



Environmental assessment of feeding strategies of precision feeding in growing-finishing pigs (Task 6.2.)

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Objectives

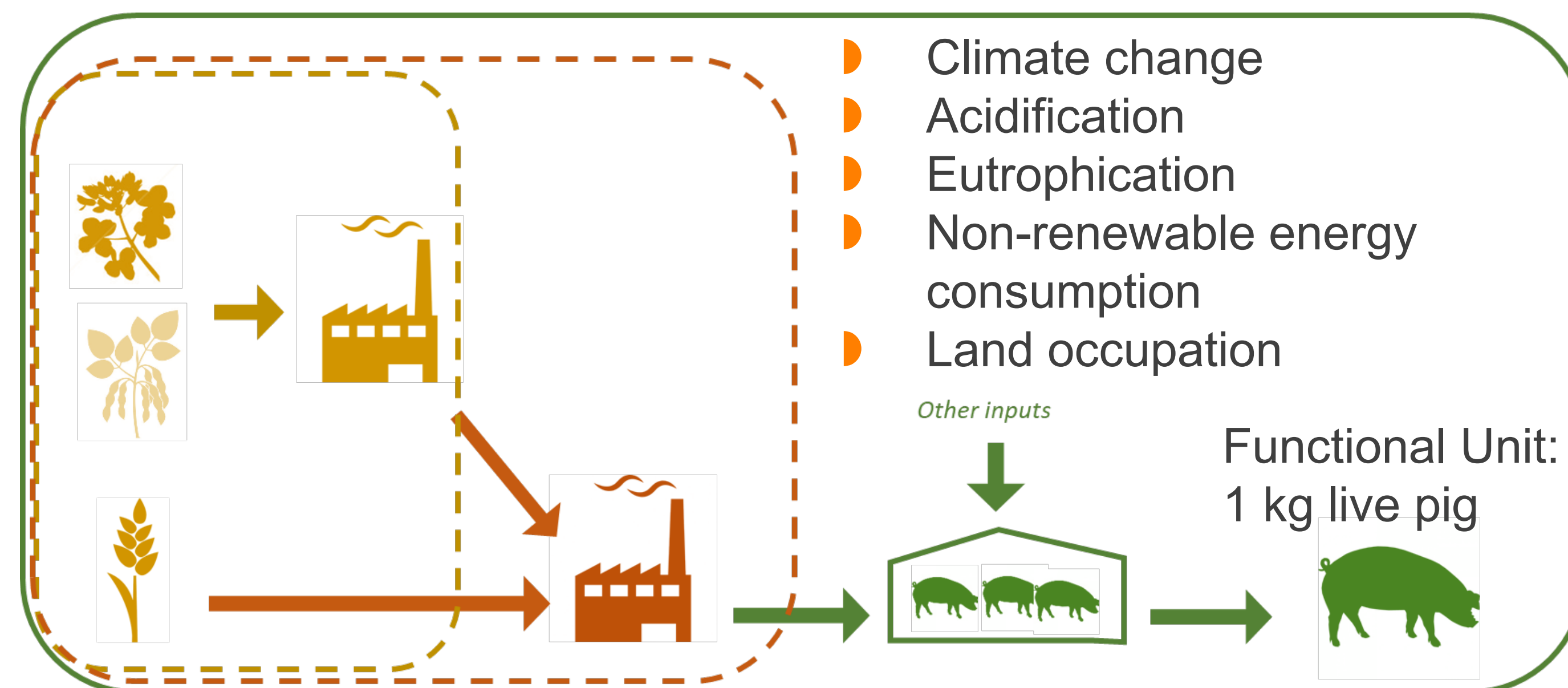
Feed production and excretion of nutrients by the animals are the major sources of the environmental impacts of pig production. The development of communication and information technologies in pig farms allows today the development of precision feeding (PF) in growing-finishing pigs, which appears as a promising technology to decrease environmental impacts of pig production. However, few studies have compared environmental impacts of conventional and PF. Therefore, an objective of Task 6.2. within Feed-a-Gene was to perform life cycle assessment (LCA) of pig production with either conventional or PF applied to growing-finishing pigs.

Two assessments

Experiments → current level of improvement

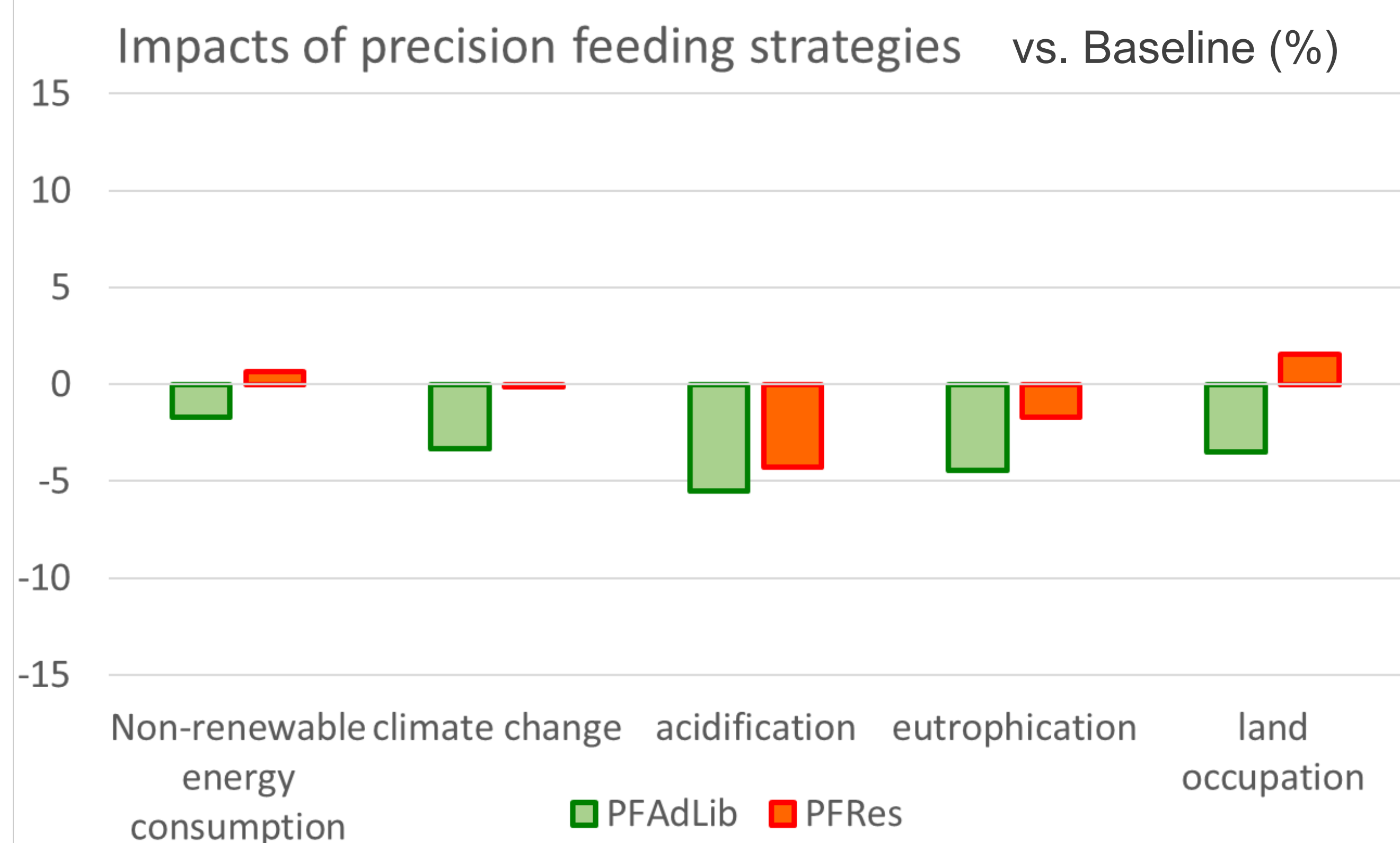
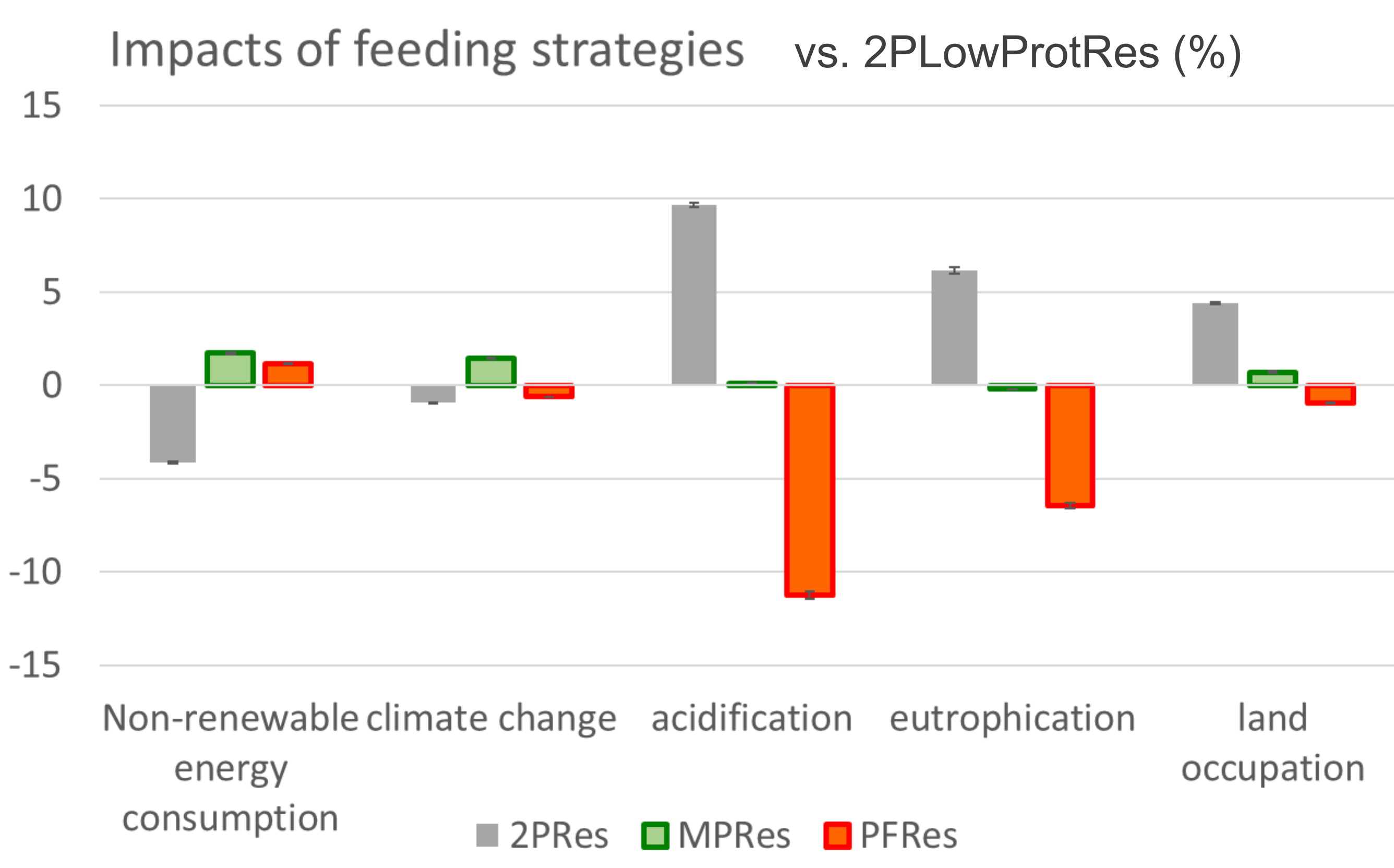
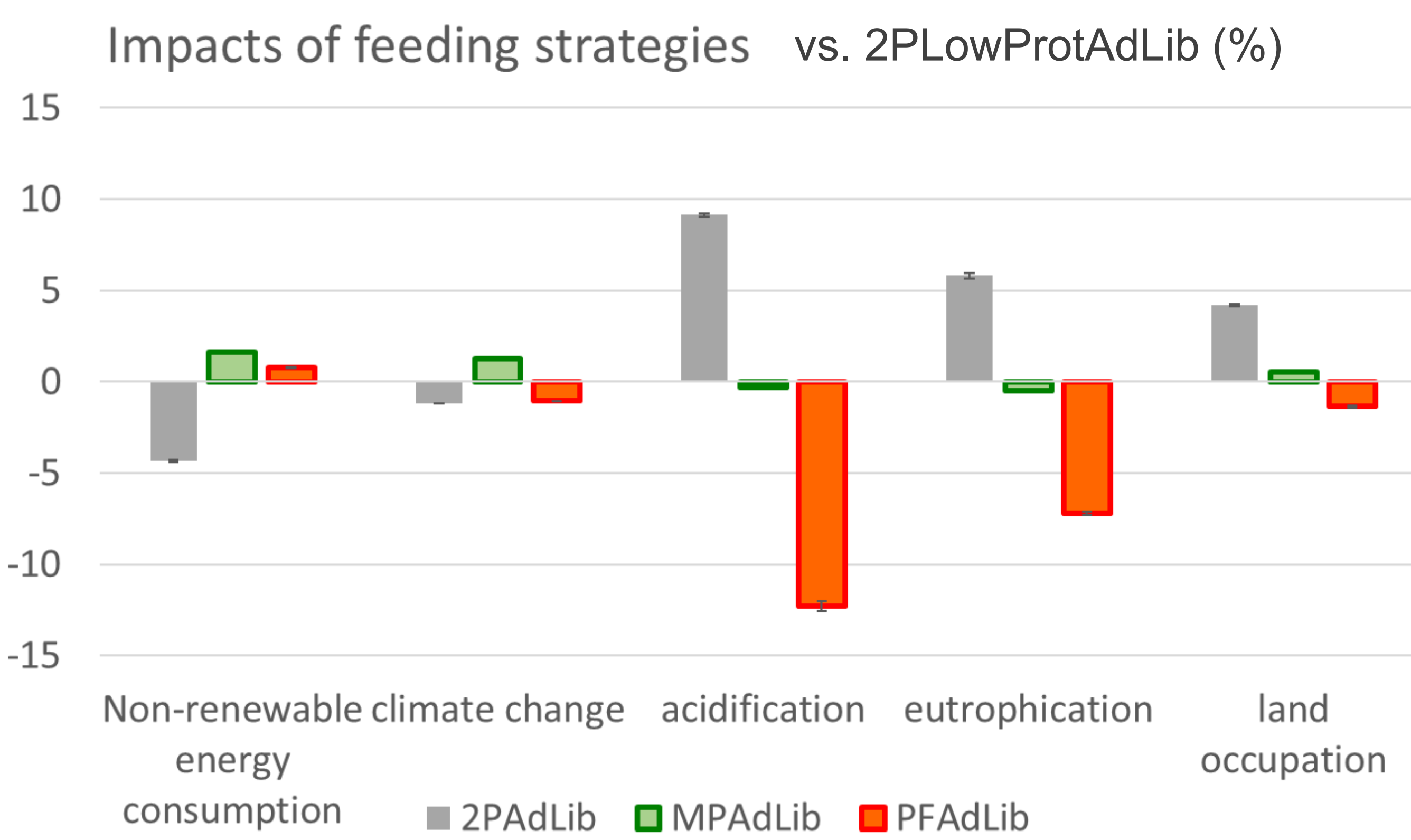
In the ExpAdLib experiment, two-phase <i>ad libitum</i> (2PAdLib) feeding was compared to <i>ad libitum</i> PF. In this case, 2PAdLib is the baseline scenario	
In the ExpRes experiment, two-phase restricted (2PRes) feeding was compared to restricted PF (PRes). In this case, 2PRes is the baseline scenario	

Cradle-to-farm-gate LCA



Simulations → potential of improvement

With the model developed by Cadero et al. (2018), four feeding programs – 2P (reference two-phase), 2PLowProt (two-phase with low protein content), MP (daily multiphase group feeding) and PF (daily multiphase individual feeding) – were simulated according to two levels of supply: AdLib and Res.



Precision feeding as a way to reduce environmental impacts

- N excretion ↓ in PF → PF systematically reduces acidification and eutrophication impacts
- Climate change is reduced experimentally in ad libitum feeding but not in restricted feeding because the higher energy consumption is not compensated by a lower feed conversion ratio
- Climate change is not reduced in simulations due to a little increase in feed conversion ratio
- The environmental gain obtained with precision feeding is very sensitive to the modalities of application of precision feeding (digestible lysine contents of feeds formulated, impacts of feeds, feed supply). Therefore, the construction of precision feeding strategies should take into account the effects of modalities of application not only on feed cost and nutrient excretion but also on environmental impacts of feeds and on animal performance.

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