Concluding notes

The four groups discussed the following aspects and highlight their relevance for sustaining and advancing grassland ecosystem service multifunctionality and in agroecology:

(1) **Extensive grasslands** - Site-adapted grassland management for more ecosystem services: Where and how do we need to extensify?
- Challenges remain with introducing species into existing grasslands such as to be able to move from action-based to result-based agri-environmental measures (e.g., indicator species required for BFF Q2); e.g., overseeding not always effective; complete ploughing not desirable. An option might be to introduce *Rhinanthus* species alongside to weaken productive grasses.
- Use cutting date and height to steer BFF plant communities, e.g., early cutting against reed dominance in wet grasslands.
- Rewetting is important to preserve remaining peat, requiring extensification and collaboration at regional scale (land owners and users).
- A national strategy to steer the local extensification of grassland management is required. Mountain farms depend somewhat less on production (but more on subsidies for managing the land) compared to lowland farms, for which extensification of such locations is a big challenge.

(2) **Intensive grasslands** - Challenges in intensive production: How to promote ecosystem services but not restrict production?
- Current challenges in intensive grasslands are (i) nutrient use efficiency, (ii) sward composition stability over time, and (iii) yield stability, with global change making these issues additionally severe. Thus, many challenges will considerably increase in the future.
- Climate change will result in different optimal plant community compositions at some places and also in changes in cutting dates as annual weather variability will increase.
- A certain proportion of intensive grasslands is managed too intensively (e.g., very low cutting height; focus on ray grass not always justified), resulting in issues with weed infestation (etc.).
- Policy and industry incentives increase requirements for farmers but do not always achieve the desired (production) goal. Agroecological approaches might be an entry point to improve this situation.
- Tradeoff of intensive production with other services/biodiversity in intensive grasslands. Thus, landscape-scale multifunctionality is key; incentives and policies should consider scales beyond farm-level. Yet, intensive production of high-quality grass-based feed needed to avoid feed-food conflicts arising from intensive concentrate feeding.

(3) **Grasslands in the crop rotation** - Do people know that grassland multifunctionality also supports a plant-based diet?
- Grasslands in the crop rotation (leys) of vast importance for organic farms, especially for weed control and nutrient fertility/soil carbon but also other services; link to agroecology.
- Farmers are generally aware of benefits of temporary grasslands, but in regions without ruminants their cultivation is much less attractive. Future/alternative uses of the cuttings will

be increasingly important such as use as mulch/fertilizer, protein extraction, pellets, biogas, packaging material. Several challenges associated with these uses (cultural, technical but also ethical).

- Experience from the long term DOK trail shows the vast importance of leys and associated farmyard manure to be key for maintaining soil fertility and carbon stocks. Potential tradeoff with CO2-eq. emissions from animals and stressing the relevance of mixed systems for closed nutrient cycles.
- Current pressure to reduce leys and produce more cash crops; policymakers not necessarily aware of the importance of leys and the associated ecosystem services. Reduction of maize for animal feed (and other arable-based feed production) appears to be ecologically more relevant but is obviously less in the focus of current policymaking.

(4) **Biodiversity conservation** - Actively increasing biodiversity and ecosystem services: How to do it?

- Nature conservation contract with e.g. Vogelwarte or cantons and associated direct exchange on the management practices and goal setting applied are efficient and motivating for farmers.
- Focus of ecological quality of agri-environmental measures (BFF Q2) too much on plant species; other species disregarded. A new system is needed, potentially considering larger spatial scales beyond the parcels.
- Potential trade between farmers (cooperation): extensive areas but also CO_2 certificates conceivable.
- Farmers struggle with the many rules and regulations, and perceive these as demotivating. Goal-oriented policies are preferred.
- Mid-intensive grasslands might overcome the focus on extensive versus high-intensive grasslands at the moment, and provide some more ecosystem services and biodiversity.