



Pastoralists turn variability into food

We are accustomed to see nature's unpredictability as a constraint to agriculture and development. So we try to isolate agriculture from the natural environment. But our very efforts to introduce stability seem to have contributed to make nature even more volatile with climate change. With little room to manoeuvre in order to keep global warming within 2°C increase, we now badly need ways of saving *both* agriculture *and* the natural environment. Could working *with* nature rather than fighting it be such a way? Could the variability of natural environments be turned into a resource? As pastoral systems all over the world are specialised to do precisely that, we think they have more to offer than is normally believed.

The absolute basics in understanding pastoralism

Environmental variability is the rule

Where rain falls in unpredictably itinerant showers, patchy in time and space, as in most pastoral regions, environmental variability is the rule. Variability triggered by the weather combines with other variables in the ecosystem, like biodiversity. This is a world of brief but important opportunities for grazing animals. Nutrient-rich pasture grows in sequenced patches, the most valuable concentrations being where biomass is *less* abundant, at high altitudes or in drier regions. How many animals can thrive in a given year depends not only on the annual precipitation, but also on *when* the plants are grazed in relation to their life cycle, down to the day and the hour. Most pasture is more nutritious just before flowering, or at night after a day of photosynthesis. Being able to graze in the right place at the right time can make all the difference.

Pastoralism is a specialisation to make a living from environmental variability

Where environmental variability is the rule, the capacity to take advantage of it means higher productivity and resilience. 'Pastoralism' refers to a wide family of livestock-based livelihood/food production systems that are highly diverse but all share the specialisation to make a living from the variability in the natural environment. This consists in improving the animals' diet and welfare by managing their grazing itineraries at various scales in time and space. Adding value by managing grazing itineraries *requires* the high levels of variability, including biodiversity, found in natural environments. The productivity of a pastoral herd is increased *because* of its active engagement with a highly variable ecosystem, not despite it.

This specialisation takes different forms to match different ecosystems, and comes in different degrees depending on the availability of additional options such as trading and cultivation or rural-urban connections. The exact number of livestock keepers sharing the specialisation 'pastoralism' is unknown but likely to be in the hundreds of millions, currently hidden in public data under an array of categories and sub-categories.

Professional men and women in pastoral systems can achieve relatively low variability in livestock outputs without making themselves dependent on stable inputs; instead, they take advantage of the variability of natural inputs by matching it in real time with variability that they integrate into their operational processes. A manifest example of such 'process variability', pastoral mobility, is therefore first and foremost a *production* strategy. Other examples are flexible/communal land-tenure systems, the circular economy of crop-livestock integration through seasonal collaboration between specialist groups of cultivators and herders, or some new forms of rural-urban linkages. Distinguishing variability in natural



inputs from variability in operational processes, and capturing their real-time functional relationship, are critical steps towards understanding how resilient pastoral systems work.

... which goes together with ecological sustainability...

Productivity in pastoral systems can increase together with ecological sustainability. Where nutrients in pasture are unevenly distributed amidst biomass of little or no use, livestock ingesting all available biomass (overgrazing) would waste digestive potential on useless material and soon lose appetite. In these conditions, overgrazing is therefore *not* in the interest of individual pastoralists on communal rangeland. Pastoralism is about increasing productivity by targeting *only the most nutritious bites* in the variable pasture biomass (managing herds' grazing itineraries). When allowed to operate according to its specialisation, pastoralism contributes to biodiversity and landscape functionality.

... and generates significant economic value

The efficiency of pastoralism is also reflected in its persistent economic importance after decades of public underinvestment and lack of services. Empirical evidence suggests that pastoralism creates jobs both in primary production and along several value chains, supports crop-farming systems through providing manure and draught animals, and provides tax revenue. Pastoralism is also far superior to any other livestock production strategy in terms of protein efficiency: the net human-edible proteins produced against those consumed through the production cycle. Despite all the well-known challenges, these systems continue to contribute to food security by providing affordable meat to domestic markets and milk to millions of vulnerable households in remote rural areas.

Based on Misereor (2019). *Pastoral Development Orientation Framework*, Misereor, Aachen.