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Implementing Sustainability Frameworks on Product-Level – Exploring the Usability

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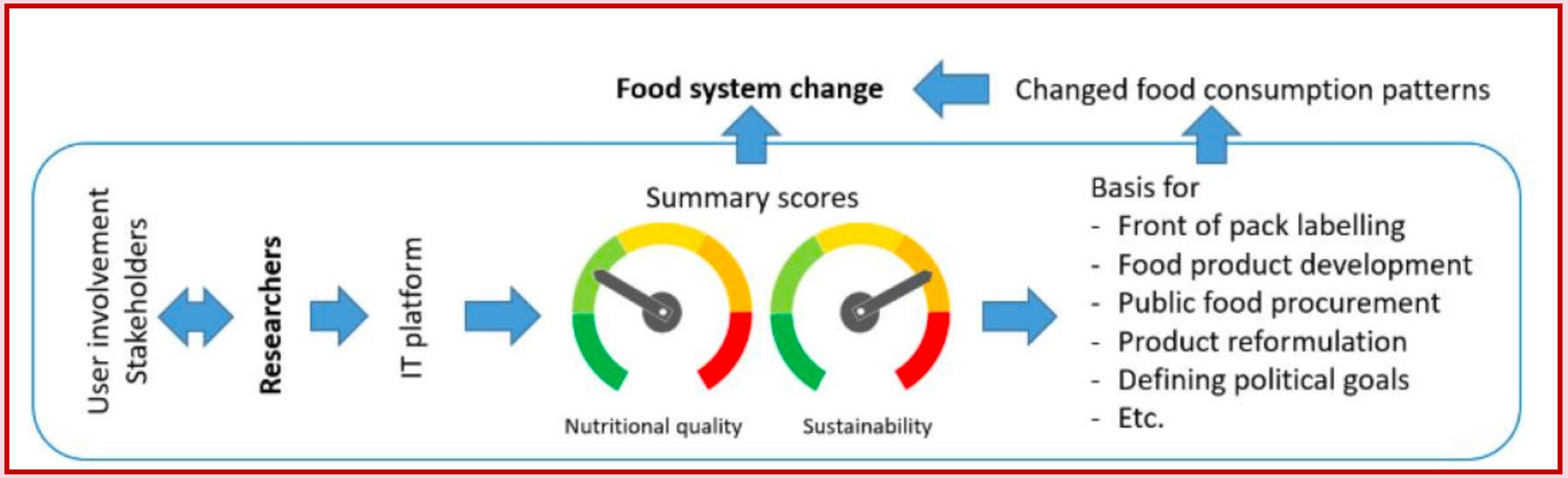
Framework for assessing nutritional, social and environmental impact of food products



Method and Material

1 Identifying frameworks

De Olde et al. (2016) + Desiderio et al. (2022) + Zou et al. (2022) = 103 frameworks

2 Selection criteria

3 Selection phases

10 Selection criteria

- e.g., peer-reviewed, inclusion of both env. and soc. dimension

3 Selected frameworks

Food System Sustainability (FSS) framework

Sustainable Nutrient Security (SNS) framework

4 Application of adapted frameworks on Norwegian food products

Milk, greenhouse tomatoes, wheat, greenhouse cucumbers, beef, sheep and pork

5 Usability assessment

Data availability, data correctness, ease of use, transparency, effectiveness and relevance, and simplicity/complexity

Food System Sustainability (FSS)

By Jacobi et al. (2020)

Objective: Evaluating sustainability in different food systems

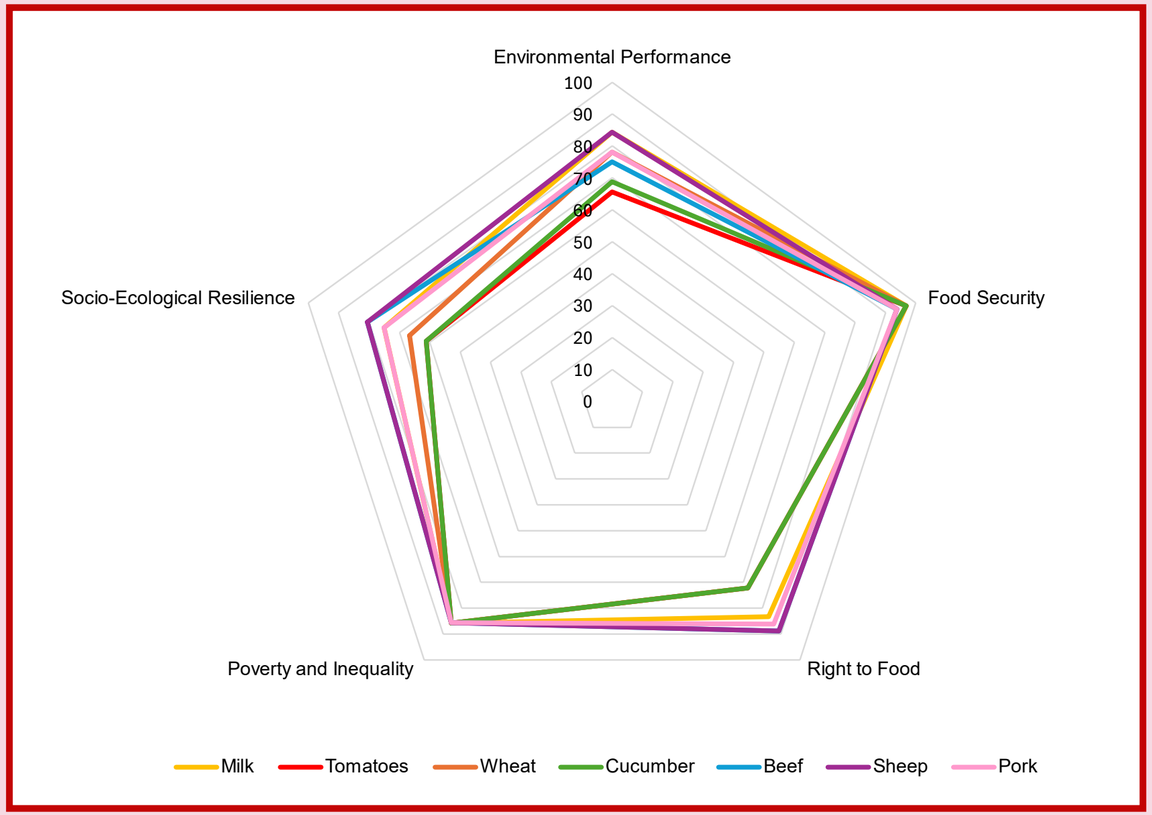
Contains:

- 5 impact categories
- 56 individual indicators

Data: qualitative and quantitative

Scoring system: 0 (undesirable) to 100 (desirable)

- Each category received a score based on the average of its indicators.

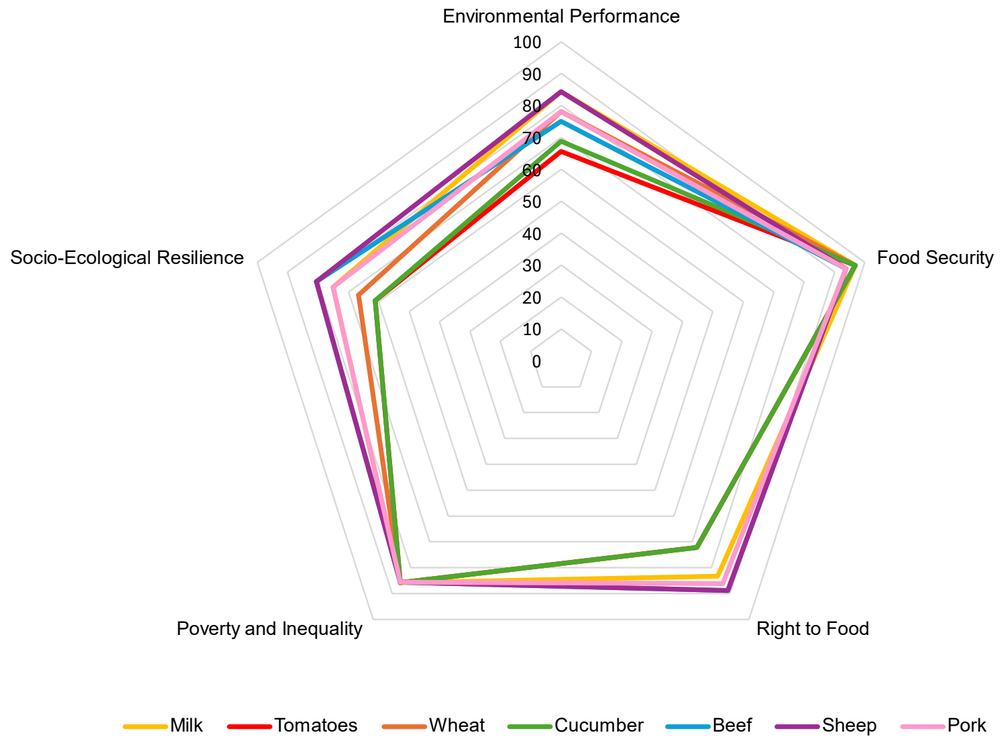


Food System Sustainability (FSS)

USABILITY ASSESSMENT

Data availability	**0**	No recommended database; need to seek our own
Data correctness	-	Expert knowledge and judgement
Ease of use	-	Extensive data requirement
Transparency	-	Different scoring method and complex calculations
Effectiveness/relevance	-	Limitations on social issues
Simplicity/Complexity	-	56 indicators, different scoring method

PRODUCT ASSESSMENT



Agroecosystem Capacity Service Index (ACSI)

		Area %	Supporting Services (Su)	Biotic heterogeneity (Su1)	Provisioning services (Pr)	Food Crops (Pr1)	Wild foods & resources (Pr2)	Livestock (domestic) (Pr3)	Fodder (Pr4)	Seed (Pr5)	Timber (Pr6)	Wood Fuel (Pr7)	Biochemical / medicine (Pr8)	Freshwater (Pr9)	Regulating Services (R)	Local climate regulation (R1)	Global Climat Regulation (R2)	Erosion regulation (R3)	Nutrient regulation (R4)	Water purification (R5)	Water regulation (R6)	Pollination (R7)	Biological control (R8)	Cultural services (C)	Knowledge systems (C1)	Cultural heritage & diversity (C2)	Area Normalized (A)	Strength to provide (S)	# Services (N)	# Services (N) Normalized	Land cover (ASPC)	Land cover (ASPC) Normalized	ASPCI Normalized
			$*\sum_{i}^{1}\frac{Si}{1}$ Value rating scale		$*\sum_{i}^{12}\frac{(Pi+Pn)}{12}$	Values from rating scale									$*\sum_{i}^{8}\frac{(Ri+Rn)}{8}$	Value from rating scale								$*\sum_{i}^{2}\frac{(Ci+Cn)}{2}$			$a\frac{(x-A)*(b-a)}{(B-A)}$	$\frac{\sum Sui+\sum Pri+\sum Ri+\sum Ci}{(\#\ services)}$	Count # provided	$a\frac{(x-A)*(b-a)}{(B-A)}$	$Ai*Si*Ni$	$a\frac{(x-A)*(b-a)}{(B-A)}$	$\frac{(x-A)*(b-a)}{(B-A)}$
	Colums: land cover class																															
1	Forage and pasture	23.35	4	4	1.1	0	0	5	5	0	0	0	0	0	1.875	0	3	5	5	0	0	1	1	1.5	0	3	1.17	1.6	10	2.5	4.6705	1.67	
2	Potatoes	0.01	2	2	0.6	5	0	0	0	0	0	0	0	0	1.375	0	0	5	5	0	0	0	1	0	0	0	0.00	0.9	6	1.5	0.0005	0.00	
3	Grains	0.24	2	2	1.7	5	0	5	5	0	0	0	0	0	1.375	0	0	5	5	0	0	0	1	0	0	0	0.01	1.4	7	1.75	0.0289	0.01	
4	Outfield	76.40	5	5	1.7	0	5	5	5	0	0	0	0	0	3.875	5	5	5	5	3	2	2	4	4.5	4	5	3.82	3	14	3.5	40.112	14.33	
5																																	
6																																	
7																																	
8																																	
		100.00																									5.00		37	9.25	ASPCI	16.00	
	Total number of land cover classes	4.00																						0							**ASPCI (normalized)**	**4.001**
	Maximum capacity per type of service		5		45										40									10								

*14 is the highest SPC identified within the sample of products
** is 5 (max capacity) times # of land cover classes

True Min Value	A	0	0	0	0
True Max Value	B	100	20	14	20
Normalized Min	a	0	0.00	0.000	0.000
Normalized Max	b	5	5	5	5

Average of strength Si and # of services Ni	Area % times (Average of strength Si and # of services Ni)/2	
2.0500	47.8729	
1.2000	0.0098	
1.5750	0.3720	
3.2500	#####	
0.0000	0.0000	
0.0000	0.0000	
0.0000	0.0000	
0.0000	0.0000	
8.0750	#####	####

Land use: Driftsgranskningene Hovedtabell 17f (daa	
Forage and pasture	286.70
Potatoes	0.10
Grains	2.90
Outfield	938.00
Total	1227.70

Colour code											
No capacity	0										
Low capacity	0 0.5 0.8 1	Relevant capacity	1.3 1.5 1.8 2	Medium high capacity	2.3 2.5 2.8 3	High capacity	3.3 3.5 3.8 4	Very high capacity	4.3 4.5 4.8 5		

Sustainable Nutrient Security (SNS)

By Gustafson et al. (2016)

Objective: Assessment of sustainable nutrition security on national level based on food system outcome

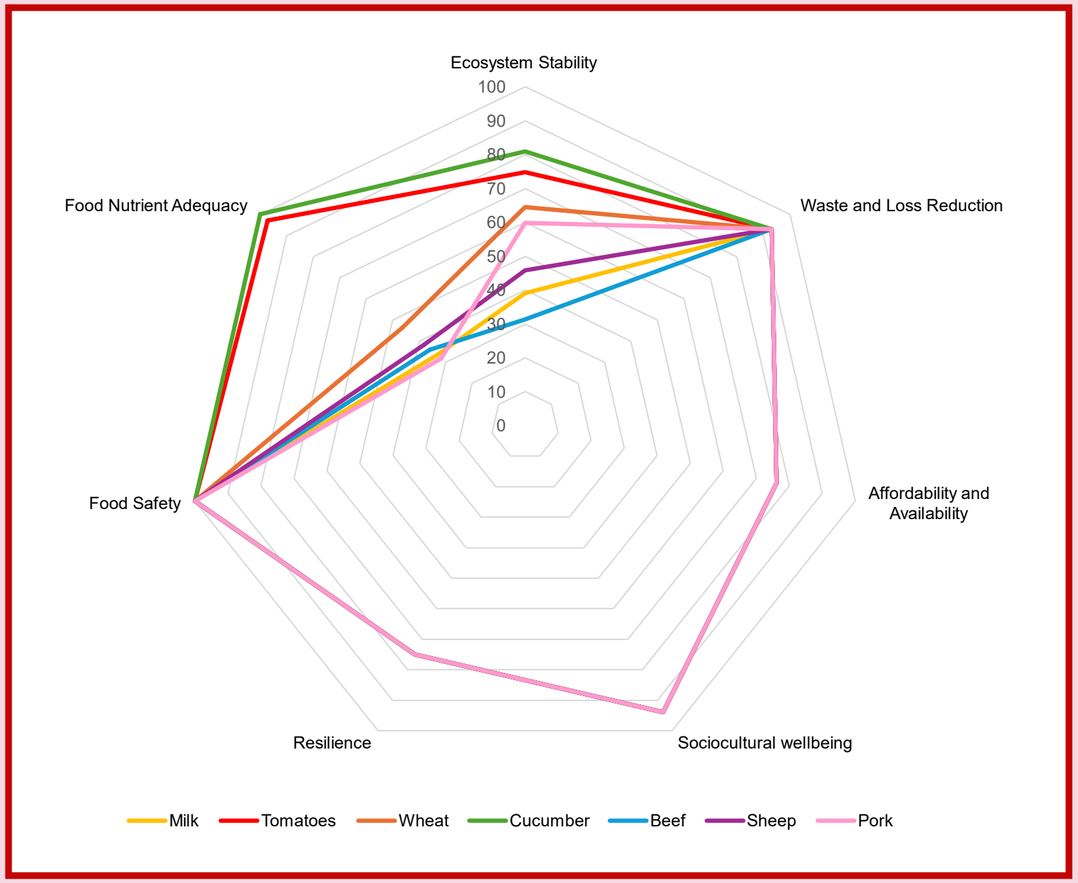
Contains:

- 7 impact categories
- 23 individual indicators

Data: qualitative and quantitative

Scoring system: 0 (undesirable) to 100 (desirable)

- Each category received a score based on the average of its indicators.

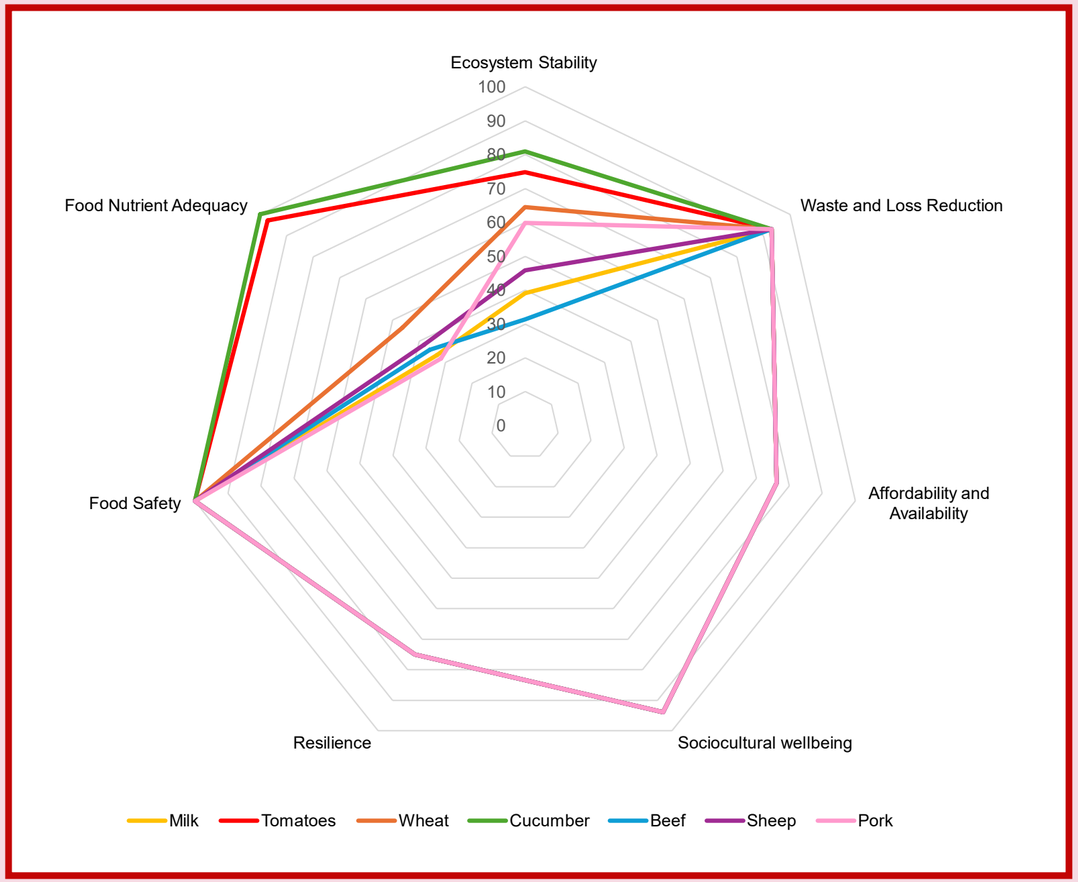


Sustainable Nutrient Security (SNS)

USABILITY ASSESSMENT

Data availability	+	Existing indicator with database
Data correctness	+	Established database and indexes
Ease of use	0	Complex calculation for env. indicators
Transparency	-	Undisclosed methodology/calculation
Effectiveness/relevance	-	National-level data
Simplicity/Complexity	0	15 indicators with available data

PRODUCT ASSESSMENT



So… What Have We Learned?

Trade-offs of usability

- Comprehensive assessment over usability

Challenges of adapting social sustainability assessment at a product level

Different frameworks rank food products differently

Conclusion

Need more effort to enhance usability of existing frameworks at a product level

HOW?

Balancing trade-offs

Integrating relevant indicators for whole supply chain, inclusing consumers

Thank you!

Questions?