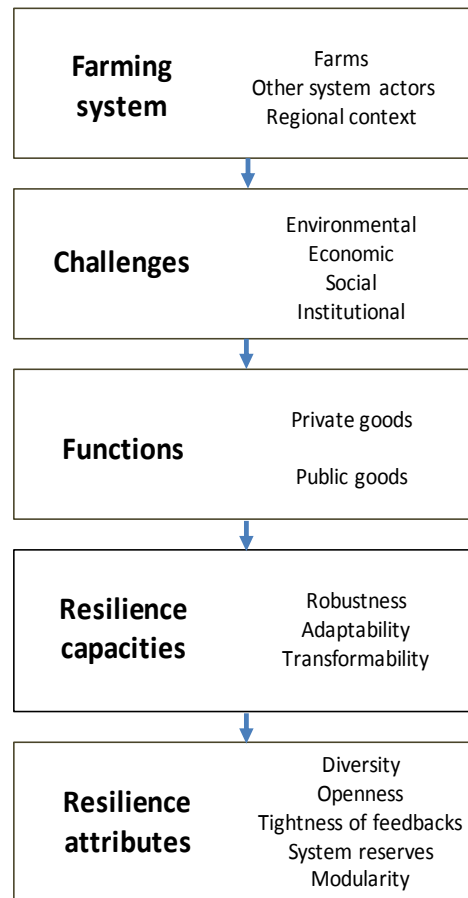


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What is the sustainability and resilience of EU farming systems?

1. Resilience *of what?*
2. Resilience *to what?*
3. Resilience *for what purpose?*
4. What *resilience capacities?*
5. What *enhances* resilience?



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Resilience capacities



a. Robustness



b. Adaptability



c. Transformability



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Workshops

Participants:

- Farmers, government, NGOs, industry
- 6-26 participants per CS
- Nov 2018-March 2019

Format:

- Individual forms
- Small group discussions
- Plenary discussions

Case study	Date workshop	Participants (#)
BE-dairy	27-11-18	16
BG-arable	11-01-2019	19
DE-arable&mixed	09-01-2019	12
ES-extensive livestock	31-01-2019	24
FR-extensive livestock	14-02-2019	26
IT-hazelnut	21-01-2019	21
NL-arable	11-12-2018	11
PO-horticulture	05-03-2019	20
RO-mixed	06-02-2019	14
SE-poultry	22-01-2019	6
UK-arable	16-01-2019	15



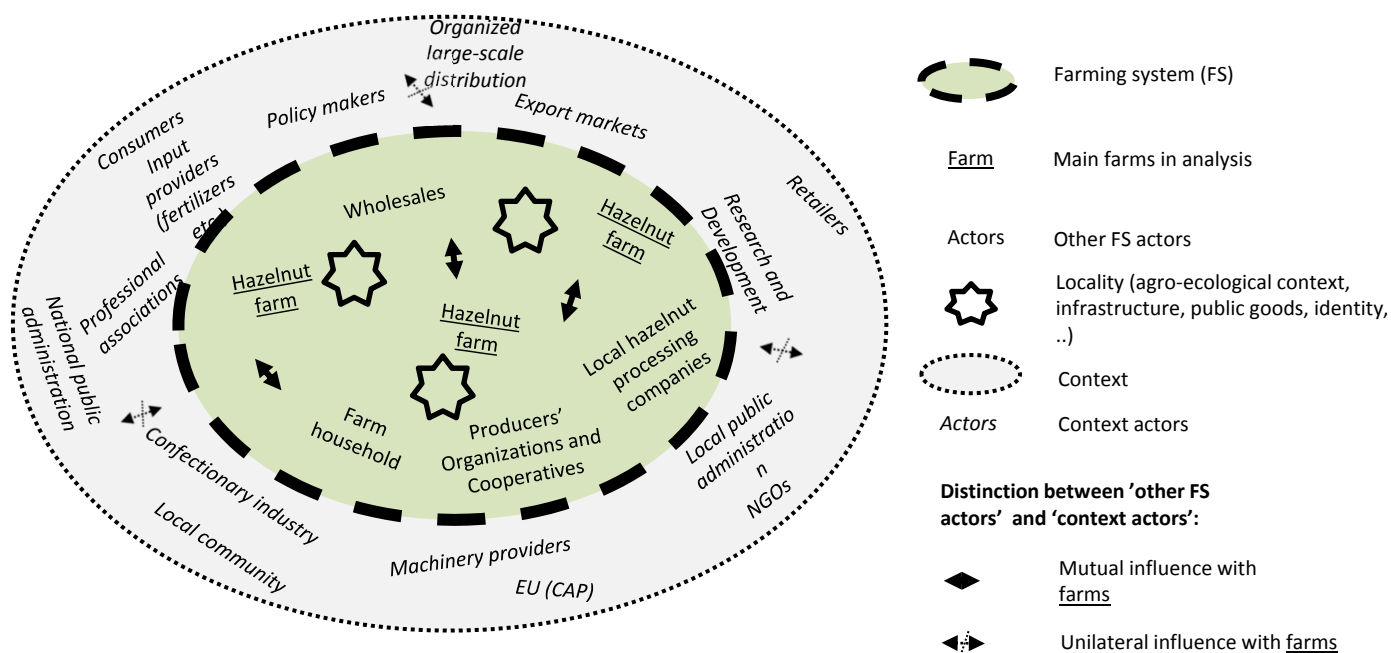
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Defining the farming system



Example from the case study IT-hazelnut



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Farming system functions

Farming system function	Indicators NL-starch potato
Deliver healthy and affordable food products (Food production)	Starch potato production (t/ha) Sugar beet production (t/ha) Cereal production (t/ha)
Deliver other bio-based resources for the processing sector (Bio-based resources)	Diversity of industrial potato products Straw production (t/ha) -
Ensure economic viability; viable farms help to strengthen the economy and contribute to balanced territorial development. (Economic viability)	Profit (Euro/ha) Income from agricultural activities (%) Land prices
Improve quality of life in farming areas by providing employment and offering decent working conditions. (Quality of life)	Working hours per year per farmer Employment related to agriculture Satisfaction of being a farmer Women working in agriculture (%)



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Farming system functions

Farming system function	Indicators NL-starch potato
Maintain natural resources in good condition (water, soil, air) (Natural resources)	Greenhouse gas emissions Soil quality Regional water availability Responsible use of nutrients
Protect biodiversity of habitats, genes, and species (Biodiversity & habitat)	Responsible use of crop protection products Number of bird species Surface of land with nature friendly management
Ensure that rural areas are attractive places for residence and tourism (countryside, social structures) (Attractiveness of the area)	Unhealthy stress under farmers Farms with broadened activities Villages with a minimum of one school and supermarket
Ensure animal health & welfare (Animal health & welfare)	Farms with certificates for animal welfare Responsible use of antibiotics



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Workshop activities (first part)

Activity	Format	Scoring
Delineating the social boundaries of the farming system	Plenary discussion	-
Feedback on list with representative indicators for system functions	Plenary discussion	-
Assessing function importance	Filling in a form individually	Divide 100 points over the eight functions
Assessing indicator representativeness per function	Filling in a form individually	Divide 100 points over the indicators per function
Assessing indicator performance	Filling in a form individually	Score from 1-5
Assessing function performance	Calculation	Weighted average of indicator scoring (weight being dependent on indicator representativeness)



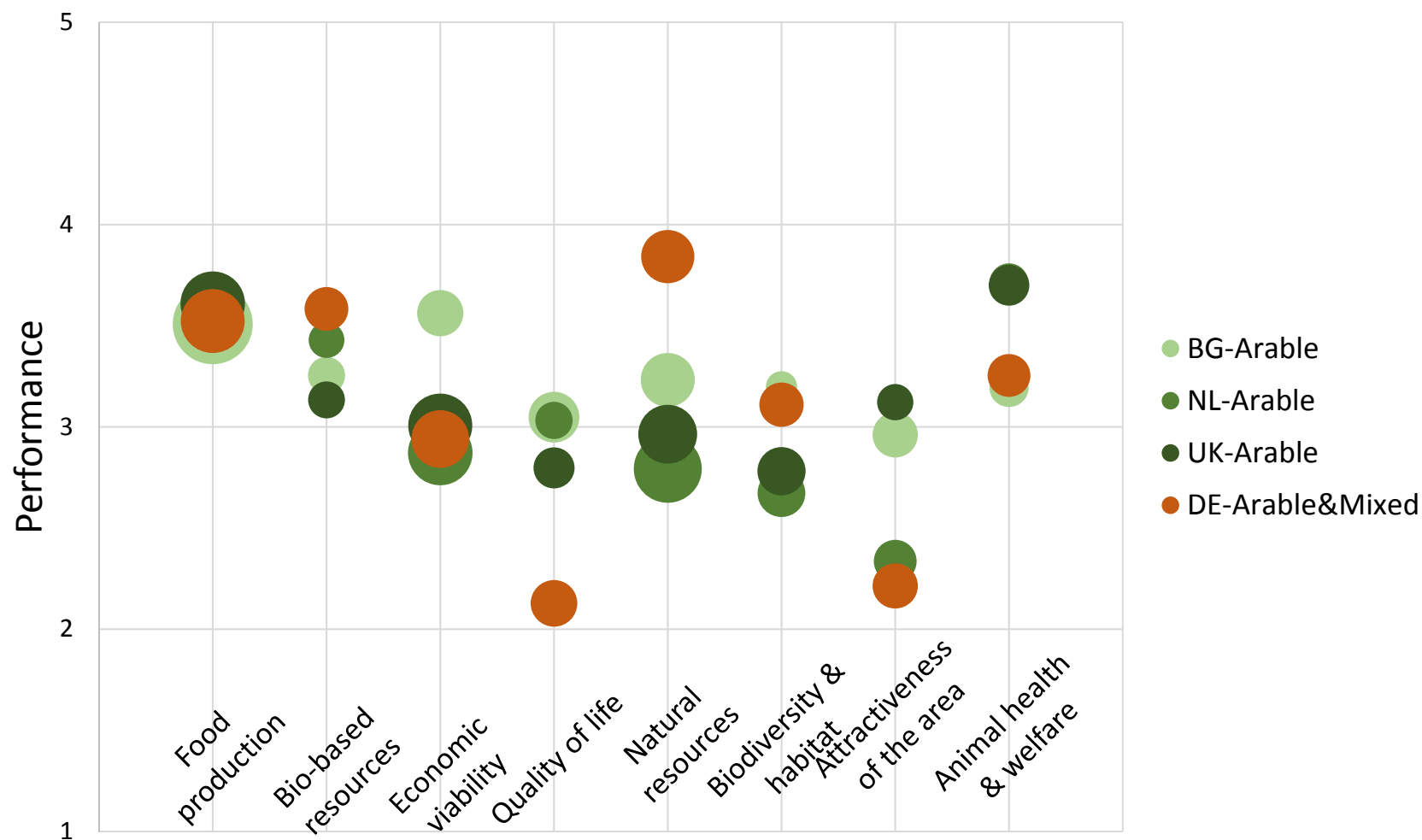
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Function importance & performance



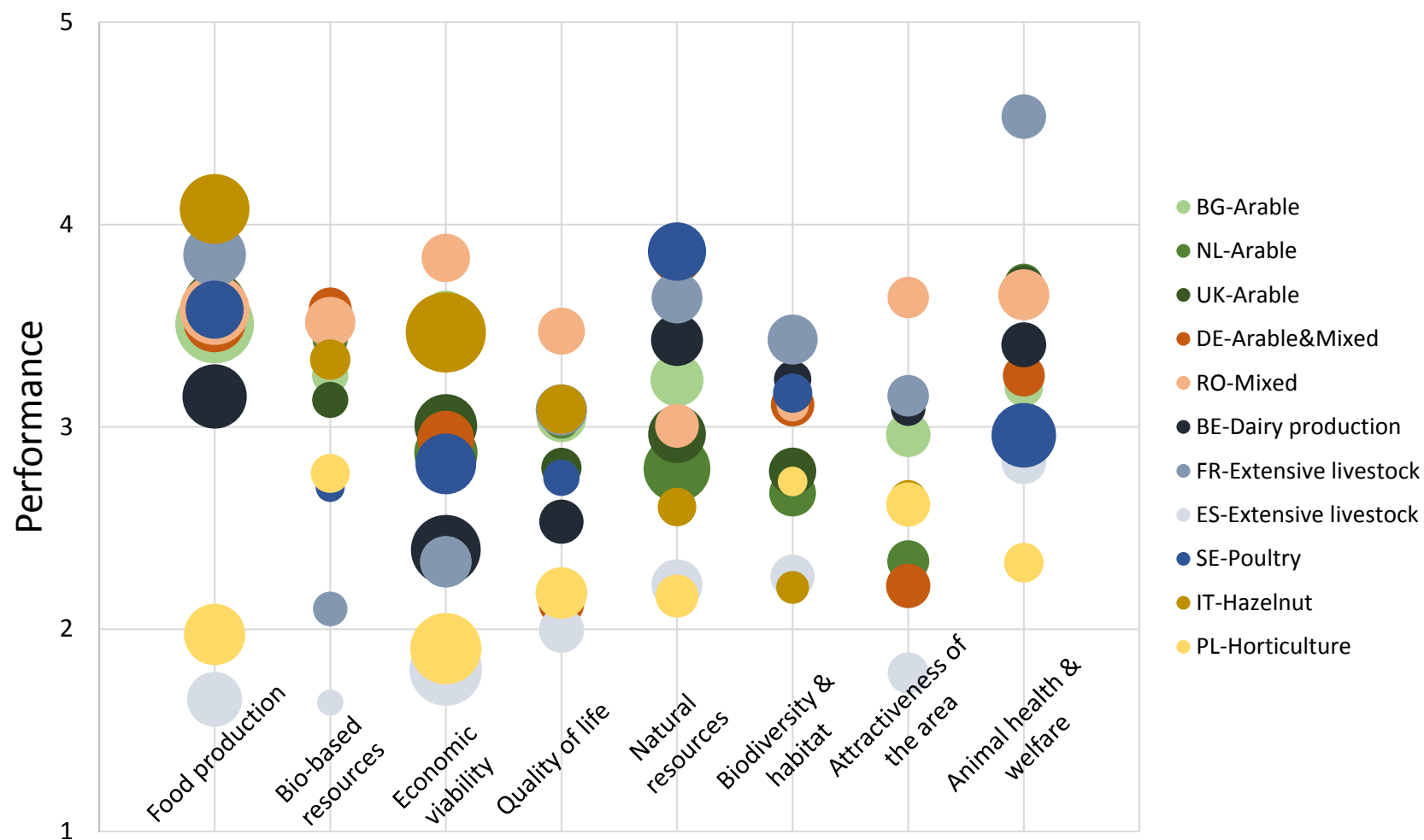
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Function importance & performance



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Workshop activities (second part)

Activity	Format	Scoring
Discussion indicator and function importance and performance	Plenary discussion	-
Selecting indicators for further analysis	Plenary discussion	-
Explanation of robustness, adaptability and transformability	Presentation	-
Sketching dynamics of selected indicators	Small groups	-
Identifying major challenges and strategies	Small groups	-



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Selection of indicators

Following importance of functions:

Farming system function	Number of indicators of which dynamics were discussed
Food production	7
Bio-based resources	0
Economic viability	10
Quality of life	2
Natural resources	4
Biodiversity & habitat	3
Attractiveness of the area	2
Animal health & welfare	1



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Sketching dynamics

Participants included:

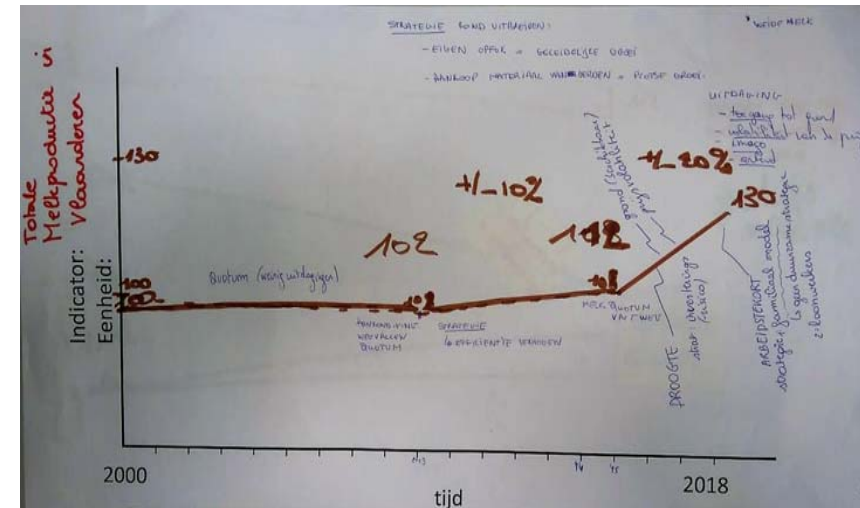
- Trends
- Major shocks and stresses
- Strategies

Participants included little:

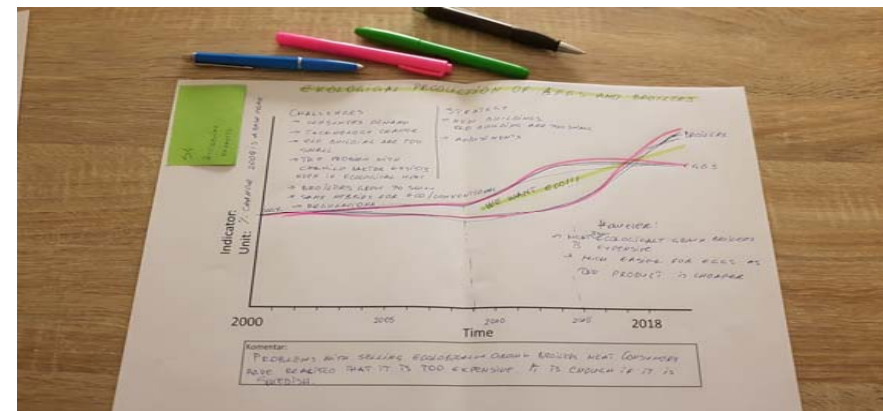
- Year to year variation

In general, main indicators looked robust,

But are they really?



Milk production (BE-dairy)



Organic egg production (SE-poultry)



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Strategies

General orientation of strategies:

- Making the system more profitable through: mechanisation, intensification, expansion, adding value
- Reflection: it seems that stakeholders prefer to
 - react to fast processes rather than slow processes.
 - keep control rather than to live with and adapt to change.



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Workshop activities (third part)

Activity	Format	Scoring
Assessing strategy implementation	Filling in a form individually	Score from 1-5 for implementation, <i>where 1: not to very poor, 2: poor, 3: moderate, 4: good , 5: perfect implementation.</i>
Assessing the contribution of strategies to robustness, adaptability and transformability	Filling in a form individually	Score from -3 to +3 for contribution, <i>where 0: no, 1: weak, 2: moderate, 3: strong contribution, and -: negative, +: positive contribution</i>
Assessing presence of resilience attributes	Filling in a form individually	Score from 1-5 for presence, <i>where 1: not to very poor, 2: poor, 3: moderate, 4: good , 5: perfect presence.</i>
Assessing the contribution of resilience attributes to robustness, adaptability and transformability	Filling in a form individually	Score from -3 to +3 for contribution, <i>where 0: no, 1: weak, 2: moderate, 3: strong contribution, and -: negative, +: positive contribution</i>



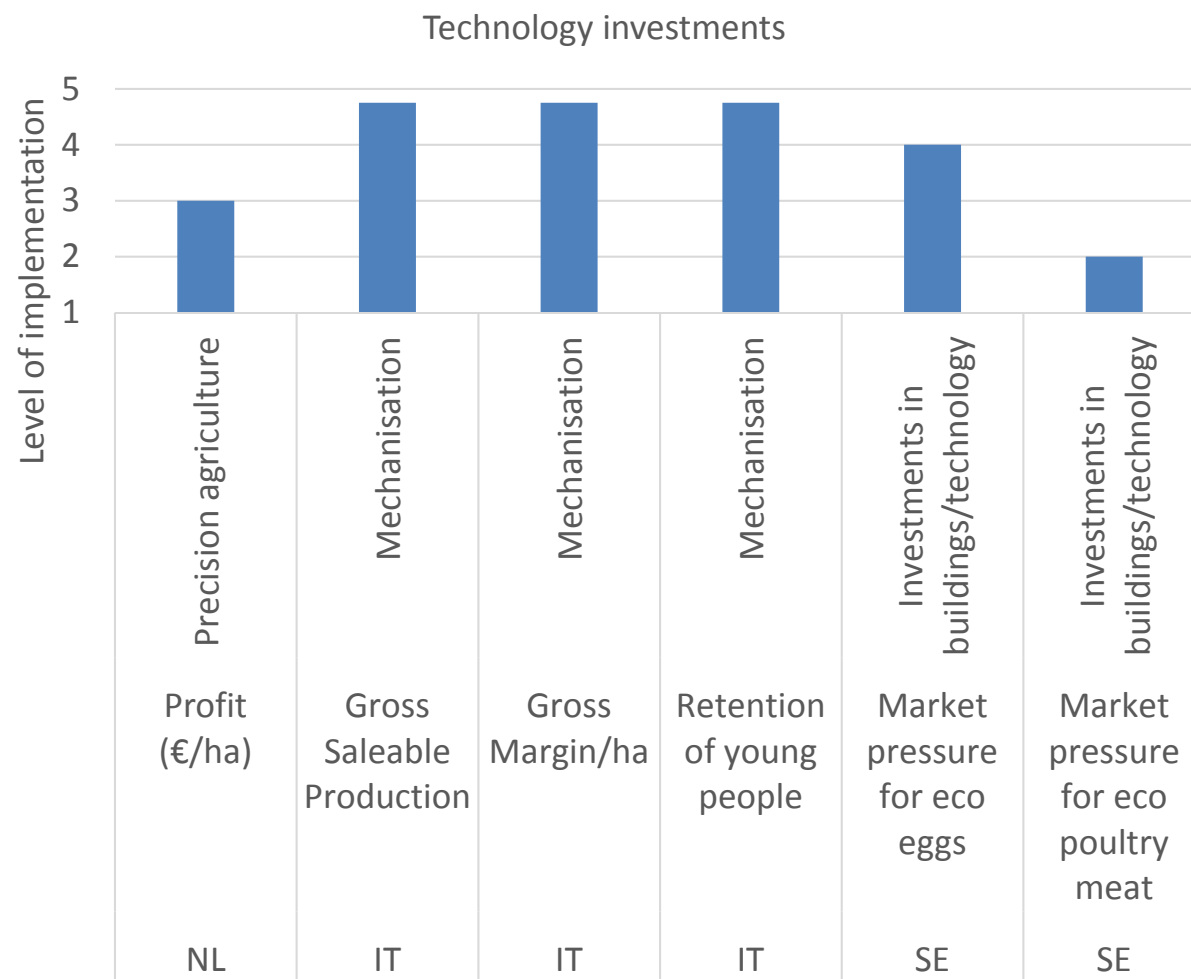
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Strategies (level of implementation)



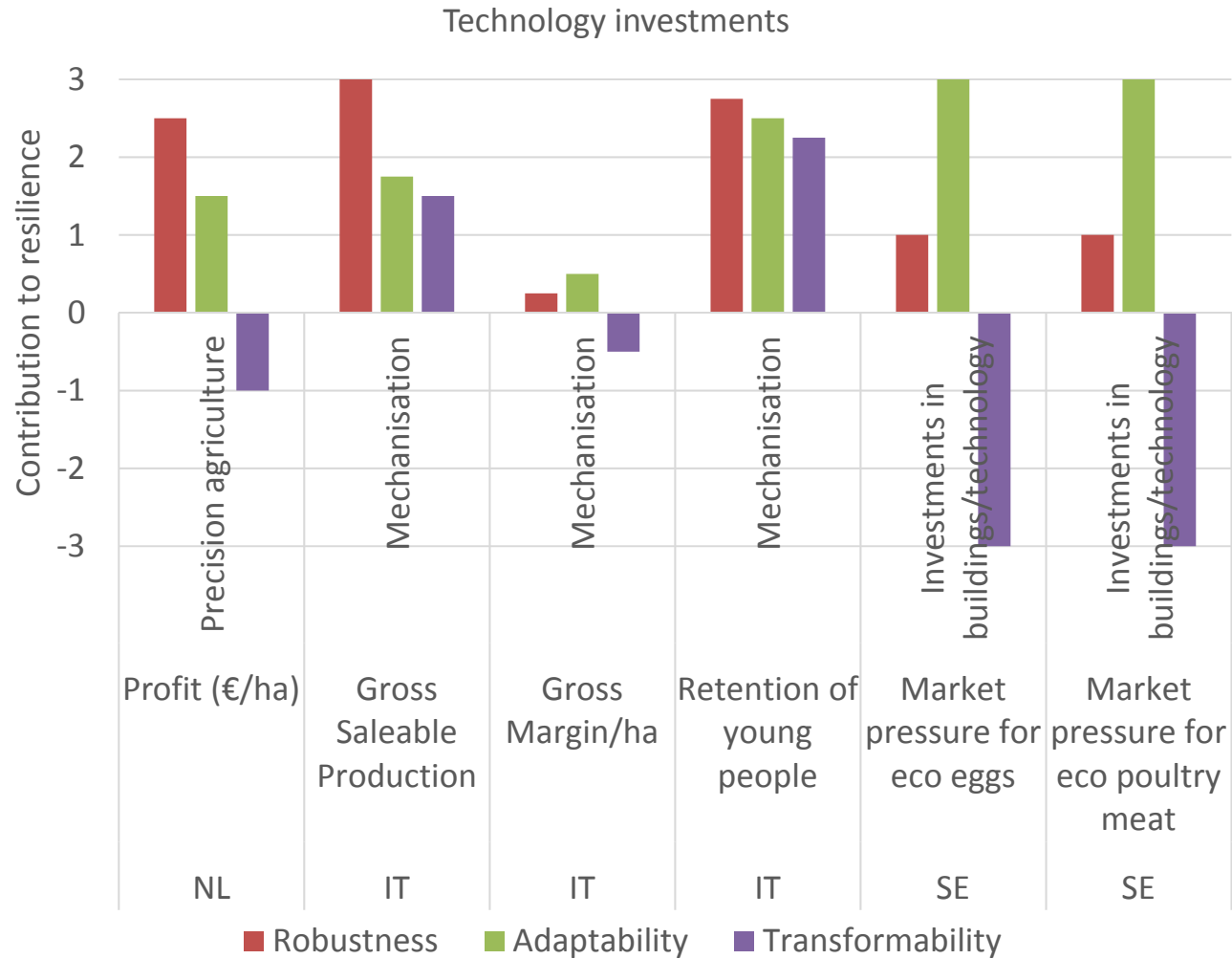
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Strategies (contribution to resilience capacities)



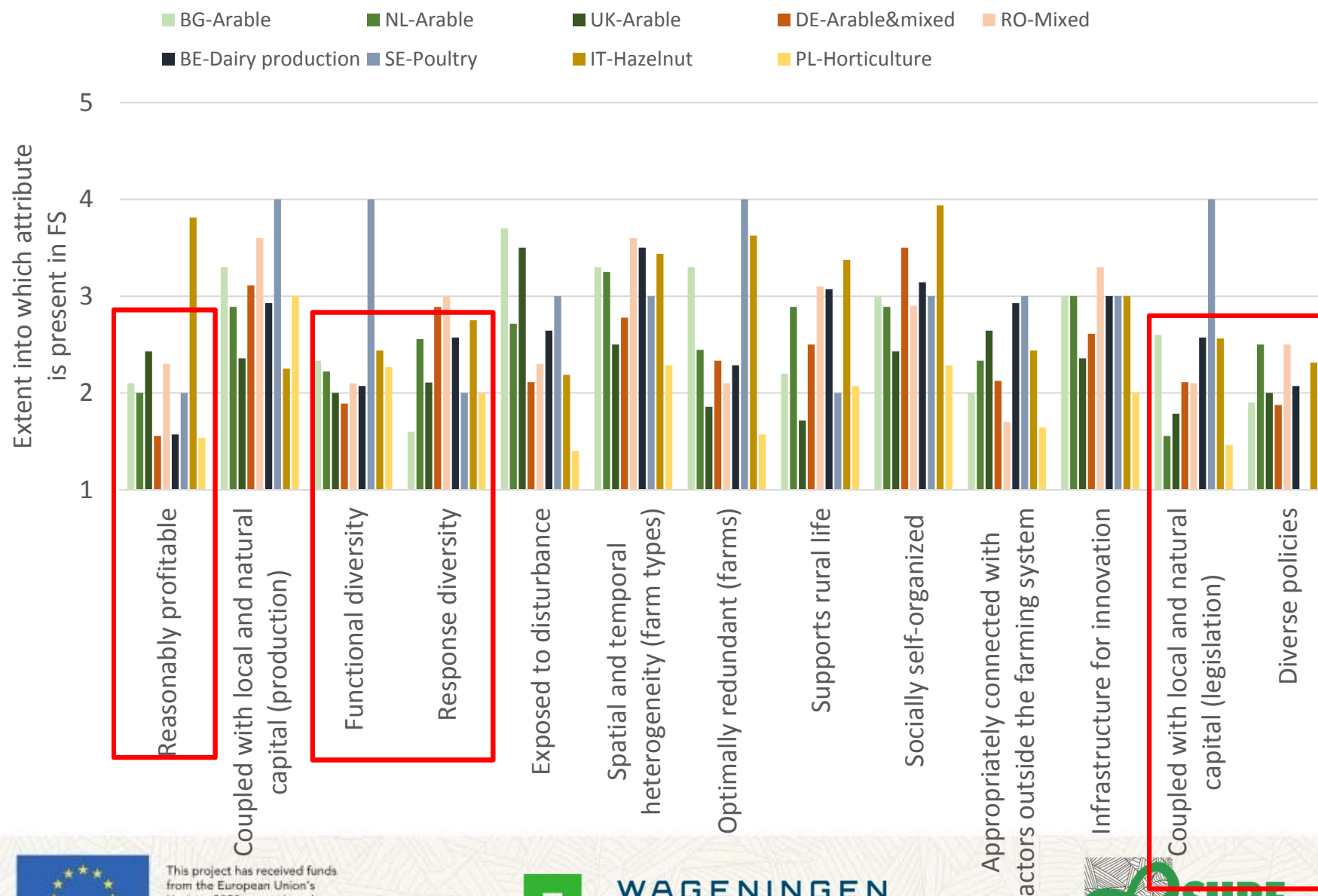
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Attributes (level of presence)



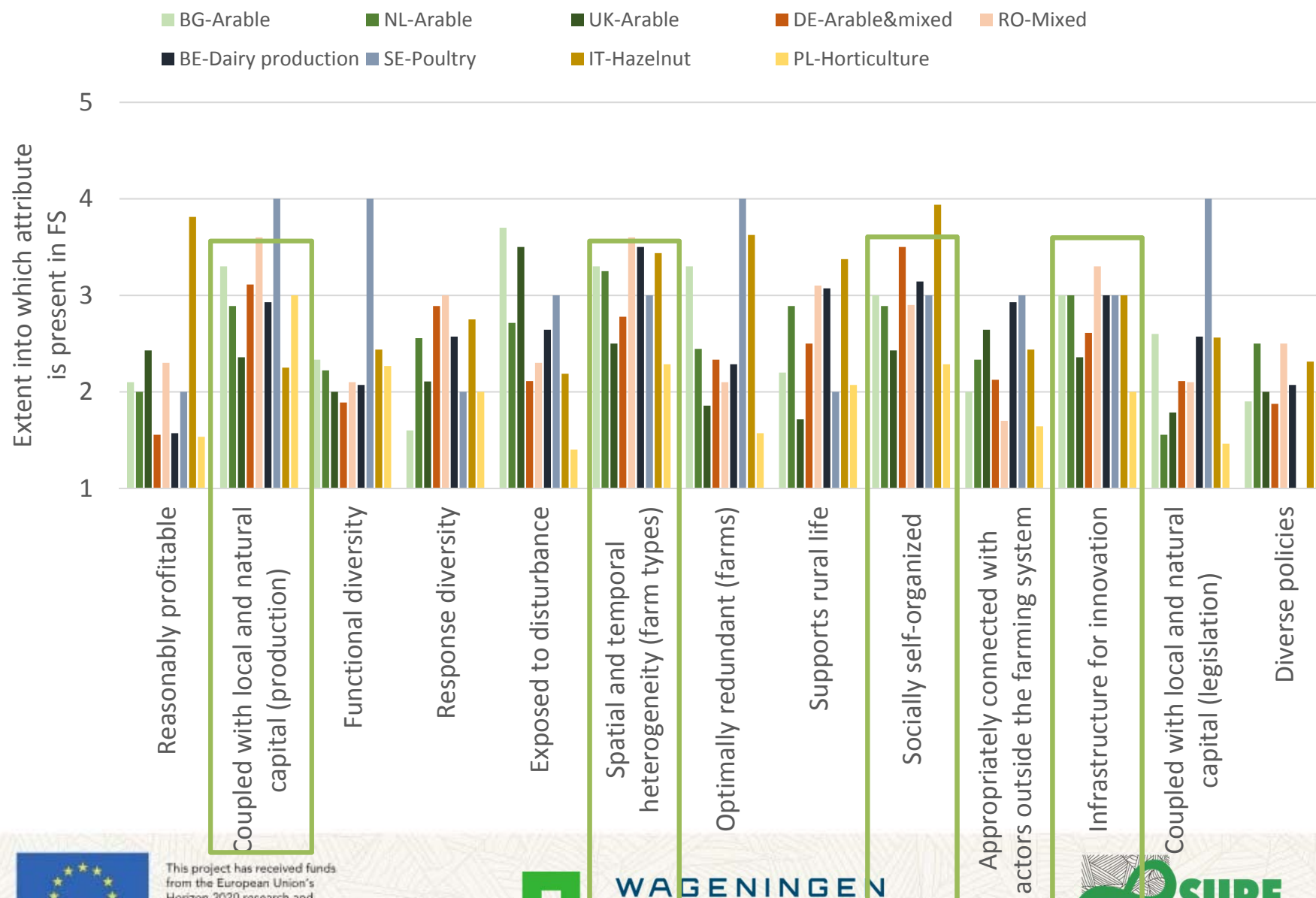
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Attributes (level of presence)



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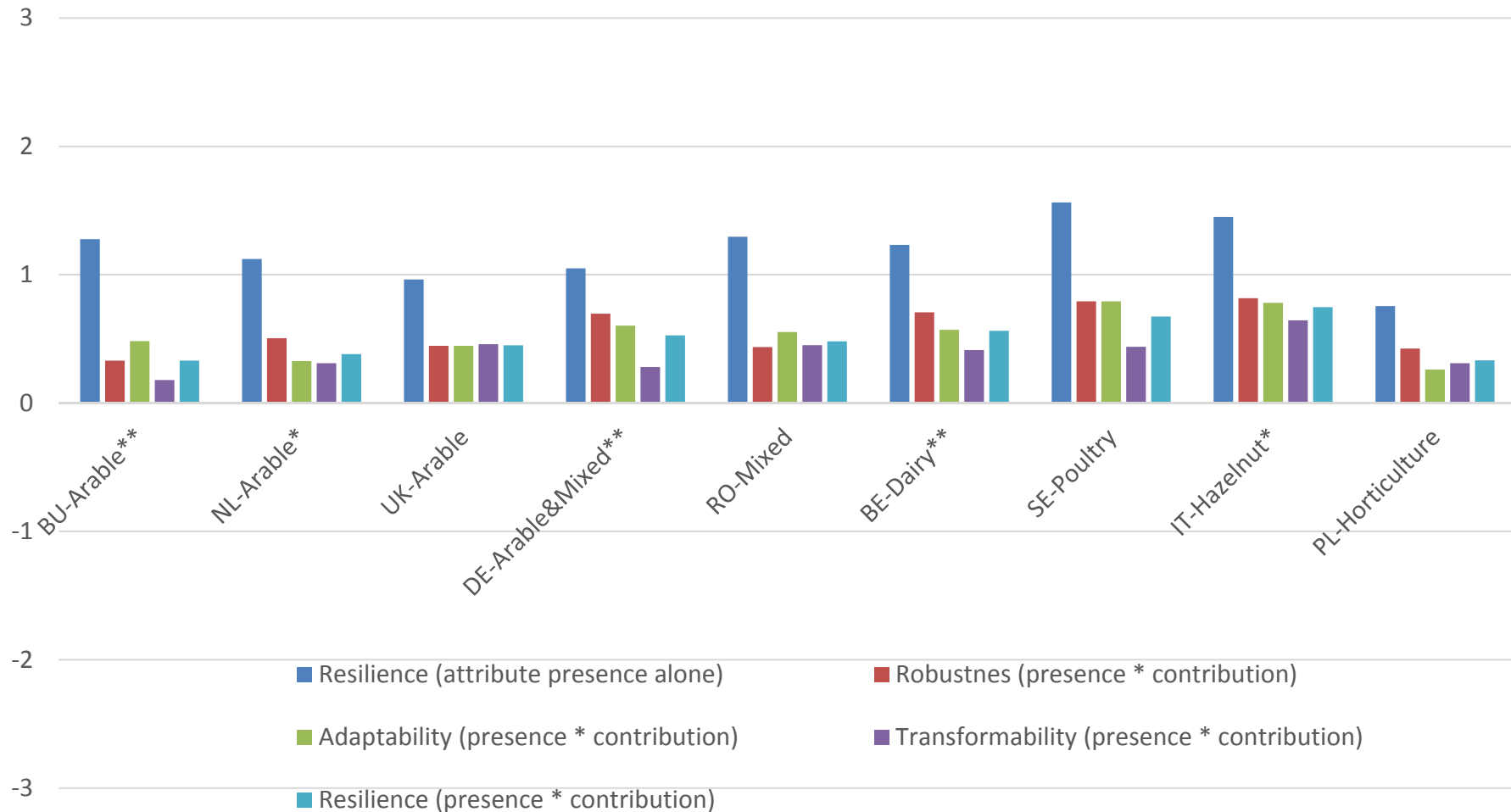


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From attributes to resilience capacities of FS

(Simply averaging scores for attributes)



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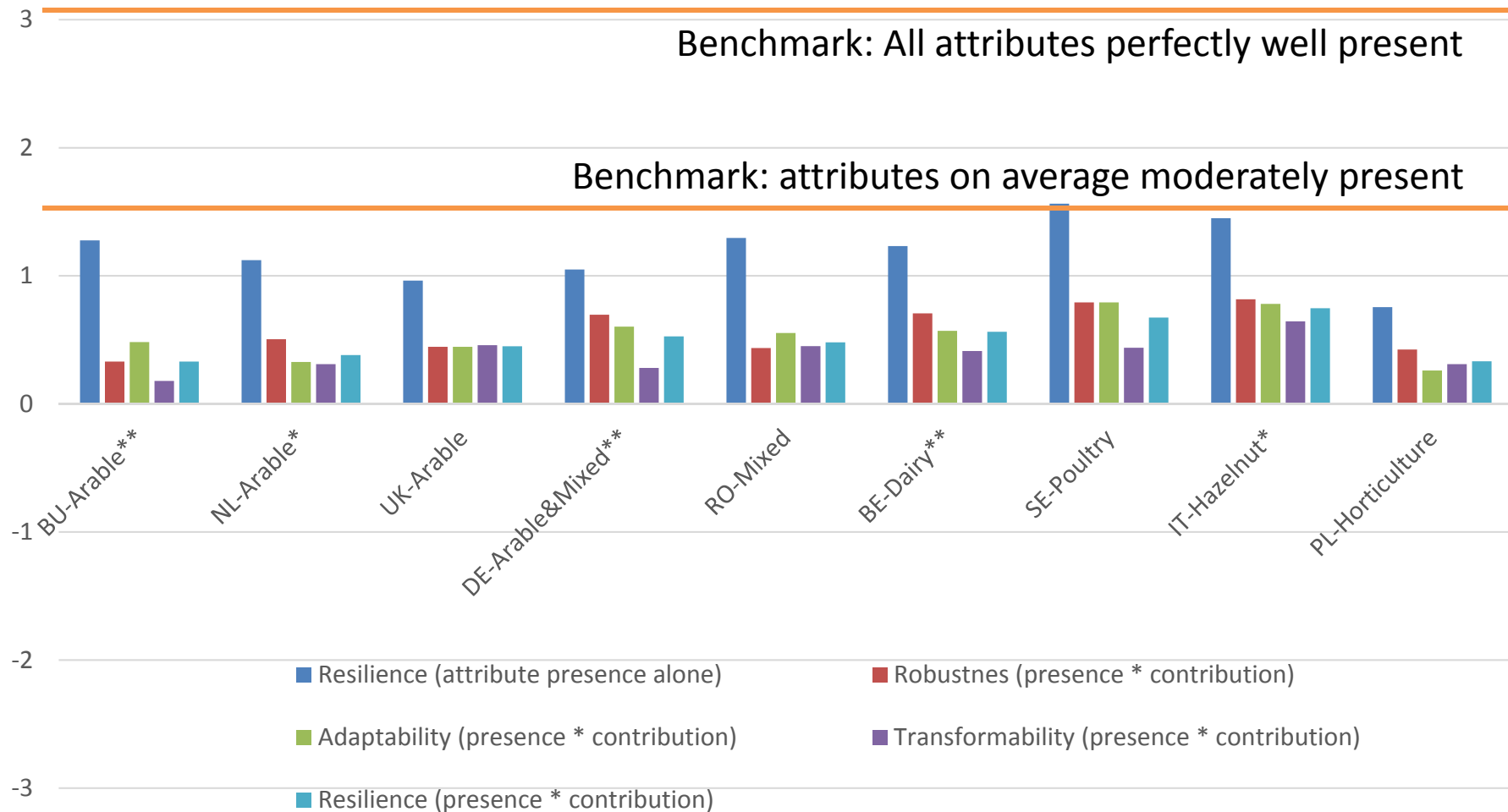


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From attributes to resilience capacities of FS

(Simply averaging scores for attributes)



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Conclusions

Studied EU Farming systems **perform moderately**.

Main focus on:

1. System profitability
2. System production

Overall resilience is assessed to be **low to moderate**.

Strategies and attributes generally have **most** positive effects **on robustness** and **least on transformability**.



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Concluding questions

- What could be strategies and attributes for fostering transformability?
- What is the benchmark for a resilient system?
 - E.g. diversity of attributes, moderately present?
 - Or subset of attributes, strongly present?



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Thank you



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Output

Paas et al. 2019 D5.2 Participatory impact assessment of sustainability and resilience of EU farming systems. SURE-Farm project.

→ Case study reports and a synthesis of all case study findings (base for this presentation)

Reidsma et al. in prep., to be submitted to Eurochoices

→ Presentation of findings from 11 case-studies (reflection of this presentation)

Paas et al. in prep., to be submitted to Ecology & Society

→ Presentation of methodology with case studies on specialized farming systems.

Nera et al. in prep., to be submitted to Sustainability

→ Case study results from a hazelnut farming system in Italy with special attention for adaptive cycles.



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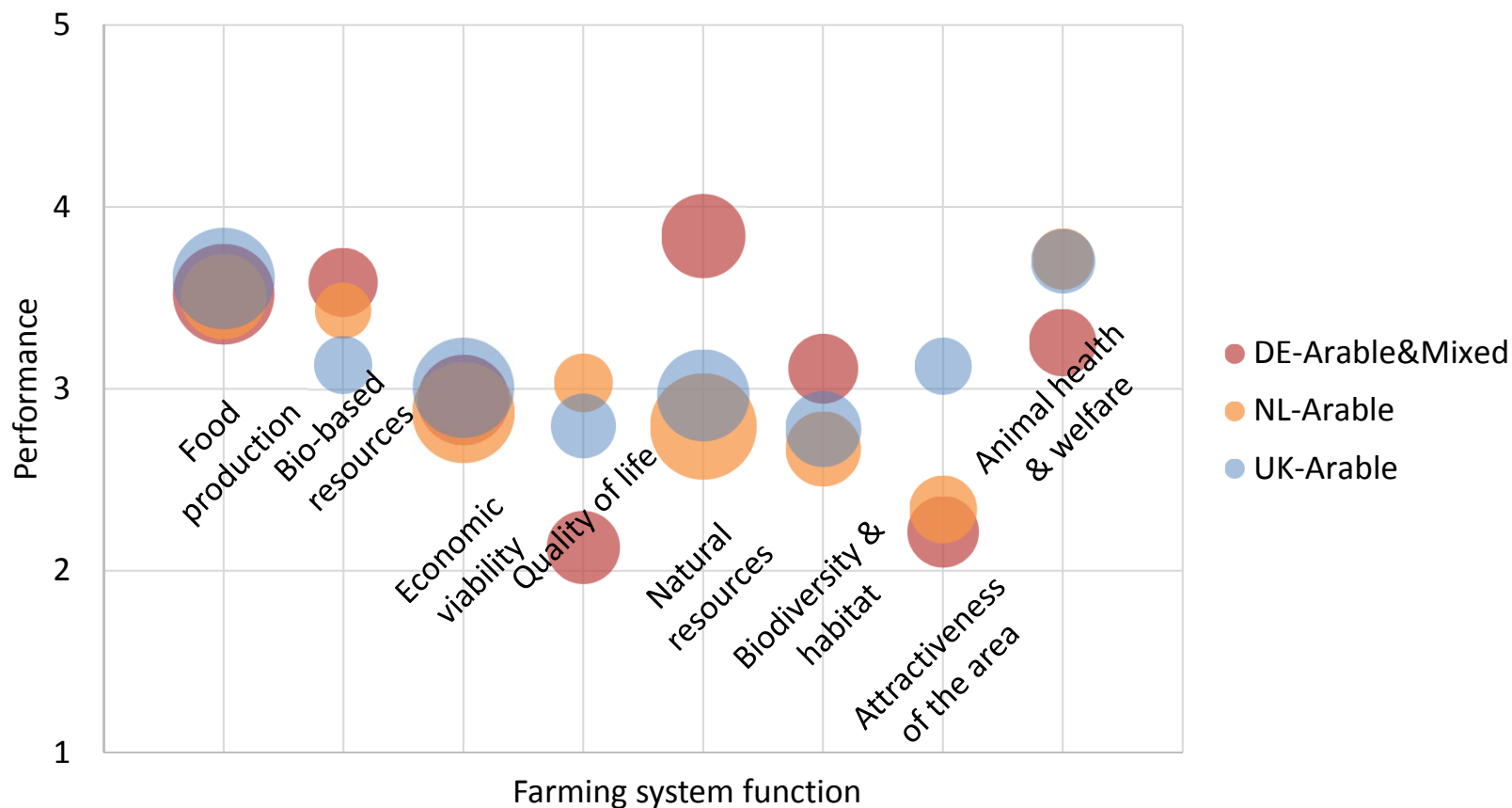
Partners:



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Function importance & performance



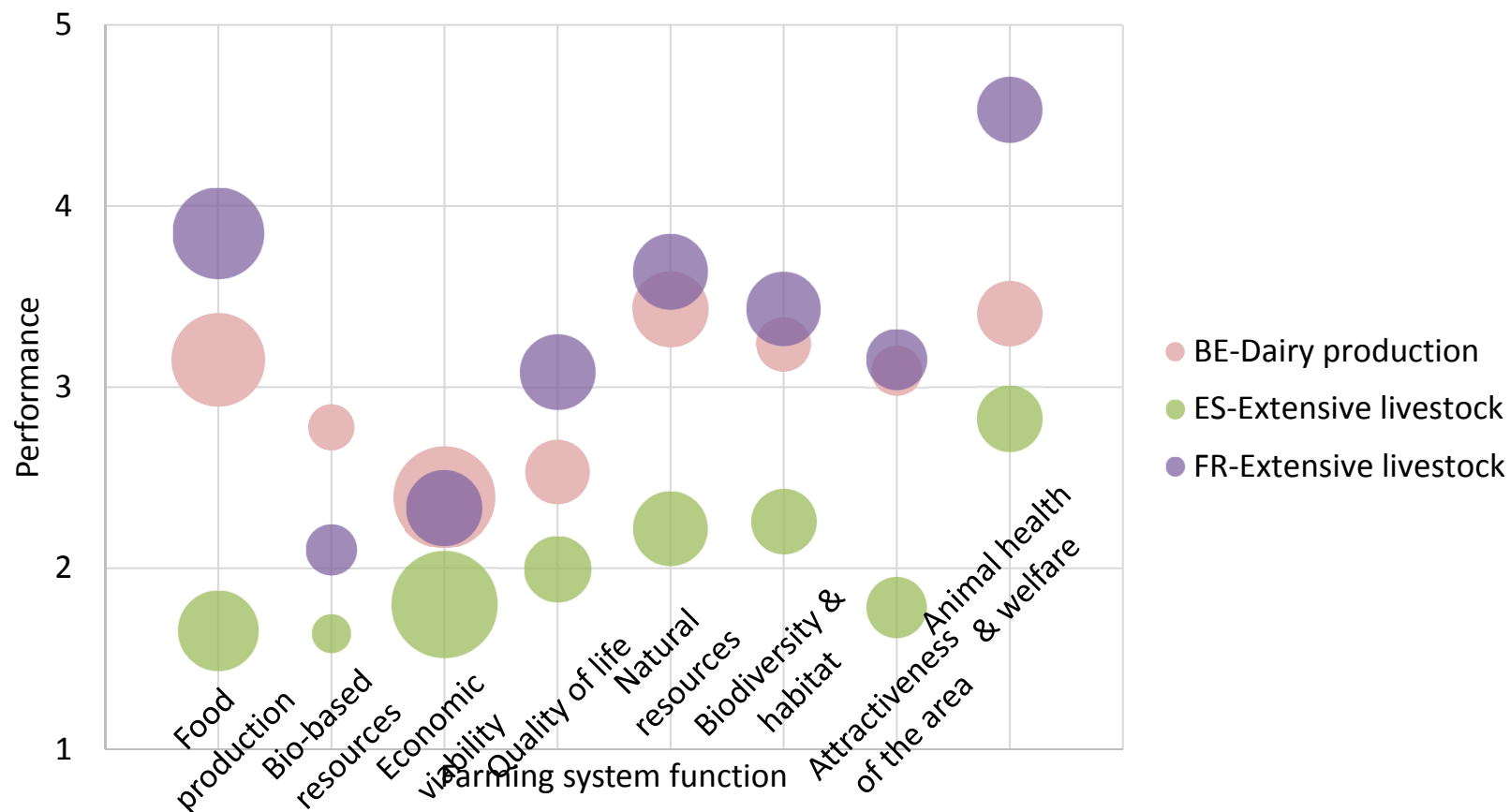
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Function importance & performance



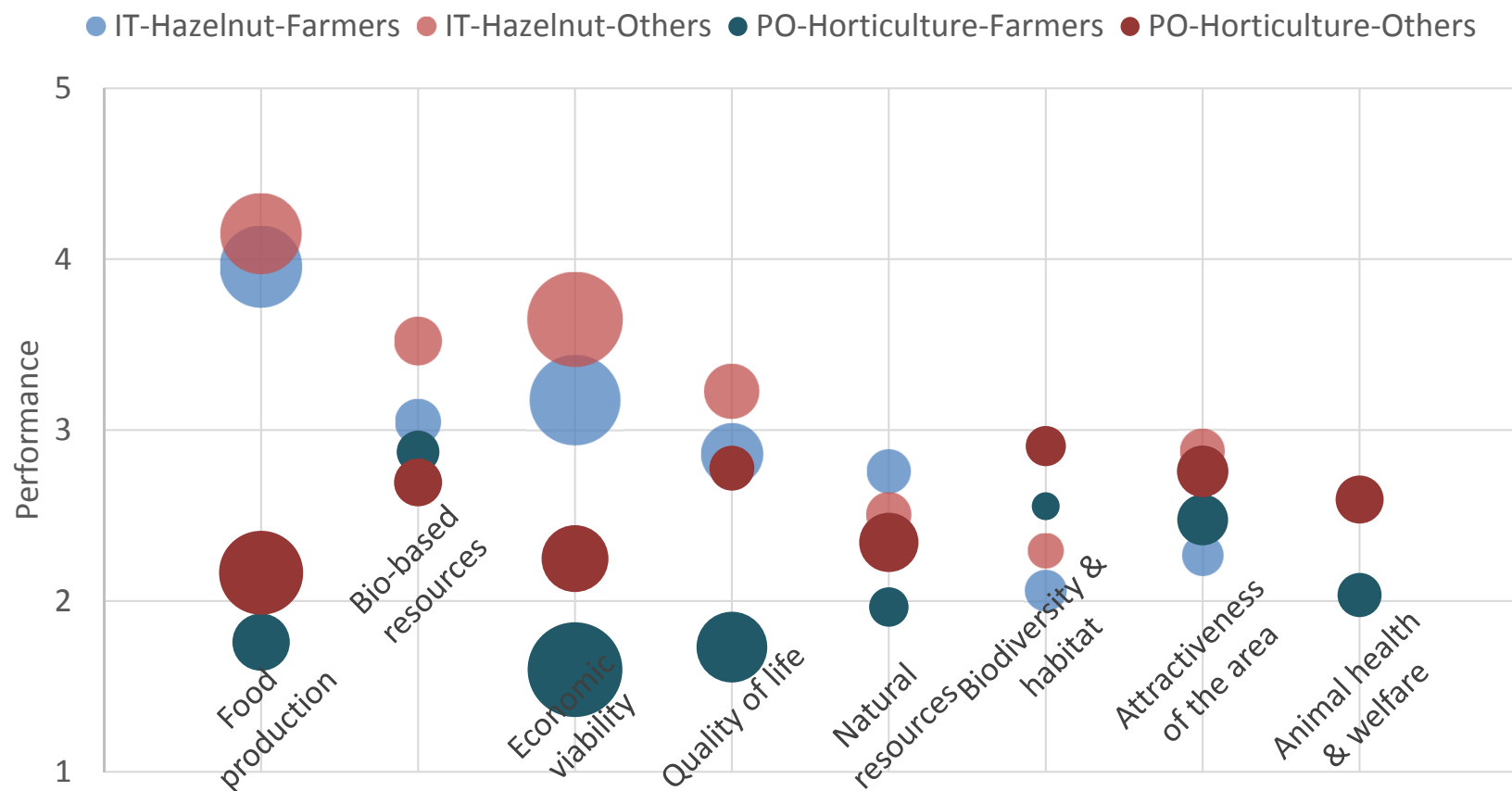
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Function importance & performance



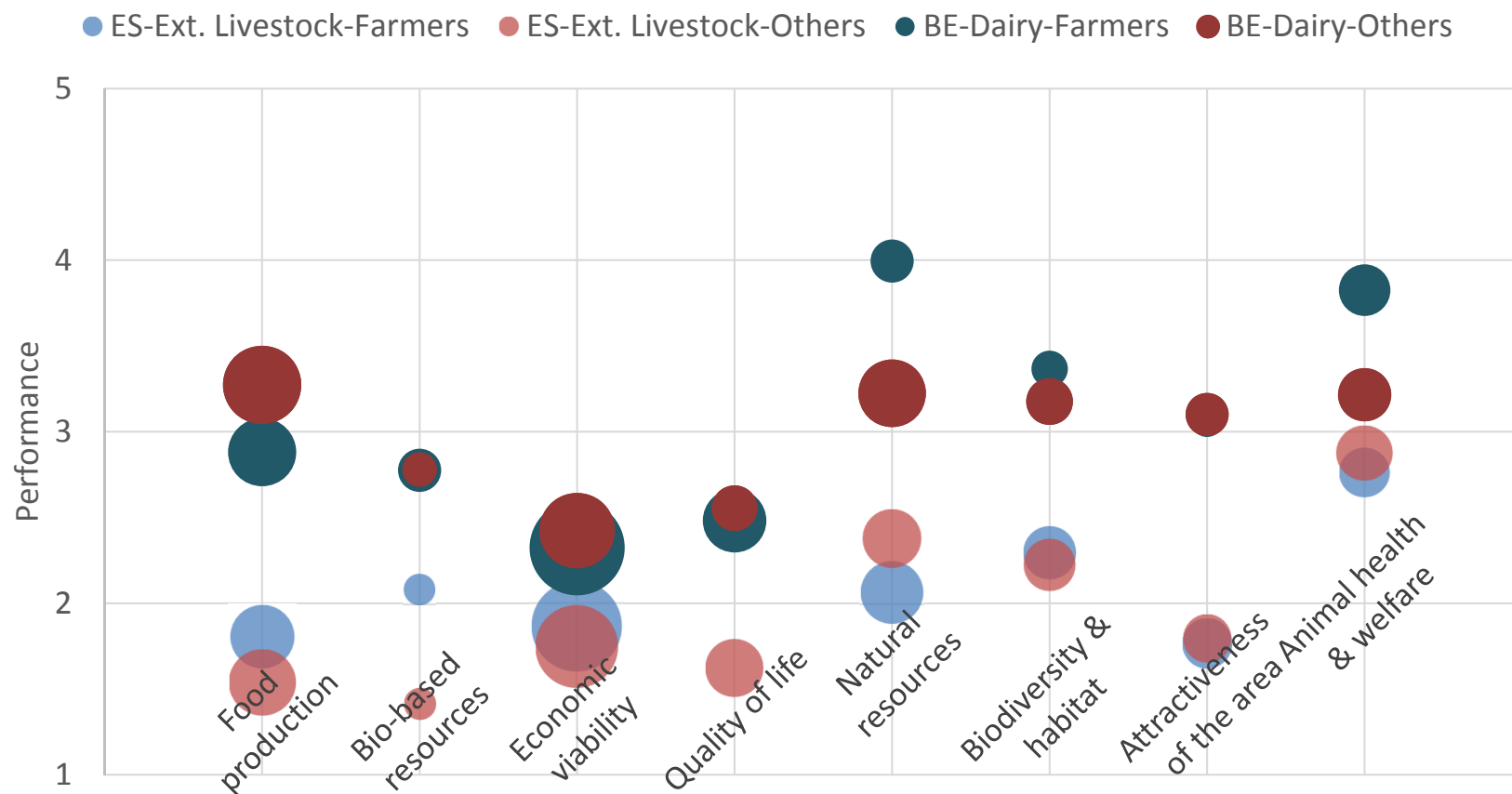
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Function importance & performance



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Strategies

General orientation of strategies:

- Making the system more profitable through: mechanisation, intensification, expansion, adding value, reducing costs

Resilience attributes	Strategies linked to attribute (%)
Reasonably profitable	36
Coupled with local and natural capital (production)	10
Functional diversity	14
Response diversity	3
Exposed to disturbance	1
Spatial and temporal heterogeneity (farm types)	2
Optimally redundant (farms)	0
Supports rural life	1
Socially self-organized	10
Appropriately connected with actors outside the farming system	2
Infrastructure for innovation	9
Coupled with local and natural capital (legislation)	10
Diverse policies	1



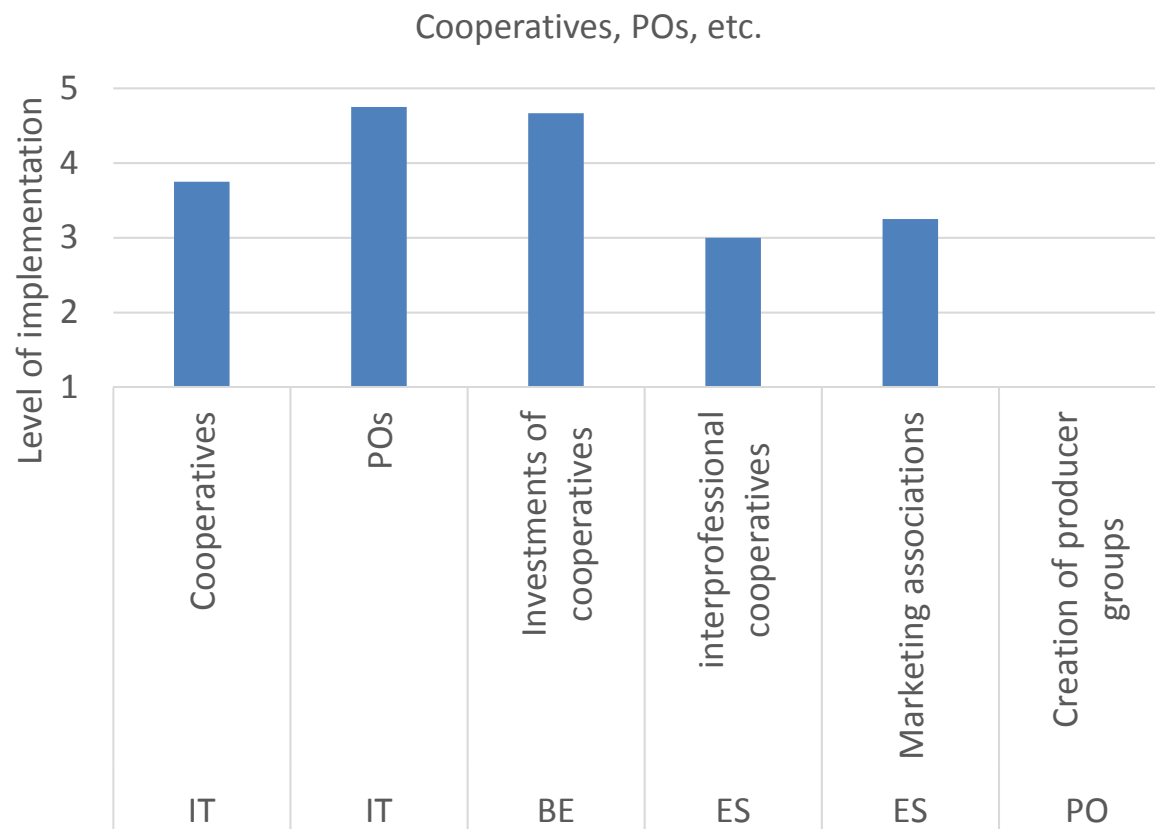
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Strategies (level of implementation)



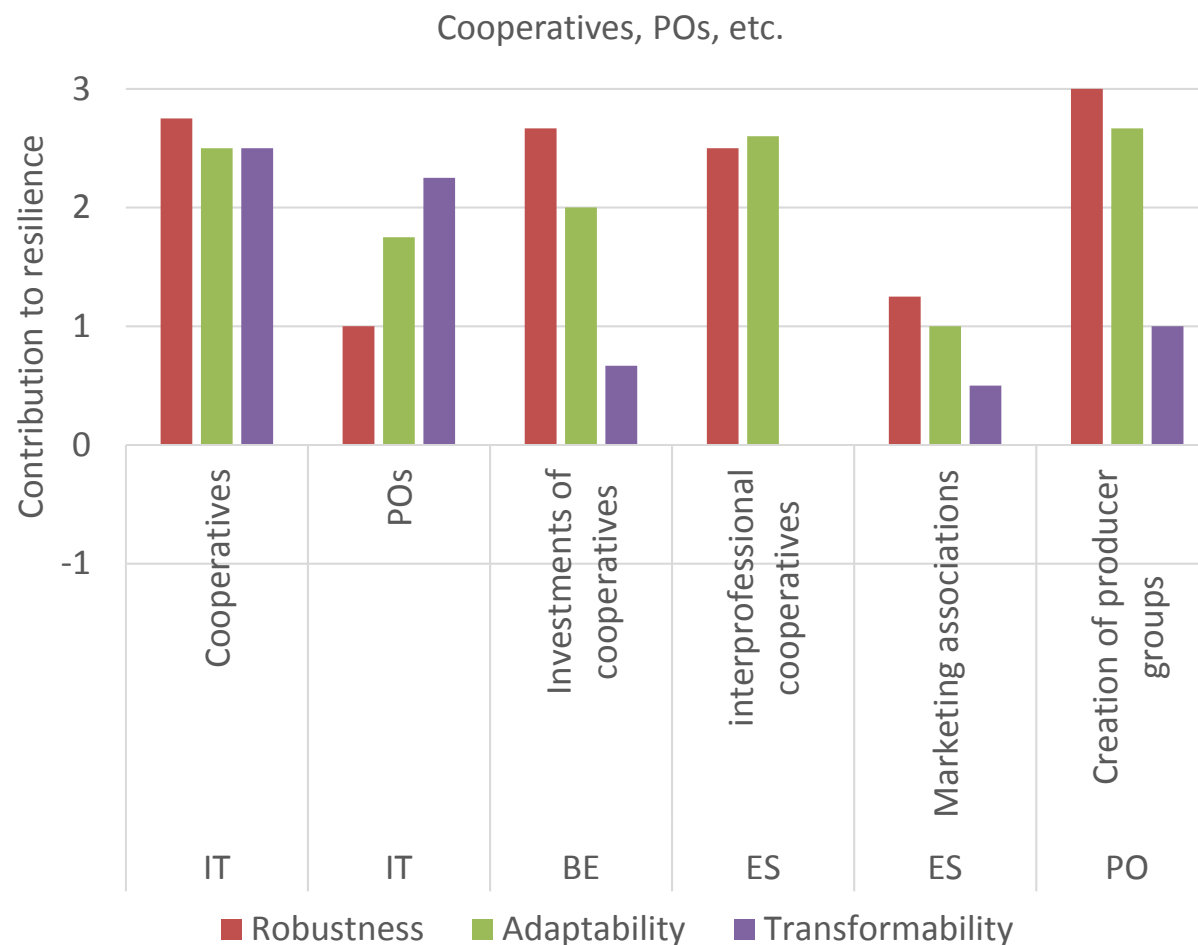
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Strategies (contribution to resilience capacities)



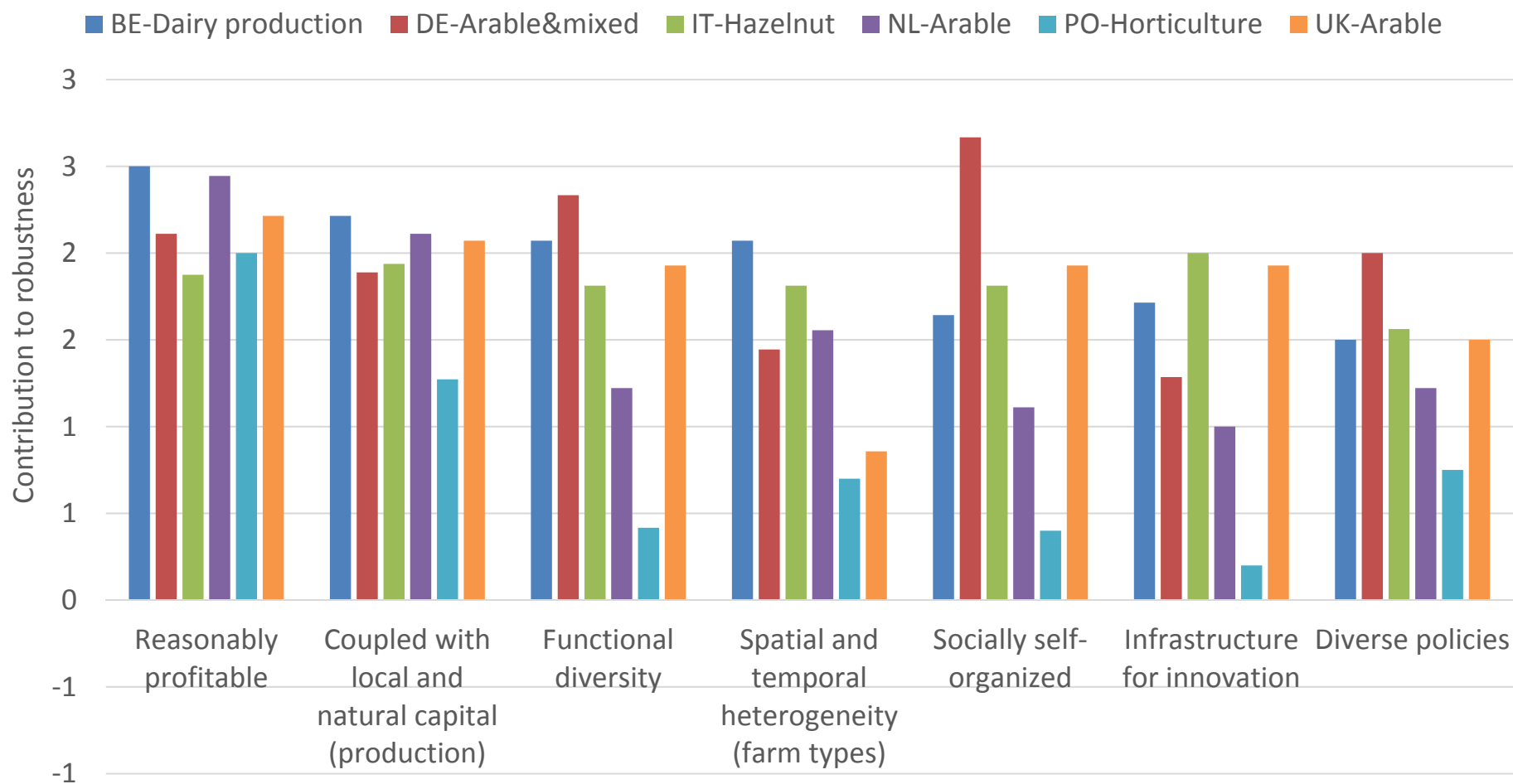
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Attributes (contribution to robustness)



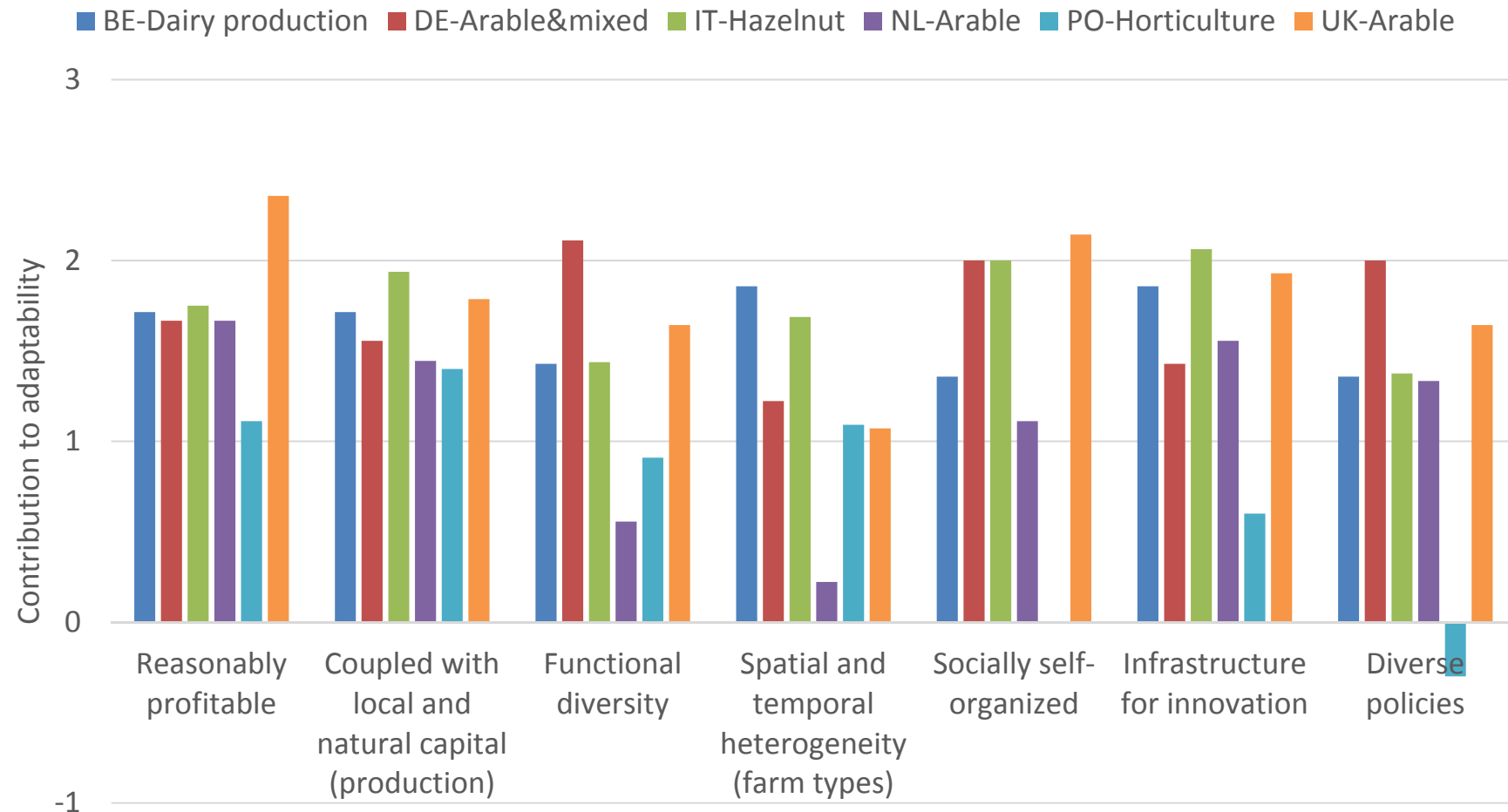
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Attributes (contribution to adaptability)



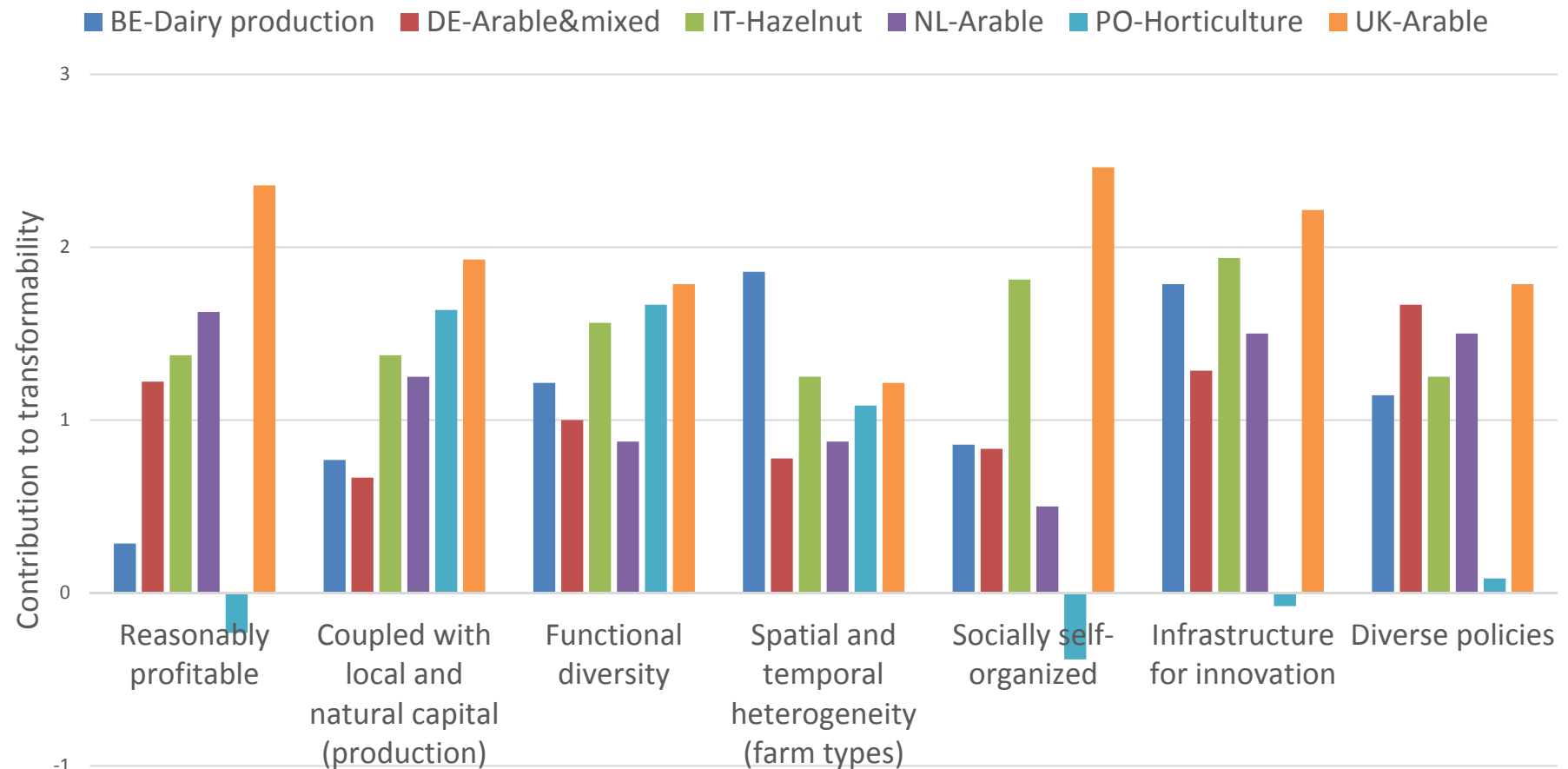
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Attributes (contribution to transformability)

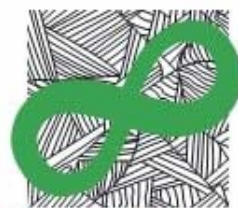


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