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Cows are not Klimate-Killers! The undervalued potentials from grass and grazers for nutrition

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Key words: ruminants, grazing management, climate change, soil fertility, breeding goals, land use change

Abstract 1

Cows are grazers. But cattle and buffaloes are becoming feed conquerors for humans by intensive feeding with concentrates. This not appropriate handling of ruminants leads to nearly 1,4 billion heads – twice the number of them than 50 years ago. While the first half has been fed mostly by pasture the other 700 millions are virtually fed on fields. Grazers are a needful part of the evolution of pasture and have been globally effective as landscape gardeners – and since sedentism as drivers of cultural development. 40 percent of the global land surface is non arable grassland. Its protein and energy supply transformed – mostly – by ruminants is an essential part for food security. Because of the dimension these soils are the greatest CO2-sink. Sustainable grazing management operates photosynthesis very efficiently – leading to green and root growth. The latter one is increasing soil fertility by humus. As humus contains more than 50 percent of its weight as C, every ton of humus is extracting 1,8 tons of CO2 from the atmosphere.

Abstract 2

The Agricultural science and teaching is still based on a perception of growth, productivity *and* efficiency *which is externalizing social, ecological and economical costs. Industrial livestock production 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. Nitrous oxide (N2O) is the largest agricultural threat to the climate - especially through intensive fertilization for cultivating concentrated feed. On average, 2-5% of nitrogen fertilizer is converted into N2O which damages the atmosphere 296-fold than CO2 (methane 25-fold). 75% of the total N2O emissions (and 90% of all ammonia emissions - NH3) in Europe are caused by livestock farming. But if ruminants graze on land that is not suitable for cultivation, they turn grass, hay and silage into milk, meat and draught power a n d increase the carbon-rich topsoil.*

Key words: sustainability, grazing management, soil fertility, protein resource, food security, climate change, land use change

Introduction

In the public debate, it has even become common to compare cattle with cars, to bash the first ones as climate killers. Cows burp methane into the atmosphere day after day, which is 25 times more harmful to the climate than CO2. But we need to distinguish between different agricultural systems: from eco-friendly and sustainable resource use and energy intensive industrial approaches.

The scientific and in the following the public 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. So 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.
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. It is rather short sighted to limit the discussion to the methane that comes from the rumen of cows and other ruminants Nitrous oxide (N2O), not methane, is the largest agricultural threat to the climate.
75% of the total N2O emissions (and 90% of all ammonia emissions -NH3) 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 CO2, but nitrous oxide, which is primarily released through nitrogen fertilization, damages the atmosphere more than 300-fold. On average, 2-5% of nitrogen fertilizer is converted into N2O. The authors of the 600 page European Nitrogen Assessment (ENA) argue that the role of NH3 (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 and pampas are converted – eventually to make way for fields and range land.
When intensively fed, cows and ruminants compete with humans for food. But this is not the case when they serve as grazers used to regenerate soils or 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.

Results
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 mostly 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.

Discussion
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 much

more 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.

Suggestions to tackle the future challenges of organic animal husbandry

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 CO2 emissions, as well as the cutting-down of rainforests for fodder production are all part of this bill.

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