**Conclusion planning**

***So, what have I found – and why does it matter?***

***Institutions***

* Different institutions, knowingly or otherwise, supply different elements of the total economic value (TEV) of farm animal and crop genetic diversity. This is important to ensure the full range of values which diversity encodes are adequately supplied through institutional conservation responses.
* Breed and arguably crop variety diversity doesn’t necessarily equate to genetic diversity (ref). Conservation activities should therefore supply explicit facets of diversity to improve the focus of conservation strategies.
* It is unclear how new disruptive technologies, such gene editing, will impact future demand for diversity and therefore supply side responses to architect more or less diversity. This is important because technological progress has been detrimental to diversity (e.g. artificial insemination) but may be harnessed to increase diversity though greater utilisation of trait diversity in future breeding strategies.
* Sustainable intensification is a paradigm that promotes increased resource use efficiencies in agri-production through more efficient application of inputs that maximises outputs and reduces negative environmental externalities. Despite a strong focus on efficiency, SI offers little guidance for policy cultural and heritage values in agriculture, despite their important role as public goods in agriculture. SI as an evolving paradigm must offer greater guidance on how to supply the cultural and heritage values embedded in food and production systems amidst a concerted focus to produce more sustainably.
* FAnGR conservation activities in many countries is not rationalised and this has reduced the effectiveness of conservation schemes seeking to supply (more) diversity. Differentiating incentive support for FAnGR conservation through systematically prioritised breed investments (as employed in PGR conservation using gap analysis frameworks) may improve cost effectiveness of conservation programmes.
* The market undersupplies PGR and FAnGR diversity because market prices generally favour homogenisation of production that erodes diversity but increases yield. While shorter supply chains and niche market development may favour some rare breed and cultivar products, those that lack a demand side value will not benefit. Interventions are needed because homogenisation reduces adaptability for farm systems to cope with climate change impacts and the need to produce more food from marginal lands (Garnett et al., 2017).

**RO Paper**

* There has been little exploration of the cost of conserving FAnGR in smallholder and extensive farm systems, despite the lower cost of capital for these systems to invest in diversity (compared to intensive systems).
* Farmer WTA to conserve rare breeds varies depending on the design of contractual schemes. Our choice model suggests these preferences vary between bovine and ovine farmers.We suggest schemes that meet farmer preferences for contract attributes are likely to result in lower conservation costs and higher scheme compliance.
* We show farmers keeping rare breeds were not WTA less to enrol in a conservation programme, suggesting targeting such farmers per se may not reduce the cost of conservation.
* Farmers keeping rare breeds tended to favour adaptability attributes of a breed m than farmers keeping more intensive breeds, suggesting adaptability is an important factor influencing breed choice (as well as yield). Most farmers thought conserving rare breeds was important for preserving cultural heritage, while retaining genetic diversity was perceived as much less important. This reveals a divergence between wider food security goals (that stress the importance of genetic diversity for food and agriculture) and societal preferences for cultural and heritage values of diversity as a public good. The supply side therefore needs to consider both facets of demand in conservation strategies.
* Multiple barriers to entry persist for many farmers (in our Romanian sample) seeking to enrol in conservation schemes; which ultimately reduces scheme participation.
* Our work suggests a conservation scheme for rare breeds is indeed desirable to Romanian farmers as revealed by high (forecast) participation rates. Moreover, we suggest rates offered in the RDP do meet farmer WTA preferences for undertaking conservation activities.
* Further work to establish whether breed diversity ‘hotspots’ persist in Europe remains an important yet under-explored area. Analysis in this area could help guide the establishment of spatially targeted conservation policies in areas where the opportunity cost of conserving is least (Naidoo et al., 2006).

**BLP Paper**

* We showed the cost of conserving crop wild relatives varies depending on the conservation goal employed. For instance, conservation goals attempting to maximise diversity cost more than those targeting social equity, suggesting a trade-off between different desirable objectives of a scheme. Clear guidance is required on how PES type schemes should consider fairness and social equity considerations in scheme design.
* The cost of conservation, as revealed in the CT survey, was heterogeneous across individual farmers and communities. Additionally, this cost varied between sites located in GMA and non-GMA areas, as well as between ecoregions. This is important because it provides the basis to select least cost providers of conservation services.
* We suggest conservation of CWR across five ecoregions would likely cost between X and X. There are limitations in these cost estimates and increasing the sample size of economic surveys remains an important aspect of future work.
* Empirical rules concerning the geographical coverage of conservation schemes is poorly documented and limited information persists to guide (in situ) investments in CWR diversity. Greater appreciation of proximate indicators of diversity may support optimised investment strategies that minimise overlap in collections.
* We show differentiated conservation strategies should be implemented for some species. Capturing very rare CWR through in situ approaches may add considerable cost to schemes, suggesting ex situ approaches or the use of genetic reserves may be more appropriate. Simply put, there is an underexplored trade-off between maximising the rate of return from conservation investments and the conservation approach employed.
* Competitive tenders have been relatively under-explored in developing countries (Whitten et al., 2017) yet we show capable application for such approaches to determine cost data for conservation activities. The application of a BLP model demonstrates discriminatory payment rules can result in cost effectiveness improvements over uniform payment rules and we suggest the use of auction mechanisms for supplying PACS (but also PES) has merit over traditional, fixed price approaches.

**UK MCDA**

* This application is the first to rationalise breed incentive support based on the MCDA framework and we suggest capable application to guide investments in the use and non-use value attributes of breeds.
* Severel data gaps persist for rare breeds that constrain conservation decision making. There is a need to apply established and novel genetic technologies to explore traditional and rare breed traits that may inform conservation spending. The former undermines arguments to conserve for ‘option value’ sake alone.
* Our work suggests endangerment, diversity and lastly marketability should be systematically promoted as reasons for conservation. The most important criteria to inform conservation decisions as deemed by experts was X and X.
* We show how the allocation of a Breed Improvement Fund (BIF) varies depending on the scheme objectives that target different value attributes of diversity. This provides important basis for clearly defining the objective of an (agrobiodiversity) scheme and the associated variation in scheme cost.
* A PCA on the criteria employed for rationalisation suggests some correlation, implying these could be reduced. However, we also suggest further work to increase the scope of criteria included may capture other proximate use and non-values of preservation.
* Addressing opponents for conservation triage, we suggest conservation of farm animal and crop diversity may circumnavigate many issues triage, namely because this diversity is “human-induced” and not the product of natural selection.
* In the UK, Brexit is impacting future rural policy. There is a need to demonstrate public monies are being used for public goods through the construction of new policy approaches that rationalise breed support to transact for demand and supply the broader range of use and non-use values of diversity.
* Exploring the use of conservation tenders to identify least cost suppliers of agrobiodiveristy conservation services in the UK appears warranted.

***What do I know now, that I didn’t know before?*** (e.g., before I read the literature or before I collected and analysed the data)

* FAnGR supply different facets of economic value located on the TEV spectrum.
* Agrobiodiversity conservation schemes are poorly targeted and investments in diversity are blanket funded, which ultimately leads to cost inefficiencies and non-optimal supply of diversity as a public good.
* Subsides offered in the RDP did match the expectations of farmers in Romania for supplying FAnGR conservation services.
* Farmers currently keeping rare breeds may not necessarily be cheapest suppliers of conservation services.
* Farmers generally support conservation activities for conserving cultural heritage.
* Farmers WTA for conserving CWR in Zambia is heterogeneous. Large variations persist in farmers bid offers, and these vary by community, land designation and ecoregion.
* Our results suggest a trade-off between diversity and social equity in agrobiodiveristy schemes. Clear guidance is needed to manage these factors in future scheme design.
* Considering cost in scheme design can help inform the selection of appropriate conservation approaches (i.e. in situ or ex situ). For instance, capturing rare populations in situ may entail excessive cost, suggesting alternative measures, such as ex situ storage, may be more appropriate.
* Rationalising investments in diversity may improve conservation outcomes. We show MCDA considers both extinction risk and the public benefits that may arise from conserving FAnGR. This wider scope better considers the use and non-use values of diversity.
* The hypothetical allocation of a BIF was sensitive to the conservation goal employed.
* A PCA revealed important relationships between some criteria. First, breeds with greater adaptability and hardiness were more likely to be used in conservation grazing schemes. Second, collection of breed germplasm (for genebanking) is rationalised by breed endangerment. Third, diversity is positively correlated with endangerment status (i.e. more diverse breeds are generally less endangered).

**Conclusions should do some or all of the following:**

* remind the reader of the research problem and purpose and how they were addressed
* briefly summarise what has been covered in the paper
* make some kind of holistic assessment/judgement/ claim that pertains to the whole project (i.e., more than a descriptive summary)
* assess the value/relevance/ implications of the key findings in light of existing studies and literature
* ‘speak’ to the Introduction
* outline implications of the study (for theory, practice, further research)
* comment on the findings that failed to support or only partially support the hypothesis or research questions directing the study
* refer to the limitations of the studies that may affect the validity or the generalisability of results
* make recommendations for further research
* make claims for new knowledge/ contribution to knowledge.

We know, for example, the structure of a Conclusion section in a thesis commonly follows these stages or moves:

* An introductory restatement of research problem, aims and/or research question
* A summary of findings and limitations
* Practical applications/implications
* Recommendations for further research