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

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.

Implications for lobbying and advocacy

In respect of the 'do no harm' principle, this basic knowledge about pastoralism and its interaction with the natural environment needs to be reflected in the arguments we use for lobbying and advocacy purposes. The following practical implications also call for particular attention.

We need to refrain from representing pastoral mobility as a 'coping strategy'. Representing pastoral mobility as a coping strategy in the face of a hostile environment is harmful to pastoralists because it negates their most defining strength: their specialisation to turn environmental variability into a resource. Calling pastoral mobility a 'coping strategy' frames it as a measure to reduce risk or contain damage. In reality, pastoral mobility is a risk-taking strategy, complex, proactive, built on sophisticated institutions and considerable knowledge making, and primarily intended to add value — which is why it is typically more intense when opportunities peak, as during the rainy season. Pastoralists' specialisation to 'navigate' the opportunities of the rangelands is no more a 'coping strategy' than is the fishermen's capacity to navigate the sea. When this does not appear to be the case, and pastoralists do seem to be facing a challenge, lobbying and advocacy should not fall back

into the default view of environmental variability as a problem. Instead of echoing narratives that pin pastoralists' problems on natural (unavoidable) causes, we should ask what man-made conditions are responsible for preventing pastoral systems from functioning according to their specialisation.

We need to refrain from representing pastoralism as a livestock system belonging to 'marginal' lands. Pastoral systems all over the world have the unique capacity to turn into food and livelihoods the high levels of variability characteristic of regions such as drylands or mountains. However, they do so by taking advantage of *seasonal* opportunities, and this is only possible if their livestock — their means of production — can survive from one season of opportunities to the next. In order to do that, pastoralists must spend part of the year in wetter or warmer (lower-altitude) regions — often regions where crop farming predominates. This has always been the case. It therefore harms pastoralists to 'lock' them — even if just conceptually — into the lands they can use sustainably only during the annual period of opportunities in that area.

We need to refrain from supporting divisive categorisations. Pastoralists are united by their specialisation to take advantage of variability, but divided by the categorisations commonly used in public administrations and even in research. While saying little about pastoralists' specialisation as livestock keepers, these categorisations split them into politically and economically negligible groups, and 'lock' them onto particular practices and regions. Pastoral systems cut across the imaginary boundaries claimed by these categorisations. Working with highly variable environments, their strength is in opening up options (process variability). For example, pastoralists' use of agro-ecological zones is not fixed but changes both seasonally and over the years to match the variability in inputs. Specialist cultivators and specialist herders can also be tied by seasonal forms of cooperation or even be members of the same family. Pastoralists formally categorised as 'settled' might be as mobile than those categorised as 'nomads', at least at certain times of the year, and many move regularly between settlements and mobile camps. Migratory routes of so-called 'nomads' are actually never 'random' but carefully planned, and 'fixed' migratory routes of so-called 'transhumants' are only fixed because their normal degree of variability has been prevented. Supporting this legacy of categorisations harms pastoralists by disaggregating them into small discrete entities in the eyes of decision makers while disregarding the dynamics that make pastoralism strong.