



How to develop a framework (MCDA) for the evaluation of One Welfare concept

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Autumn school- Assisi (Italy)

25th-27th October 2023

The ONE WELFARE APPROACH

The concept of One Welfare recognizes the **interconnections** between animal welfare, human wellbeing, and the environment



Why is it important to consider One Welfare in organic and low-input outdoor farming systems?

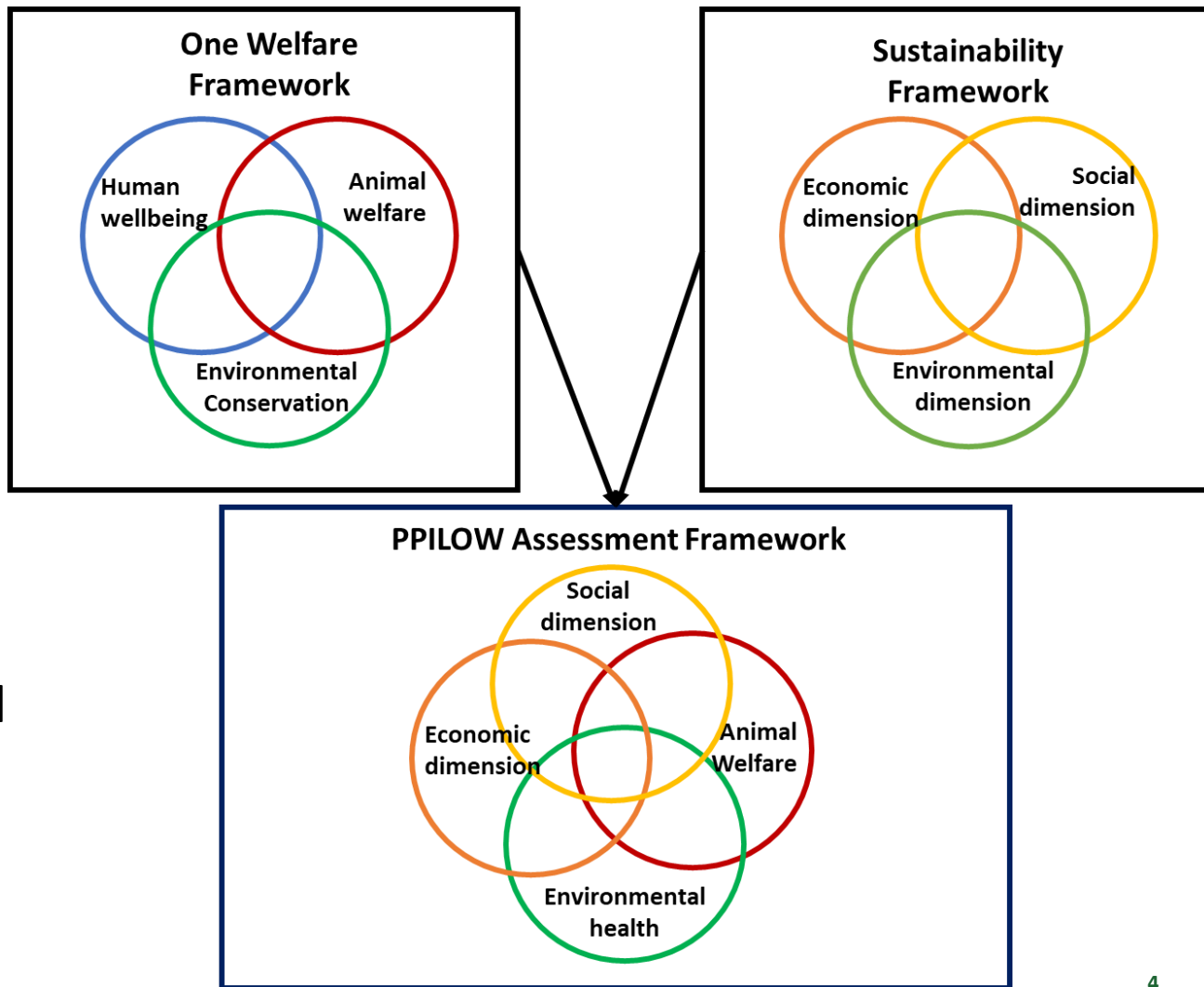
- Proving the quality of the rearing systems (and of the products)
- To understand the diversity of practices throughout Europe
- Still a need to improve animal welfare and limit mortality, in relation to outdoor access challenging the animals, ethical issues, the wish of practitioners, and societal expectations



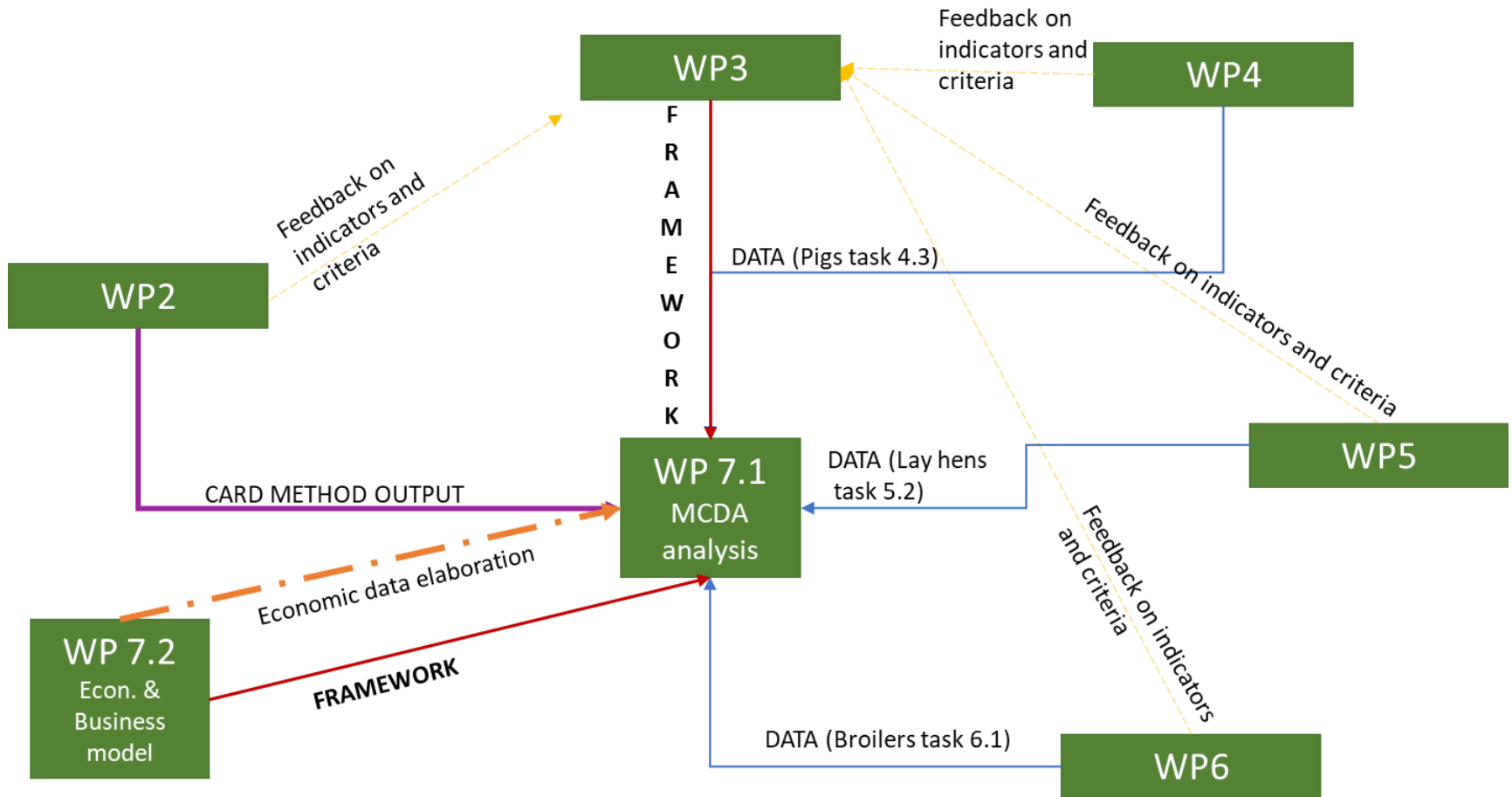
Evaluate the welfare-improving practices by taking into account environmental, economic and social impacts including *human well-being (farmers and breeder, consumers, citizens)*

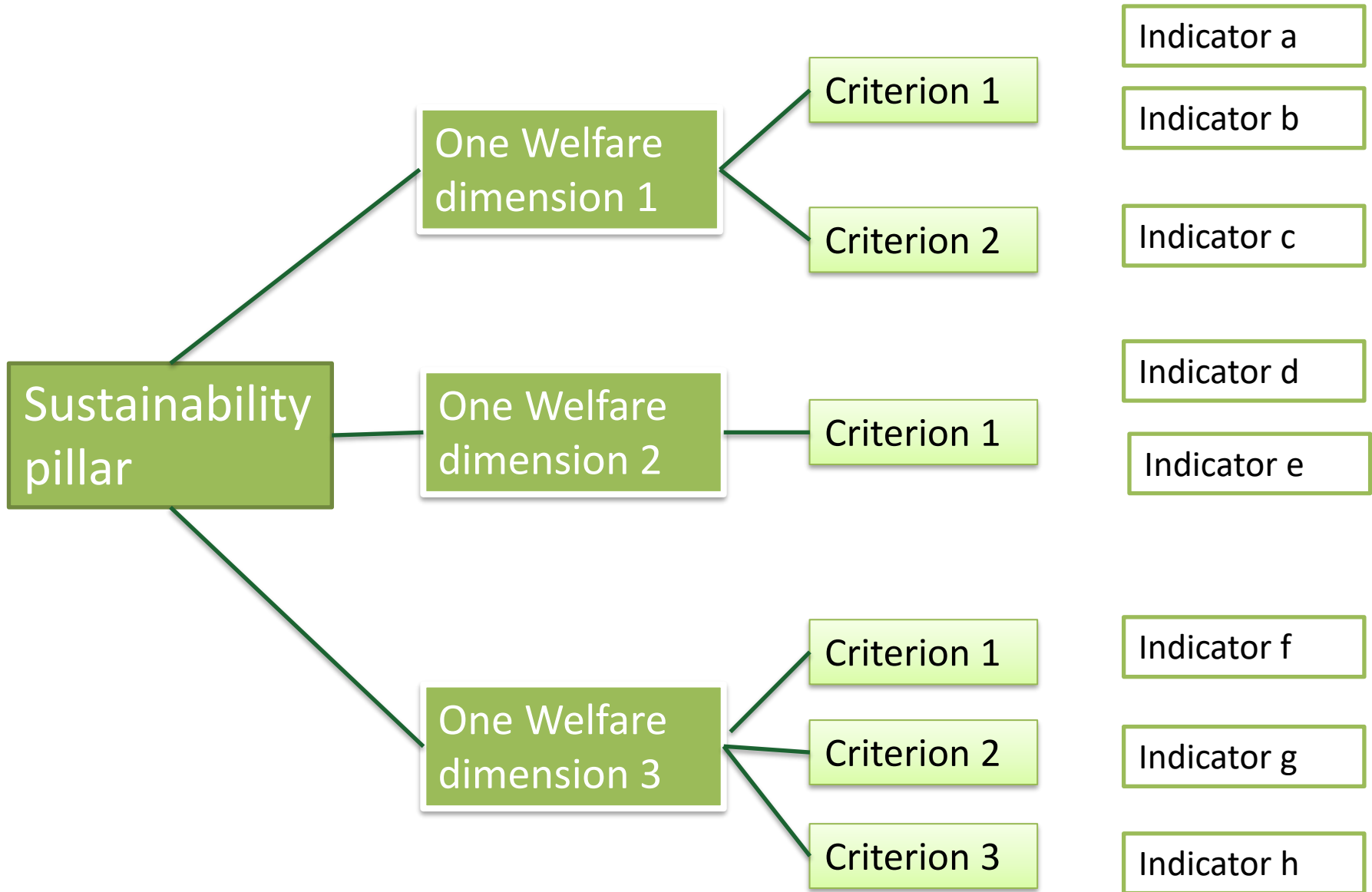
OWA assessment: the framework construction (1)

The development of an evaluation framework based on the One Welfare approach will enable sustainability goals to be embraced by emphasizing the impacts of innovative animal husbandry practices on animal and human welfare.



OWA assessment: the framework construction (2)





OWA assessment: the framework construction (3)

Species type Poultry: Broilers and Ley hens

Species type Pigs: Fattening Pig and Sows

SUSTAINABILITY PILLARS	ONE WELFARE DIMENSIONS
Animal Welfare (4)	Good Feeding (2 criteria, 2-3 indicators)
	Good Environment (Housing) (3 criteria, 3-12 indicators)
	Good Health (3 criteria, 7-24 indicators)
	Appropriate Behaviour (4 criteria, 3-10 indicators)
Environment (3)	Enhance biodiversity (3 criteria, 8 indicators)
	Reduce pollution (soil, air, water) (3 criteria, 4 indicators)
	Minimize external resources used (2 criteria, 3 indicators)
Economy (4)	Performance – quantity (3-5 criteria, 3-5 indicators)
	Performance – quality (1-6 criteria, 2-6 indicators)
	Returns (2-4 criteria, 2-4 indicators)
	Costs (2 criteria, 2 indicators)
Society (4)	Working conditions (5 criteria, 8 indicators)
	Job perception and motivation (3 criteria, 3 indicators)
	Connection with local community (3 criteria, 5 indicators)
	Social Acceptability (4 criteria, 4 indicators)

Specific criteria and indicators for each species type

Some criteria and indicators for all species type and farms

Specific criteria and indicators for each species type

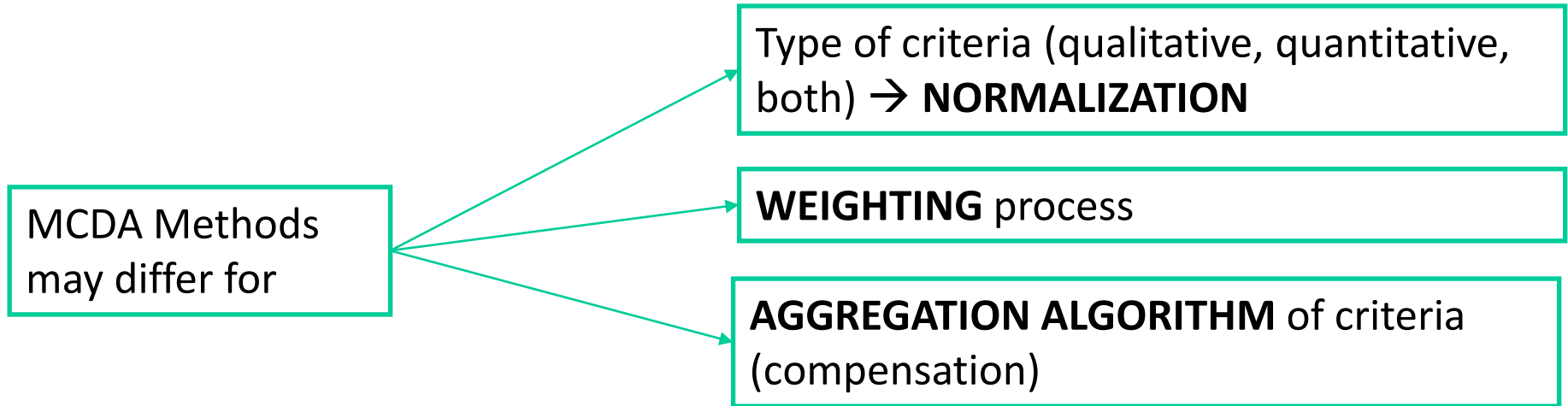
Some criteria and indicators for all species type and farms

PPILOW Multi criteria Analysis: A brief introduction

- Multicriteria analysis (MCDA) refers to a family of mathematic methods, aiming to decision support.
- It establishes preferences among multiple options with respect to an explicit set of objectives identified by the decision maker, for which it has established measurable criteria suitable for assessing the degree to which the objectives are achieved.
- In the presence of divergent criteria simultaneously, MCDA allows the assessment of complex issues and seems a successful approach to measuring the One Welfare (OW) concept.

	Alternative A1	Alternative A2	...	Alternative An
Criterion 1	V_{11}	V_{21}	...	V_{n1}
Criterion 2	V_{12}	V_{22}	...	V_{n2}
...
Criterion k	V_{1k}	V_{2k}	...	V_{nk}

PPILOW Multi criteria Analysis: A brief introduction



PROMETHEE → Both quantitative & qualitative data;

→ weights as preferences;

→ Pairwise comparison (Outranking method) → No compensation allowed

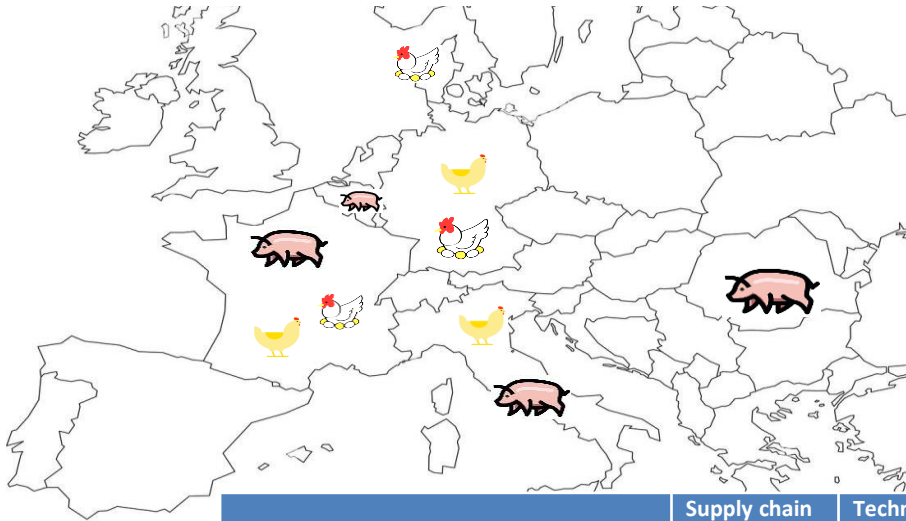
OWA assessment: a case study (1)

For the broilers, the lever analyzed is the Italian case study proposed in Task 6.1 (Provision of an adaptability index to outdoor rearing and evaluation of expected improvement from free-range enrichment). The data used refers to a real farm, located in Italy and meeting the requirements of the recruitment rules; the enrichment used is olive trees. The MCDA has been performed according to three different groups of strains (alternatives), namely, a Cross Breed (CB), a Red J (RJ), and a Naked Neck (NN): the first two were reared using the enrichment, while the last one is a standard free-range rearing system, which is considered the business-as-usual (control).



OWA assessment: a case study (2)

Weighting → Figueira and Roy, 2002 + geometric mean for aggregation



	Broilers	Ley hens	Pigs
Producers & breeders	5	9	4
Supply chain*	4	2	5
Civil society**	3	1	3
Technical experts***	4	5	8
Academic/R&D experts	3	1	4

* Feed producer; packing; retailers; hatchery

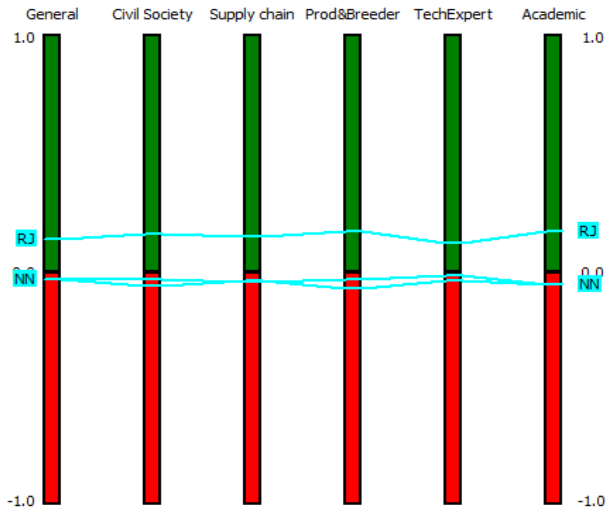
** Consumers, activists

*** Consultant, Vet, Engineers

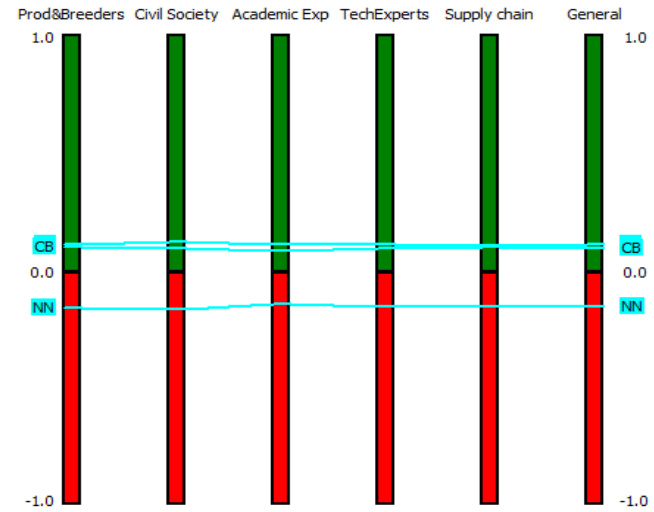
	Supply chain	Technical experts	Producers & breeders	Civil society	Academic	General
Performance quality	9.53	7.55	7.85	10.0	3.77	7.34
Good feeding	9.53	6.79	6.65	8.06	7.54	7.65
Good health	9.53	7.54	6.10	8.07	7.54	7.68
Performance quantity	8.33	5.35	8.60	3.16	1.89	4.70
Returns	8.33	8.33	7.77	4.47	7.54	7.11
Good housing	8.34	6.41	6.72	6.13	7.55	6.99
Costs	7.14	5.26	5.99	3.87	5.66	5.48
Job perception & motivation	4.76	7.98	6.36	4.47	7.55	6.05
Working conditions	4.76	7.35	9.08	5.00	7.55	6.54
Natural behaviour	4.76	5.52	3.66	10.0	7.55	5.92
Reduce pollution	3.57	5.57	6.24	10.00	7.55	6.3
Social acceptability	3.57	5.07	5.53	2.23	5.66	4.17
Enhance biodiversity	3.57	5.94	4.64	8.07	7.55	5.70
Connection with local community	1.19	4.31	3.94	3.54	7.55	3.52
Minimize external resources	1.19	4.84	4.45	7.08	7.55	4.24
Depopulation	8.04		4.05	4.73	7.545	5.84

OWA assessment: a case study (3)

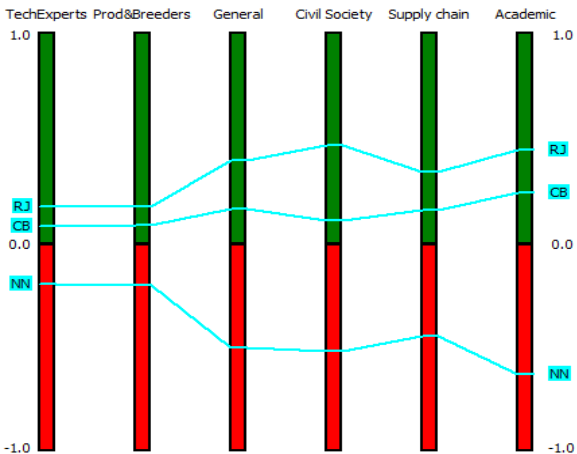
ENVIRONMENTAL PILLAR



SOCIAL PILLAR



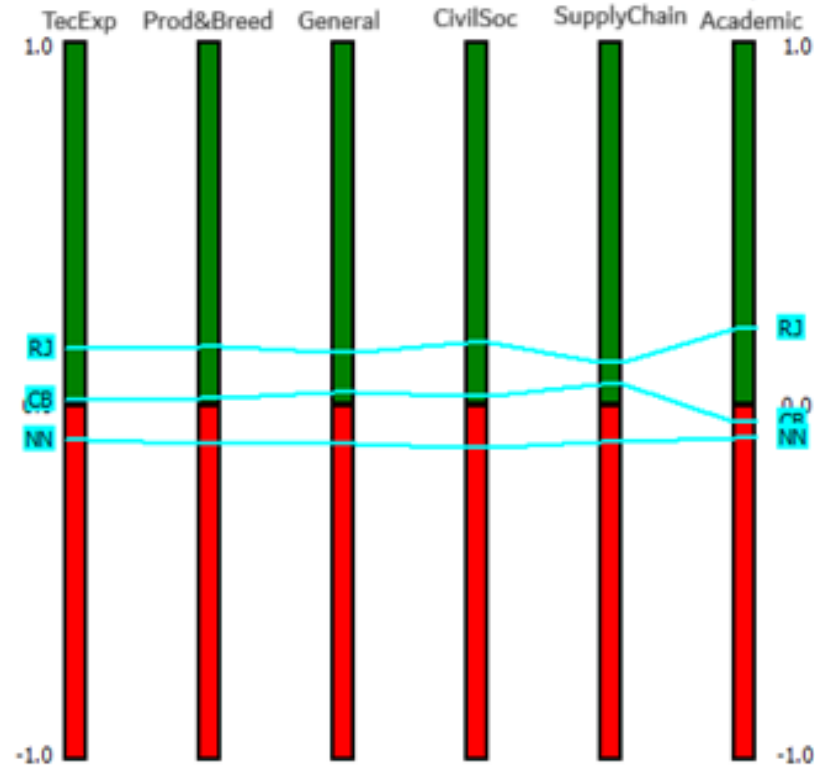
ECONOMIC PILLAR



SOCIAL PILLAR



OWA assessment: a case study (4)



Applying the evaluation framework to the Broiler case study using MCDA highlights some interesting aspects, such as the effect of enrichment on reducing land consumption, in the case of adequate production performance.

The effect of enrichment seems to be significant in all pillars and thus in the overall assessment of OWA

The possibility of an experimental factor (range enrichment, poultry strain) becoming a real alternative in welfare improvement strategies lies in the alignment among most stakeholders participating in the production and consumption chain.

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Thank you for your attention

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