

CA18105



RIBMINS

Risk-based meat inspection and
integrated meat safety assurance

Food Safety Management Systems in abattoirs: Definitions, structure and performance assessment

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I. FSMS Definitions and structure

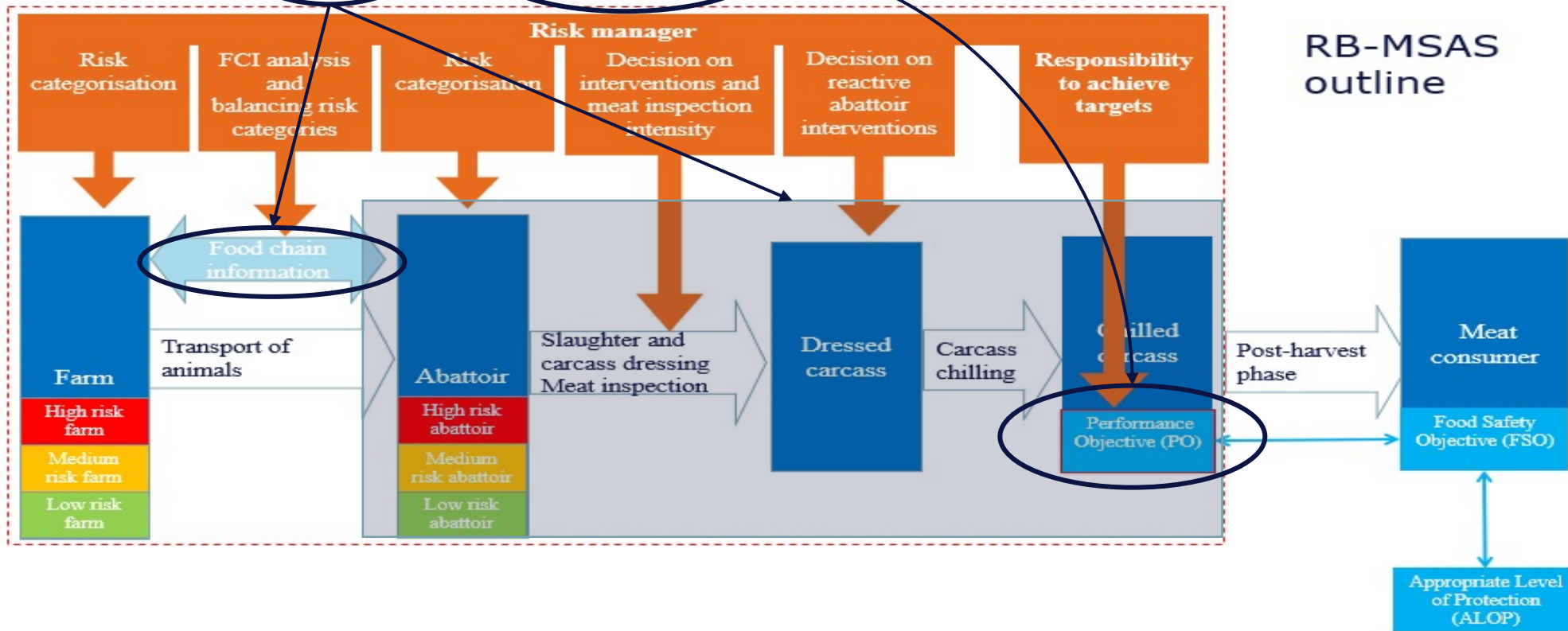
WG3 FSMS Definitions and structure

- **FSMS Term** not clearly defined anywhere but often described in terms of parts (EC legislation and Commission notices, ISO, Codex/CACs, scientific papers etc.)
- **'System'** = a set of interconnected constituent parts working together towards an **ultimate goal or objective**
- **Generic FSMS Objective** = Produce 'safe' food (in abattoir: meat), according to intended use
- **'Safe meat'** = Not always legally defined. In this work we applied the **hazards from the EFSA Opinions 2010s**
- Final **FSMS definition** for abattoirs in this work (adapted from ISO 22000) :
*'A FSMS is the set of **interrelated** and **interactive** policies, objectives and processes (= FSMS Components) that achieve the assurance that the produced carcass meat will not cause **adverse health effect** to the consumer when it is prepared (cooked) and consumed in accordance with its intended use'*

Note: Essentially (almost) all activities in an abattoir are or can be considered part of the FSMS!

Principle: The scope and objectives in any system should be clearly defined

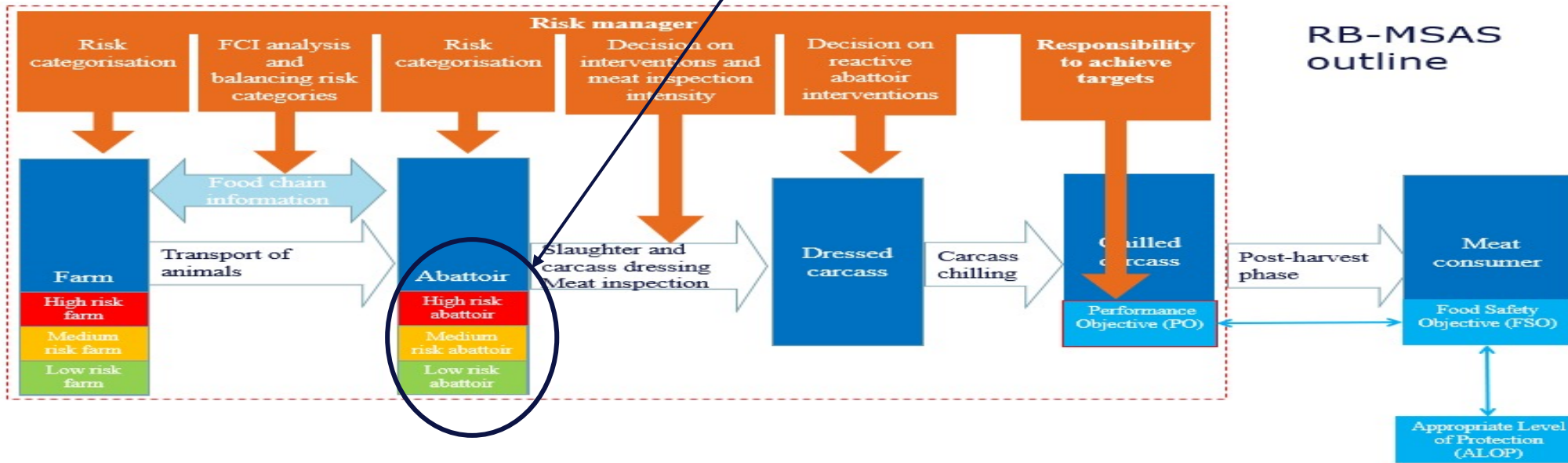
Abattoir FSMS Scope and objectives



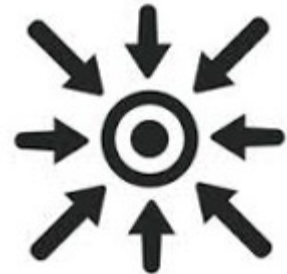
WG3 II. FSMS Performance assessment (FSMS-PA)

Why doing a FSMS-PA?

- Demonstration of compliance
- Customer requirements
- Identification of weaknesses and continuous improvement
- Abattoir ranking and/or **Risk categorisation**



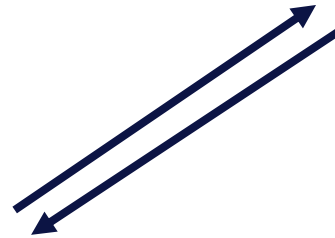
1. Specific, measurable, clear and objective



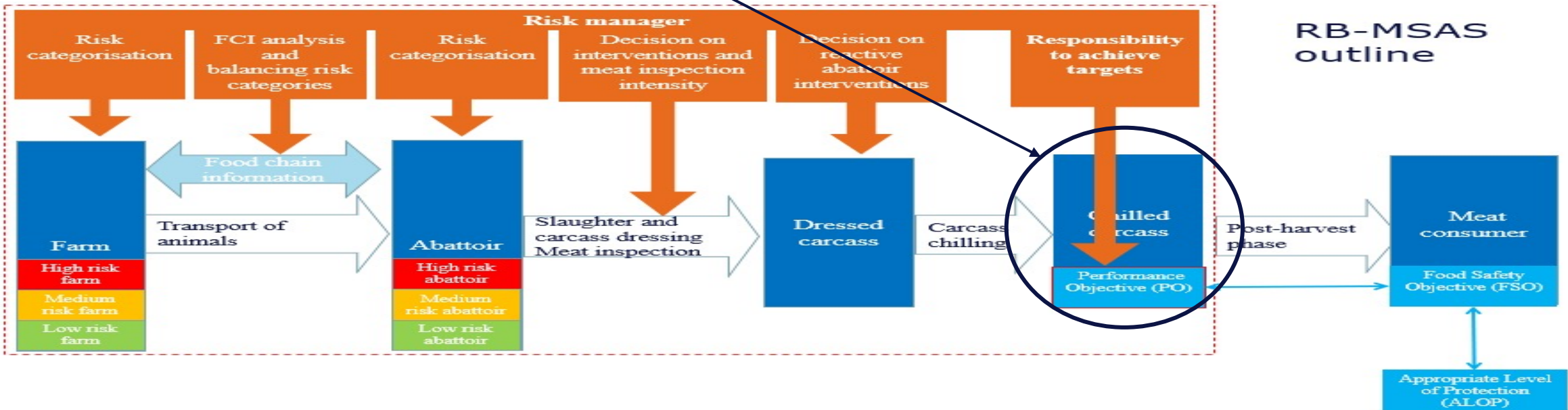
2. Cost efficient



3. Easy to implement (staff training, equipment, lab tests etc.)



1. Agree outcome (**hazard**) and process stage
2. Agree monitoring procedure (units, sampling sites, frequency etc.)
3. Agree performance limits and categories (e.g. good v poor performance or L, M and H)



WG3 2. Components-based (Holistic) FSMS-PA

1. Break FSMS down into individual components
2. Assess (score) each component separately according to defined criteria
3. Summarise individual scores into overall FSMS performance score

Note:
The actual hazard outcomes on the carcass are just one of the many components in this assessment model!

FSMS Component	Assessment levels / options / categories	Score
1 FCI as it is now	Abattoir does not systematically collect, analyze or respond to the information in the FCI	0.00
2 FCI with additional WG2 suggestions (= improved FCI)	Abattoir does not collect, analyze or respond to the information in the FCI. No system for FCI	0.00
3 Financial penalisation of farmers	The abattoir does not systematically apply financial penalisation of farmers as a response to dirty livestock (C, S & P) and birds	0.00
4 Pre-slaughter, inside lairage interventions (shearing/clipping) (only C, S & P)	High risk animals are not identified as part of routine practice for interventions to minimise faecal contamination of carcasses	0.00
5 Preselection of herds before slaughter (WP2)	The abattoir does not systematically apply risk based categorisation of herds or farms or suppliers, including transport for adapting the slaughter process. Animals without information are not considered as high risk	0.00
6 Logistic slaughter	The abattoir does not systematically apply logistic slaughter principles (slaughtering order) to address different levels of risk from animals of different states of health and cleanliness	0.00
7 Adapting line speed	Abattoir does not systematically proactively adapt the speed of the line to the level of hazard present on live animals	0.00
8 GMPs & GHPs	(score this component in its own, separate Tab)	0.08
9 Hygiene assessment systems (SCORE FIXED)	The abattoir is systematically hygiene assessed only by internal sources through audits. The abattoir systematically implements measures to follow up non-conformities	0.50
10 Staff training	(score this component in its own, separate Tab)	0.00
11 Other PRPs (pest control, storage conditions etc.) (SCORE FIXED)	Visual inspection and documentary evidence (including from internal and external audits) indicate that some / a number of PRPs relevant to carcass meat safety are NOT implemented and monitored effectively	0.50
12 HACCP	(score this component in its own, separate Tab)	0.00
13 Carcass interventions at slaughter	No intervention or interventions with NEGATIVE effects (i.e. leading to increase in contaminations, such as carcass washing)	0.00
14 Chilling	Water spray chilling	0.00
15 Carcass freezing	The abattoir does not systematically apply freezing of carcasses to respond to specific hazards	0.00
16 Use different sale channels (SCORE FIXED)	The abattoir occasionally uses different sales channels to control pathogens, depending on the level of risk on the carcass, but it is not systematically	0.50
17 Inform and follow up with farms	Abattoir does not systematically inform source farms of meat inspection findings and lab results on pathogens and does not follow up with the aim of hazard reduction at source	0.00
18 Monitoring and continuous improvement (SCORE FIXED)	(score this component in its own, separate Tab)	0.50
19 Microbiological testing	(score this component in its own, separate Tab)	0.00
20 Communication (SCORE FIXED)	Some evidence of an internal and external communication chain on food safety issues is present	0.50
21 Internal auditing	(score this component in its own, separate Tab)	0.00
Abattoir FSMS performance score		2.58

Notes for the user

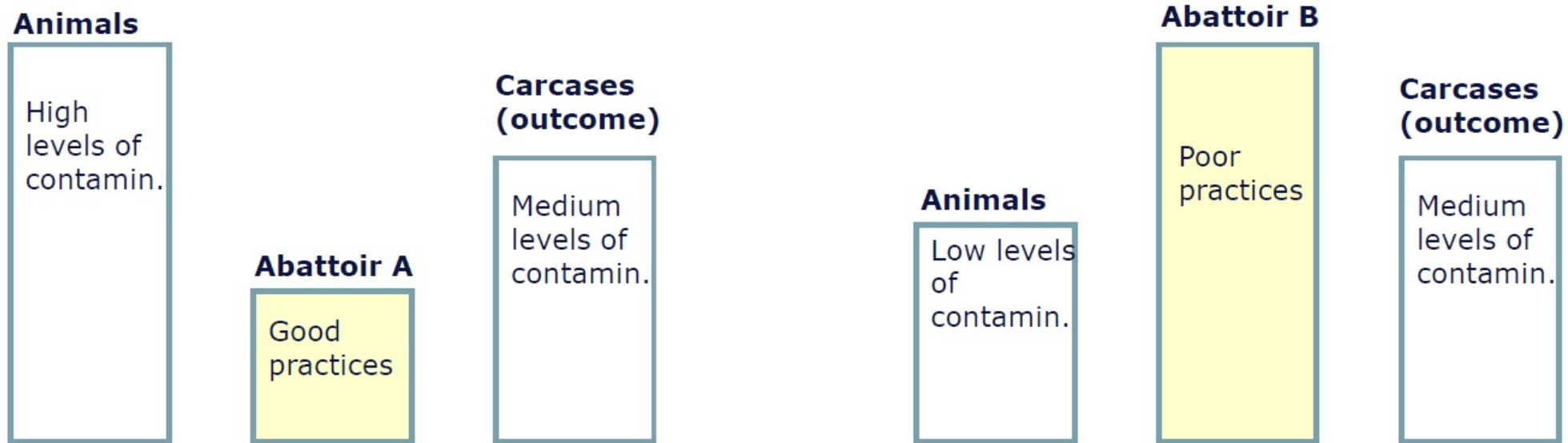
Abattoir FSMS performance category **Low**

WG3 Strengths and weaknesses of 2 FSMS-PA methods

	Strengths	Weaknesses
Outcome-based FSMS-PA	<ul style="list-style-type: none">• Easy and cheaper to design and monitor• More intuitive. Easier to understand• ...	<ul style="list-style-type: none">• Does not identify the source of a problem• Cannot separate the effect of the abattoir FSMS performance from external factors (e.g. farm prevalence, state of animals etc.)• (Higher lab costs)• ...
Holistic FSMS-PA	<ul style="list-style-type: none">• Can identify the source of problems• More effective in assessing the <u>actual</u> performance of a FSMS• (Lower lab costs)• ...	<ul style="list-style-type: none">• Higher initial cost to design and implement• More labour intensive to run (based on audits)• More complex• ...

WG3 Strengths and weaknesses of 2 FSMS-PA methods

Outcome-based FSMS-PA weakness



Discussion: Does this limitation matter in the end?

WG3 Issue 1 - Effectiveness of FSMS components (1)

Issue: The FSMS components do not have the same effectiveness against all hazards

Examples:

FSMS Component	Hazard		
	Faecal bacterial pathogens	Parasites	Chemicals
Good slaughter practices	Very effective	Not effective	Not effective
Freezing	Somehow effective	Very effective	Not effective

How to reflect this fact in the FSMS-PA? Assign effectiveness weighting scores per component and hazard through...

- Data deriving from studies and publications
- Expert elicitation

WG3 Issue 1 - Effectiveness of FSMS components (2)

Effectiveness weighting scores per component and hazard: The RIBMINS WG3 case

Source: Expert elicitation (WG3 team)

Scores range: 0 (not effective at all) – 2 (very effective)

	Cattle				Pigs			Poultry			Sheep			
	Salmonella	VTEC	Dioxins	DLPBs	Samonella	Yersinia	Toxoplasma	Campylobact	Salmonella	ESBL	Toxoplasma	VTEC	Dioxins	DLPBs
Monitoring and continuous improvement	1.90	1.90	0.70	0.78	1.70	1.67	0.88	1.70	1.63	1.67	0.88	1.7	0.8	0.8
Inform and follow up with farms	1.40	1.40	1.13	1.00	1.30	1.33	1.56	1.40	1.20	1.44	1.44	1	0.67	0.67
Use different sale channels	1.80	1.80	0.75	0.57	1.70	1.89	1.90	2.00	2.00	2.00	2	1.9	0.44	0.44
Internal auditing	1.70	1.70	0.75	0.57	1.60	1.56	0.56	1.50	1.50	1.56	1.11	1.6	0.75	0.75
Preselection of herds before slaughter (WP2)	1.80	1.80	0.50	0.56	1.80	1.67	1.40	1.70	1.88	2.00	1.2	1.4	0.6	0.6
HACCP (as per Codex)	1.80	1.80	0.60	0.44	1.60	1.56	0.60	1.78	1.60	1.78	0.6	1.7	0.44	0.44
Microbiological testing	1.90	1.90	0.20	0.22	1.90	1.89	0.50	1.90	1.80	1.89	0.4	1.9	0	0
Staff training	1.80	1.80	0.10	0.33	1.60	1.44	0.30	1.30	1.30	1.22	0.3	1.8	0.2	0.2
Communication	1.00	1.00	1.00	1.00	1.20	1.22	1.00	1.30	1.30	1.33	1.3	1.2	1.22	1.22
FCI with additional WG2 suggestions	1.44	1.56	0.43	0.43	1.78	1.56	1.67	1.60	1.38	1.44	1.2	1.4	0.25	0.25
Carcase interventions at slaughter	1.90	1.90	0.00	0.00	1.80	1.89	0.10	1.90	1.89	1.67	0.1	1.9	0	0
Adapting line speed	1.80	1.80	0.00	0.00	1.33	1.25	0.00	1.20	1.10	1.11	0	1.67	0	0
Good hygiene practices	1.80	1.80	0.00	0.00	1.70	1.78	0.00	1.70	1.60	1.67	0	1.8	0	0
Special slaughter arrangements	1.80	1.80	0.00	0.00	1.38	0.88	0.22	1.00	0.88	1.50	0.1	1.9	0	0
Logistic slaughter	1.60	1.70	0.11	0.13	1.60	1.56	0.10	1.60	1.89	2.00	0.2	1.3	0	0
Conventional chilling (carcase fit for human consumption: dry chilling, b	1.50	1.50	0.00	0.00	1.30	1.22	0.00	1.40	0.89	1.00	0.2	1.1	0	0
Hygiene assessment systems	1.50	1.50	0.00	0.00	1.11	1.22	0.11	1.50	1.33	1.44	0	1.7	0	0
Carcase interventions during chilling	1.38	1.38	0.00	0.00	1.22	1.38	0.11	1.56	1.33	1.38	0.11	1.33	0	0.11
Post-chilling carcass interventions (cutting/deboning stage)	1.33	1.33	0.00	0.00	1.25	1.43	0.00	1.50	1.25	1.29	0	1.22	0	0
GMPs	1.30	1.30	0.00	0.00	1.20	1.00	0.20	1.40	1.30	1.22	0	1.4	0.1	0
Pre-slaughter, inside lairage interventions (shearing/clipping)	1.20	1.40	0.00	0.00	0.50	0.33	0.13	0.10	0.11	0.11	0	1.6	0	0
Financial penalisation of farmers	1.30	1.20	0.00	0.00	0.78	0.67	0.67	1.10	1.00	1.11	0.4	1.1	0.2	0.2
FCI as it is now	0.89	0.78	0.38	0.38	1.56	0.78	0.67	0.90	1.00	1.56	1	0.8	0.56	0.56
Carcass grading (class A, B, C etc.)	1.00	1.00	0.30	0.11	1.00	1.11	0.90	0.90	1.00	0.89	0.7	0.9	0.1	0.1
Carcass freezing	1.00	1.00	0.00	0.00	1.00	1.00	1.90	1.60	1.10	1.22	2	0.89	0	0
Other PRPs (pest control, storage conditions etc.)	1.00	1.00	0.00	0.00	0.89	0.88	0.33	1.00	1.00	1.00	0.2	1	0	0
	38.84	39.05	6.95	6.52	35.80	34.17	15.81	36.54	34.26	36.50	15.44	37.21	6.33	6.34

Issue: The various hazards have different public health impacts – How to reflect this in the FSMS-PA (final abattoir score)?

Solution: Assign weighting scores for hazards from PH impact indicators / criteria

Hazard	PH Impact criteria				
	No. of cases	No. of hospitalisations	DALYS	Source attribution: Food, meat...	Other...
Salmonella
Toxoplasma
Dioxins
ESBL
Etc.

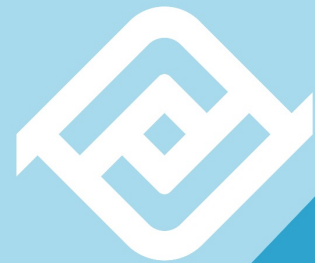
(see presentation '*Global risk categorisation of pig farms and pig abattoirs*')

WG3

WG3 Team

A big thank you to all WG3 Team members for their hard work in this objective

Thank you for the attention.
Please join us at



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