COWS ARE NOT CLIMATE KILLERS!

In the public debate, it sounds pretty simple: cows are climate killers. Full stop! It has even become common to compare cattle with cars. The main problem with agriculture – and we even read about this in scientific publications – is the environmentally unfriendly cattle...

BY ANITA IDEL

Cows burp methane into the atmosphere day after day. They occasionally fart too and they are compared unfavourably with cars – because their emissions not only consist of carbon dioxide but also of methane, which is 25 times more harmful to the climate than CO_2. The seemingly logical conclusion that the media, farmers and scientists increasingly arrive at is to advise farmers to keep pigs and chickens rather than the methane-rich horned monsters and consumers to eat more chicken wings and pork cutlets instead of beef steak.

What is wrong with this discussion?
Almost everything. Firstly, it raises a very superficial and particularly generalized view of livestock. It does not distinguish between different agricultural systems: from eco-friendly and sustainable resource use and energy intensive industrial approaches. Secondly, the view is limited to just one greenhouse gas – methane – and omits the much more important nitrous oxide, which is emitted through the nitrogen fertilization used for the intensive production of concentrated feed. And thirdly, an agricultural climate assessment should include not only the negative effects (emissions) but also the positive ones: the storage of greenhouse gases is an intrinsic potential of sustainable land use.

But the positive climatic effects of sustainable grazing systems and particularly the contribution that grazing ruminants can make to the production of carbon-rich topsoil is entirely ignored. As most people are unaware that cattle can contribute to climate relief, my counter-thesis may be even more surprising: millions of cattle have the potential to act as environmentalists. This becomes only apparent when the carbon and nitrogen cycles are taken into full consideration. The decisive factor is whether the soil and, in particular, permanent grasslands are used sustainably.

Sustainable grazing promotes root growth and carbon retention.

Ekkehard Kültz

It is rather short sighted to limit the discussion to the methane that comes from the rumen of cows and other ruminants Nitrous oxide (N_2O), not methane, is the largest agricultural threat to the climate. 75% of the total N_2O emissions (and 90% of all ammonia emissions -NH_3) in Europe are caused by livestock farming – especially through intensive fertilization for cultivating concentrated feed.
Methane is 25 times more harmful to the climate than CO_2, but nitrous oxide, which is primarily released through nitrogen fertilization, damages the atmosphere 296-fold. On average, 2-4% of nitrogen fertilizer is converted into N_2O. The authors of the recently published 600 page European Nitrogen Assessment (ENA) argue that the role of NH_3 (an indirectly operating GHG) needs to be taken much more seriously.

The differences in the intensity of livestock breeding systems are most evident in feeding: industrial livestock production demands more concentrated feed and this requires intensive fertilization which damages the climate. This further exacerbates the global food situation, since arable land is being used to cultivate animal feed rather than food for people: 40 percent of the world's grain harvest is fed to livestock, while one sixth of the world's population goes hungry. This diversion of soy, grain and maize to produce concentrated feed is what makes it possible to have such enormously high numbers of animals: nearly 1.5 billion bovine (including domestic buffalo), nearly 1 billion pigs and around 15 billion poultry. More than two-thirds of the protein-rich feed crops for livestock in the EU are imported: the damage to ecosystems and the climate not only occur where the animals are kept, but affects South America in particular, where much of the fodder is produced and rainforests are still being cut down, eventually to make way for arable land.

When intensively fed, cows and ruminants compete with humans for food. But this is not the case when they left are to graze using land that is not suitable for cultivation (or grass and clover from crop rotation). On the contrary, they turn grass, hay and silage into milk, meat and draught power.

And what of the climate? Provided that grazing is sustainably managed, cattle also help maintain the biodiversity of the countryside. They keep these grasslands, grazing lands and steppe lands, which account for approximately 40% of the global land area, intact. Because of its vast scale, permanent grassland is the largest terrestrial carbon sink on the planet. The carbon is not only stored on the surface in visible gramineous plants, but also (and primarily) in the soil. From a climatic and soil fertility viewpoint it is not only important to maintain a dense and durable coverage of perennial grasses, which protect the soil from erosion. Sustainable grazing management promotes biological activity (photosynthesis) so that through root development the amount

of topsoil (which consists of more than 50 percent carbon) ultimately increases.

Grasslands of the World

In 2005, the Food and Agricultural Organization (FAO) published an evaluation – almost 500 pages long - on the world's grassland resources – Grasslands of the World. Some of these grasslands - in (semi) arid regions – only possess greenery for part(s) of the year, after a rainy season. The Grasslands Carbon Working Group, a group of climate experts, has examined the importance of grasslands for carbon sequestration. They periodically publish country-specific information on the total of 52.5 million km² grass ecosystems which cover more than 40% of the global land area (excluding the grass-free ice masses of Greenland and the Antarctic). Of the surface area considered by the FAO to be agricultural, approximately 70% is grassland. Despite this there is very little understanding of the special characteristics of grasslands, which vary between climate zones. As a consequence, the importance of these grasslands is completely underestimated and they usually do not appear in debates over the future of our planet. This must change.

The world's grasslands contain more than a third of global carbon in their soils. In some steppe lands, more than 80% of the biomass is believed to be in the roots. However, because so little importance has so far been attached to grasslands, they are currently at huge risk. Ploughing and cultivating grassland results in a considerable loss of carbon and biomass from the soil – up to one third of the amount in many areas. To date increasing demand for protein-rich and energy-rich animal feed for industrialized agriculture has been the main cause of the destruction of rainforests and the ploughing of grasslands. More recently, the demand for agro-fuels has added to these processes.

Migratory grazing allows grasslands to regenerate.

Many monocultures not only destroy ecosystems but also have a negative energy balance (deducting the inputs above all energy consumption - from the output). This is true for both agro-fuels and the inputs for high-performance animal feed. Sustainably-managed grassland can produce more usable energy per unit area than ethanol produced from maize or soy. And the maintenance of such grasslands contributes to reducing greenhouse gases and increasing soil fertility. Over several years of trials in the USA, the yield of grassland after a decade was 238% more than the harvest from monocultures.

Global landscape gardeners

Roots play the crucial role in the formation of topsoil: the roots of today are the topsoil of tomorrow. While crops often only grow during a single growing season, and quite often only during a certain part of the growing season, perennial grasses in permanent grasslands form more root mass from year to year, allowing the soil beneath the permanent grassland to prosper. Root formation directly depends on the rhythm of grazing. It is crucial that grassland gets breaks from grazing. During this period the grazed vegetation, which has been supplied with animal excrement and urine, can regenerate. Given a minimum amount of water and the energy of the sun photosynthesis makes new grass and additional root mass begins to form – as long as the grazers don't return too soon. An example of this process – including the regeneration period – is exhibited through the largest animal migration on our planet, which still takes place annually: the vast herds of wildebeest that journey across Africa. What one can experience there on safari is a glimpse into natural history: like other natural grasslands throughout the world these savannah grasslands were created through the co-evolution of gramineous plants and the grazing animals.

The journeys of large herds of wisents and aurochs have influenced the soils and landscapes of Eurasia, but they were all killed off and have disappeared from the collective memory Europe's inhabitants. By contrast, some American citizens still remember the stories of their ancestors about the vast herds of bison that could be seen even 200 years ago. It is estimated that there were over 30 million bison grazing the prairies of North America in the early 19th Century. Over the past 30 years a network of environmental protection projects has been reintroducing these grazers to re-establish the prairies and there is a growing number of farmers commercially rearing bison.
The metre-thick prairie soils in North America have lost, on average, more than 25% of their topsoil, largely as a result of being used to grow monocultures of soy, maize or wheat. The more favourable the situation, the more difficult it is for humans to see sense. There is an urgent need to monitor long term trends in soil depletion/ accretion in order to understand and control the effects of industrial land management systems and understand the (potential) benefits of sustainable farming and grazing systems.

Efficient users of feed

This perspective, which takes the carbon and nitrogen cycles into consideration, gives not only a different climate balance for agriculture, but also a completely different view on livestock – and especially ruminant animals.

Why do cattle belch methane? And why not human beings? Because they can do something that we cannot – digest grass. This is because cattle have billions of micro-organisms in their rumen which break down the grass and make the nutrients available to the cattle. In this process the bacteria produce methane (CH_4), in the same way as we produce carbon dioxide (CO_2). The cow then expels both CO_2 and CH_4.

It is not the cows that are the problem, but the industrialized agricultural systems which shut out farm animals from grasslands and feed them with more and more albuminous concentrated feed from corn, soybeans and grain and turn the animals into competitors with humans for food. Ruminant cattle are less efficient at converting intensive feed than poultry and omnivorous pigs.

Cows, sheep and buffalo have a great capacity to convert pasture forage into milk and meat (and draught power) in symbiosis with the micro-organisms in their rumens. From this point of view, they are ingenious users of feed. They should be particularly pastured on areas that are not suitable for crops, such as pastures and grasslands, which can be protected from erosion through sustainable grazing. The milk and meat from intensive production only appears to be cheap. The bill comes later. The loss of biological diversity, the ploughed grasslands and the associated CO_2 emissions, as well as the cutting-down of rainforests for fodder production are all part of this bill.

Yes, cows burp methane. Yet they and other ruminant animals are vital for feeding the world: through sustainable grazing they can provide milk and meat from grass while contributing to the maintenance of soil fertility and climate change mitigation. We not only need to rehabilitate the cow, but also to choose the right agricultural system. The decision of whether we kill or protect the climate with cows is up to us. ■

Anita Idel is a veterinarian, mediator and a lead author of the IAASTD report. A revised and enlarged English translation of her book, 'The cow is not a climate-killer! How the agricultural industry destroys the earth and what we can do about it' is in preparation.
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The author on a field visit

Foto Andreas Schoelzel