ANIMAL WELFARE

What animals experience, how they perform and whether they are being treated with respect are important both to 'them' and to us. Heavily contested is (1) what we think and understand is important to animals and (2) whether the way we farm adequately emulates their underlying nature or 'telos'.

Animal Welfare framework:

the Five Domains of animal welfare :

1) Good nutrition;
2) Good environment;
3) Good health;
4) Appropriate behaviour;

5) Opportunities for positive mental experiences, i.e. promoting 'healthy' emotional states.

Animal welfare assessment metrics:

Animal welfare can be assessed for each of the 4 primary domains, using surrogate markers or behaviours that can be linked accurately with their welfare state. A total of 67 indicators have been identified and prioritised in the supporting report. Below are examples suitable for academic-led and practitioner-led research / transdisciplinary collaboration.

DOMAINT	RESEARCH TYPE	INDICATOR	METHODS
1	Academic	Macro/Micronutrient balance	Analysis of soil/plant chemistry (incl. 2o compounds) in relation to an animal's biological status, using blood samples, ELISA, etc.
1	Practitioner	Body Condition Score (BCS)	Assess a percentage of the herd/flock at key times during the year, according to industry guidelines, to identify poorly performing animals.
2	Academic	Environmental enrichment provision	Comparison of different environmental features, using choice tests, to identify those of greatest utility to animals.
2	Practitioner	Utilisation of paddocks by animals	Scan/focal sampling of animals at different times of day/season, to identify which aspects of the environment they are using and if problems are evident, e.g. huddling during cold weather or clustering around trees in shade-sparse areas during hot weather.
3	Academic	Oxidative stress	Lactation stress produces changes in the levels of non-esterified fatty acids (NEFA) that can be measured by biochemical assays (Adewuyi et al., 2005).
3	Practitioner	Animal health spend	Farm records/veterinary input. Break down into prophylactic and therapeutic spend to give an indication of proactive vs. reactive treatment.
4	Academic	Infra-red thermography (IRT)	Remote sensing method, used to measure body temperature. Can indicate heat/cold stress, as well as potential ill-health.
4	Practitioner	Play behaviour	Observation of animals, especially young ones, when introduced to novel situations/paddocks. An indicator of positive welfare.

Priority research topics and knowledge gaps

1) **Animal welfare challenges with wintering Livestock:** Can RA offers solutions? Or contribute to developing new solutions? Solutions have to be tailored to each NZ regions as constraints differ.
2) **Animal management that sustains purity of Freshwater:** can RA offer solutions to maintaining ecological integrity of wetlands, riparian strips and freshwaters, and enhance animal welfare at the same time?
3) **Disease:** Are animals in RA farms less affected by disease? This could be assessed taking a paired comparative approach contrasting RA farms with mainstream farms and focussing on females at parturition and peak milk production were stress is already occurring and animals are therefore more susceptible to disease. There is an urgent need to develop comprehensive national disease surveillance and treatment programmes to appropriately inform 'healthy animal' accreditation programme.
4) **Recovery from stressors post-calving/lambing:** Are animals under RA recovering better/faster from reproductive events? As above, this can be assessed taking a paired comparative approach, testing for the absence of oxidative stress dysregulated inflammation or clinical symptoms in the month following parturition.
5) **Feeding value of multispecies pastures / crops:** defined as per the combination of their chemical composition; how this matches the nutrient requirements of the animal, and whether the availability and accessibility of particular morphological components of the plants matches the 'desires-needs of the grazer'.
6) **Impact of high-density mob-grazing on animal wellbeing:** Are there any negative unintended consequences? if so, do these depend on livestock type (i.e., breed, age, etc.), animal handling for herd movements (i.e., using motored vehicles or not) and whether an appropriate period of adaptation is implemented?