Stakeholders' views regarding new practices to control microbiomes

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000213

HoloRuminant – Introduction

- We are gaining a better understanding on the role of microbes in animal production
- Scientists are developing new ways that utilize microbes to improve animal health and welfare and to mitigate environmental impacts of farming.
- These innovations must be adopted on farms in order to gain the benefits ➔ We need to understand better how farmers and other key actors feel about using innovative methods
- Our aim was

  1) to collect stakeholders' perceptions, expectations and practices to manage microbial ecosystems, and

  2) to explore stakeholders' willingness to accept proposed innovations.

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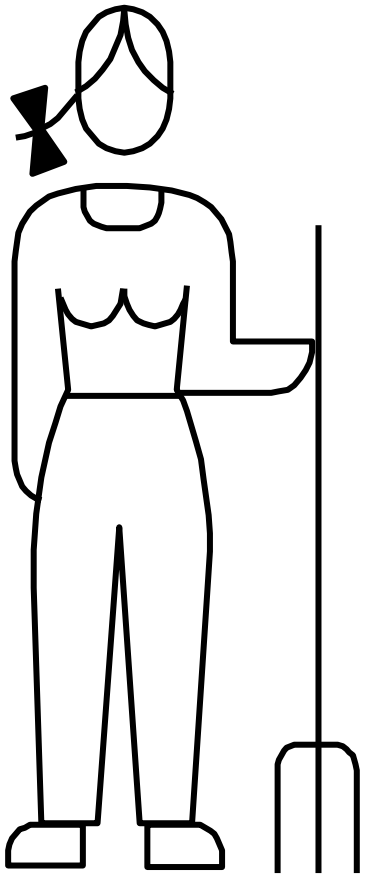
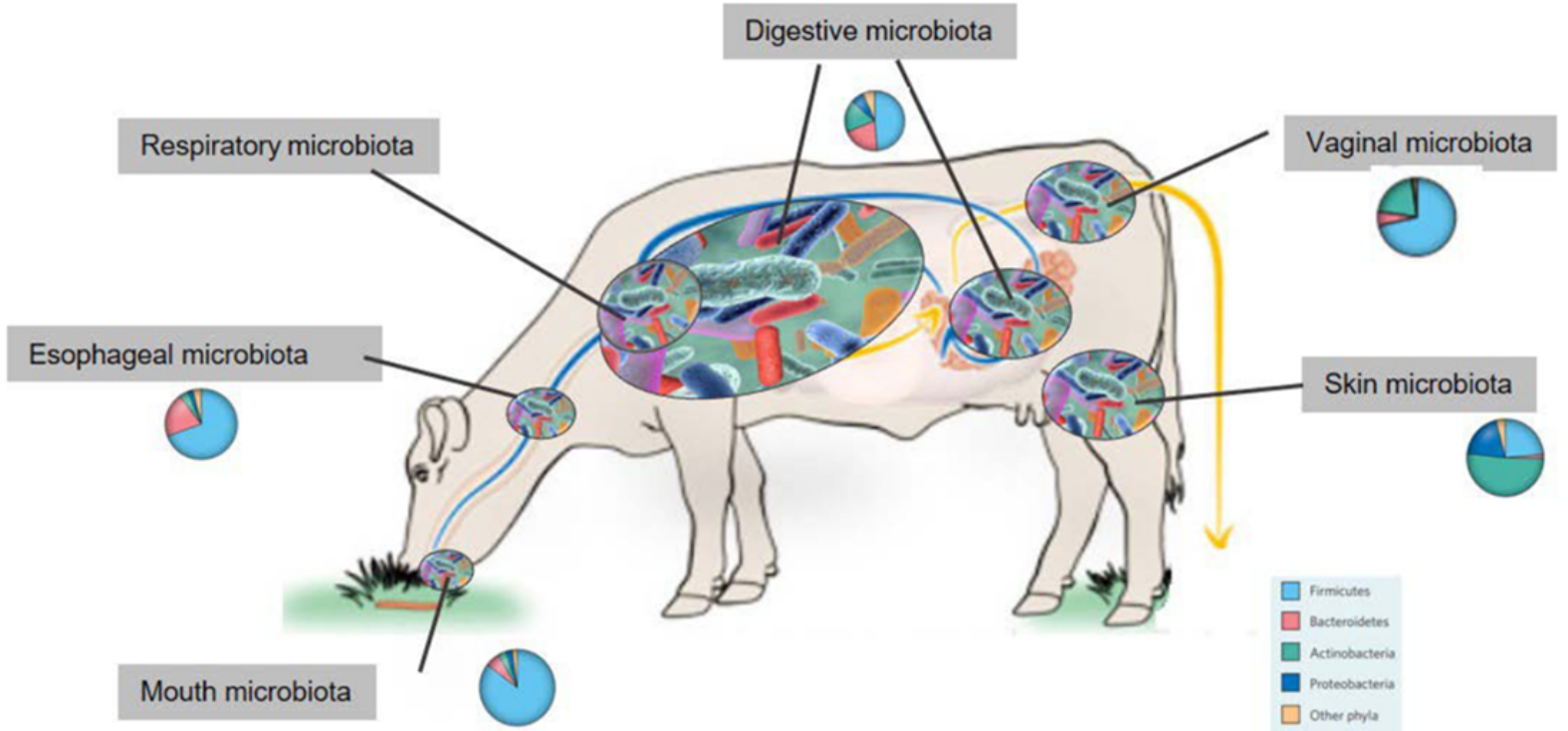
HoloRuminant – Microbial ecosystem





INRAE Productions Animales, 2020, numéro 4

- Microbial communities (bacteria, fungi, viruses) that live on the skin and mucous membranes of ruminants.
- Microbes differ between animals.
- Important role in the defense system and maintain health.

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HoloRuminant – Methods

- A review of decision-making to explain the adoption of innovations and farming practices
  - Decision-making theories and empirical results
  - Synthesis of findings
- Five nationals focus group discussions (N=43 actors; farmers, advisors and other actors) in four European countries (France, Finland, Poland, Ireland) covering the following themes:
  1. Identification of microbiomes on farms
  2. Stakeholders' knowledge
  3. Opinion on the role of microbiomes in production, health and GHG emissions
  4. Opinions on innovations relating to early life, dietary transition and environmental issues.
- European stakeholder & policy maker focus group held in Belgium
- Standard protocols for the focus groups
- Participants were recruited through national contact networks.

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HoloRuminant – Photos from the discussion groups

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- Theories explaining the adoption on technologies, for example
  - Expected utility theory
  - Reasoned action theory and its extension, the theory of planned behavior (Ajzen, 1991; Fishbein & Ajzen, 1977)
  - Innovation diffusion theory (Everett, 1995)
- Financial aspects, knowledge and perceptions are strong drivers for the adoption of practices.
- Endogenous factors such as the perceived impact of diseases, the lack of knowledge, and technical skills can be barriers for the adoption of new practices.

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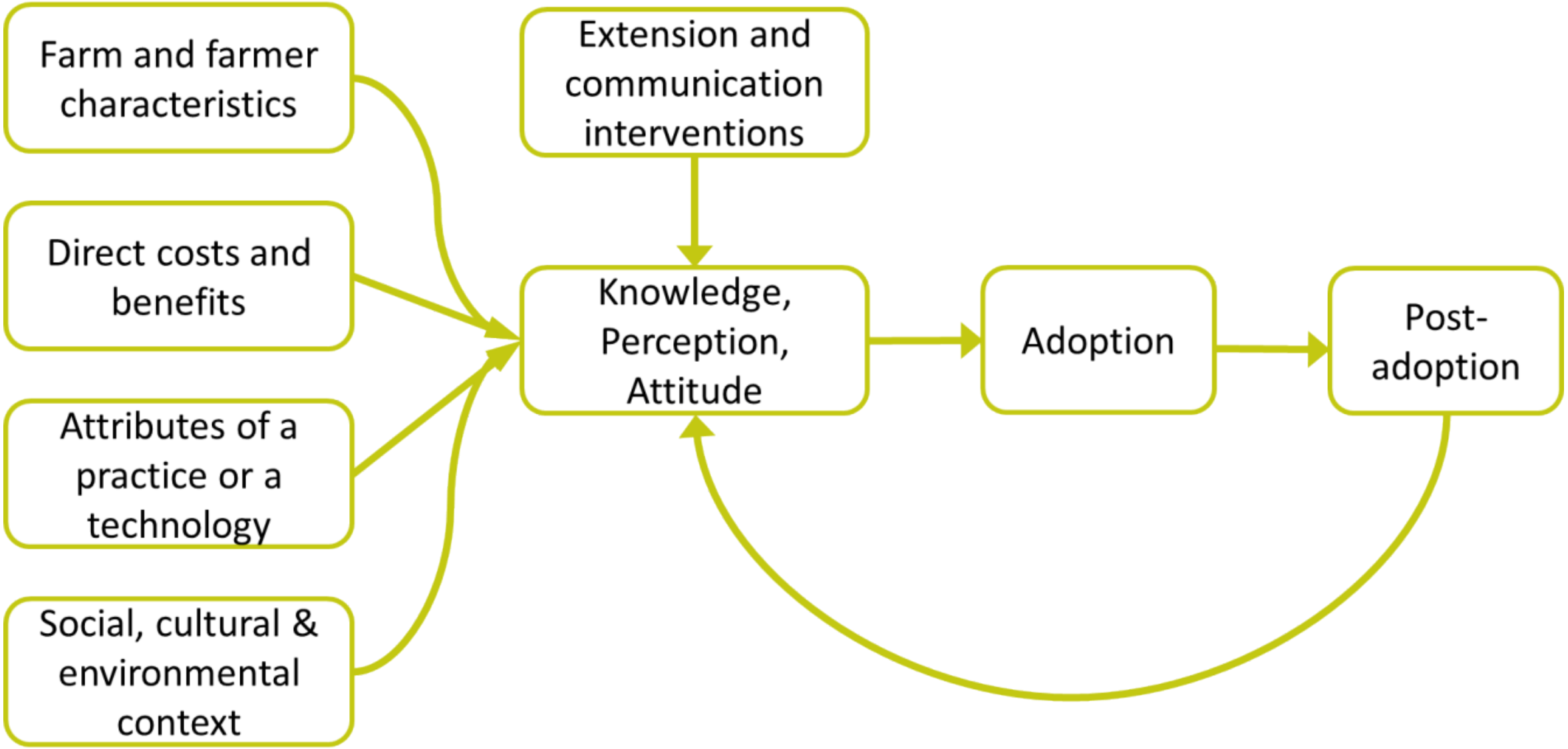
HoloRuminant – An adoption framework



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Results – Practices identified based on participants' previous knowledge

- The participants had some knowledge about microbiome and could identify at least the following practices affecting microbiome.

Ireland	France	Poland	Finland
Facilities	Building and housing	Welfare (incl. housing, feeding, health)	Management of feeding
Nutrition	Feeding		
Biosecurity	Biosecurity, Hygiene in general and at milking	Hygiene, biosecurity	Biosecurity, hygiene
	Care of young animals	Calf management	
Knowledge (Training and transfer)	Treatments of animals	Genetics	Health of adult animals
		Regional differences	Care of young animals
		Consumers' attitude	Management (leadership, planned procedure…)
		Human factor	

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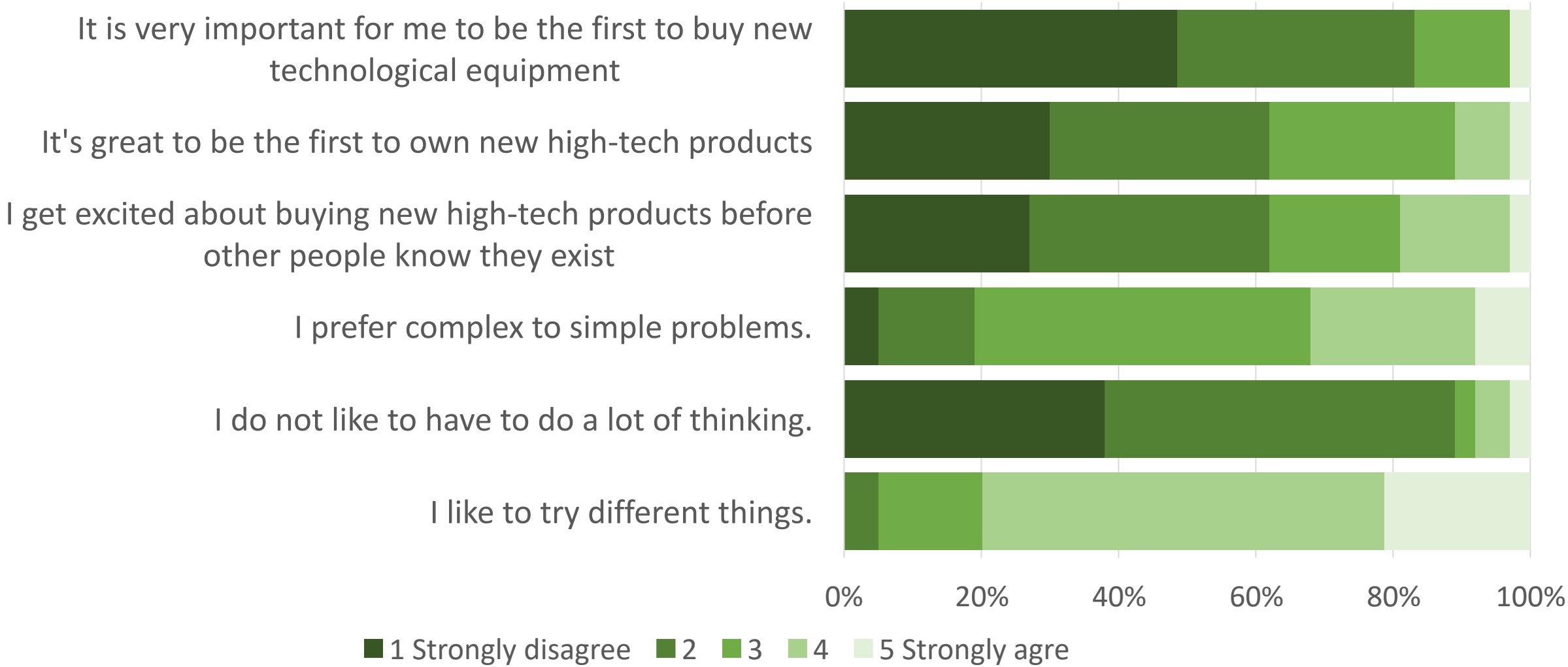
Results – Some innovativeness features of focus group participants



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Results – The importance of early establishment of a “good” microbiome for young animals was understood well.

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Results – Barriers, enabling factors and needs

Barriers	Enabling factors	Needs
Keeping young animals with the adults for an extended period		
No suitable facilities ➔ Too few calves per age group Disease challenges on the farm Increased working time and cost, reduced milk sales No pasture on the farm Not seen as relevant	Improved animal health Consumer & societal demand Done in sheep & goat farming ➔ learning & inspiration? Return to the "old" system? Testing in a small animal groups Reduced workload	➔Invest in additional pen space Practical examples, skills to see e.g. if the calf has had enough milk Economic incentives Knowledge on calf stress & health, somatic cell count & mastitis, management methods
Dietary transition (weaning and dietary transition for the cows)		
Gradual weaning requires space This is not 'fit for all' solution Not an option in complete feeding, as all animals are fed similarly	Thermal imaging camera to identify sick calves could help Nose flap could help Enhanced animal health	Good herd management skills Routines, planning Space for transition feeding, separate boxes Good health management (vaccines,parasite control)

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Results – Barriers, enabling factors and needs

Barriers	Enabling factors	Needs
Feed additives to reduce greenhouse gas emissions		
Other alternatives are preferred Costly, doubts on health impacts Dependency on industrial product Farmers feeling threatened Poor knowledge about emissions	If the additive permit to increase the energy of the feeding ration, it might be interesting for the farmer	Research-based, local knowledge No negative impact on milk yield, animal health and welfare, food safety and economic results Society's support (subsidies?)
Adding probiotics to the feed of the animals to gain health benefits		
Good feed/management preferred Worries: undesired impacts, use cost and diversity of micro-organisms Dependency on a company Time to produce probiotics	Already known and used on farms Prevention ➔ Interesting. less work Colostrum as a natural probiotic Probiotics produced on the farm Fermented plant extracts	
Microbiota approaches to improve disease prevention and detection		
-	Improving health and preventing diseases is interesting Word-of-mouth, if it works well	Lead farms can "show the way" Independent advice & validation Easy test results (yes/no) Sound economic analysis, low cost

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Results – An example of practices discussed in the Finnish focus group

Solutions for good delegation of work and maintenance

- Delegation➔ Each task has a responsible person, create ownership, give responsibilities to workers
- Reserve time for regular follow-ups and accumulation of knowhow to ensure.
- Planning ➔ Small tasks tend to be ignored if they are not scheduled
- Focus on monitoring only essential parameters
- Guiding new workers, providing clear work instructions with illustrations
- Use of whiteboards
- Giving responsibility to a worker helps to feel more comfortable at work

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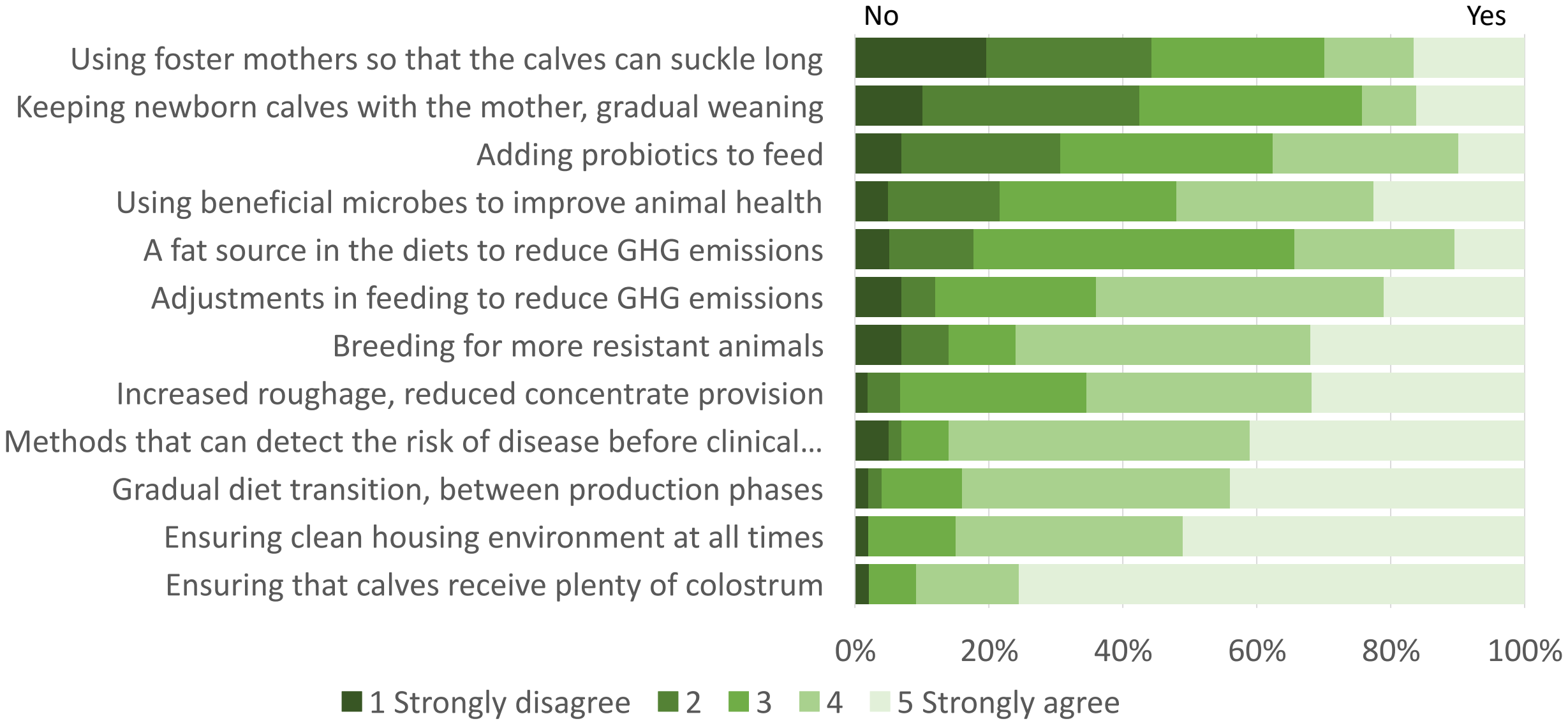
Results – I would recommend a practice….



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Conclusion – How to encourage the adoption of new methods?

- Have strong scientific evidence that the practice is affordable and has has a positive effect on production parameters, farm's workload, animal health, the quality and safety of products, the environment and sustainability of ecosystems.
- Demonstrated applicability and efficacy in local farms, where practical aspects such as work organisation, management, infrastructure can be shown in local contexts.
- Farmers' behavior is also influenced by the level of knowledge, skills and the perceived usefulness of practices ➔ Capacity building, provision of adequate training.

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Thank you for your attention

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