Klimapraxis Paper #1 EN

Drought-adapted Grazing

A Practical Guide to Mob Grazing

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1. Pasture Management in Germany: An Inventory

Using grazing as a strategy

If the grazing of our animals is to be sustainable and efficient, we need a grazing system that is well adapted to the natural site conditions: Does it suit the climate, topography, and plant composition? Does it fit the farm structure? With proper grazing management, there is enough forage available in the right quantity and quality from spring to fall. The plant stand should also be able to regenerate consistently.

If farmers want to optimize their pasture management, it is often a continuous process that takes several years. Due to climate change, grazing management will also need to adapt continuously. Mixed forms of classic grazing systems often develop over the course of the year when different systems are combined. Grazing then becomes a strategic tool to address specific challenges.

Overview of classic grazing methods

Extensive standing pasture

Animals graze on a large area at a small stocking density over several weeks.

Where suitable?	Ecologically sensitive areas, where the preservation and promotion of biodiversity is important, such as in nature reserves or on low-yielding sites.
Where not suitable?	Areas with high agricultural productivity, if high pasture fodder yields and -qualities are aimed for.

Short-grass pasture

On pasture, the grass is kept short continuously, typically through continuous grazing with low stocking density.

Where suitable?	Regions with abundant rainfall and fertile soils, where a dense sward of productive lower grasses can be encouraged.
Where not suitable?	Dry or very hot regions, where the low plant height leads to increased evaporation and drying out of the soil.

Rotational grazing (Paddock pasture)

The pasture is divided into multiple paddocks, each of which is made available to the animals individually for grazing over a period of several days.

Where suitable?	Also suitable for uneven and irregular pastures, also suitable in areas prone to drought.
Where not suitable?	Possible at all grazing-capable locations.

Portion pasture

A more intensive form of rotational grazing, where smaller portions are added more frequently. The growth heights are similar to normal rotational grazing.

Where suitable?	Also on heterogeneous pastures. Also suitable for high-performance dairy cows.
Where not suitable?	On compaction-sensitive soil.

A new grazing method

Changing climatic conditions (see Chapter 2) are becoming a challenge for agriculture in Central Europe. The **Mob Grazing** method, which involves high-intensity grazing with frequent rotations, is well-known in dry regions of America and Africa. It aims to improve the soil by building humus and stabilizing the soil water balance. It also has the potential to maintain a high-yielding plant stand even in low rainfall conditions. Mob Grazing could therefore also be an efficient and ecologically beneficial grazing strategy under Central European conditions in the future.

Characteristic features include very long resting periods of the plant stand, a high growth rate during grazing, a high stocking density, a short grazing duration of less than one day and a large grazing residue of more than half of the plants. The trampled plant residues are intended to form a protective mulch layer that has a positive effect on soil moisture. This allows the plants and grasses to grow better even in dry periods. The high grazing pressure can result in plants being grazed more evenly and efficiently. Weeds are mostly grazed and thus reduced. Mob Grazing is interesting for both permanent grassland and arable forage areas.

Under which climatic and site conditions does Mob Grazing offer advantages over conventional grazing methods? And how can it be implemented in practice? This guide is intended to provide practical decision-making support to farms and is the result of our EIP-project „Mob Grazing in Arable Forage Production – Economic and Ecological Evaluation of a New Grazing Method“ (**www.mob-grazing.de**), from August 2021 to the end of 2024. Additionally, results from the DBU-funded project „Mob Grazing in Permanent Grassland“ at the Eberswalde University for Sustainable Development are integrated.

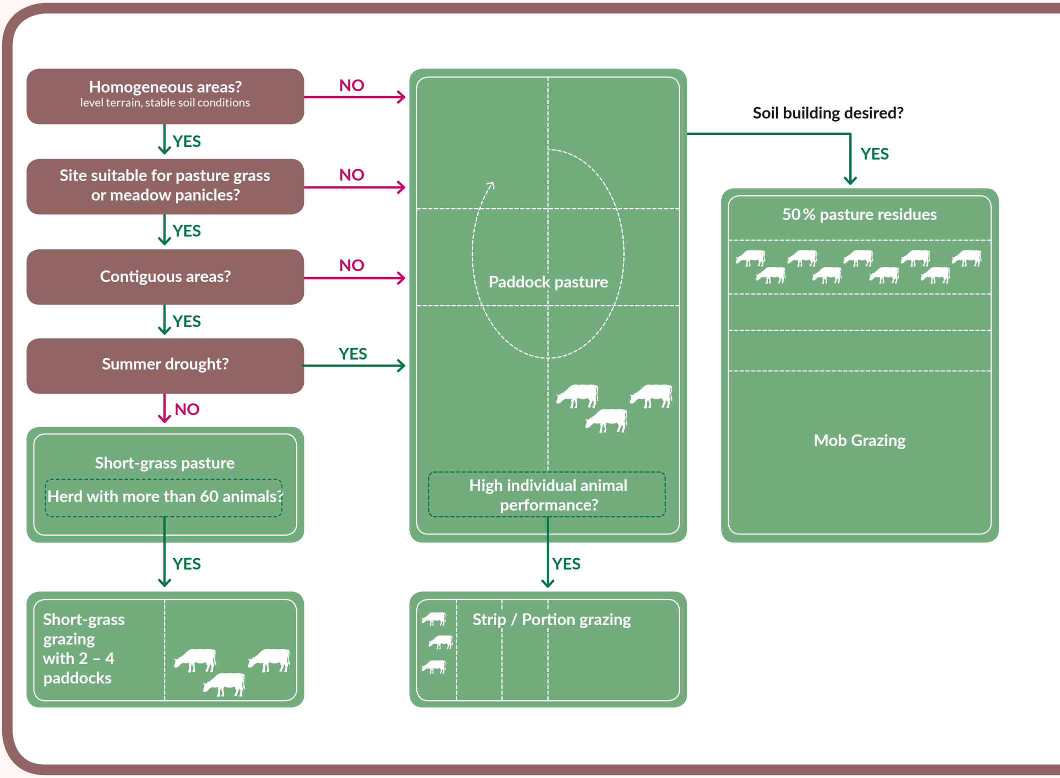


Figure 1: Which grazing system is suitable for my farm? Author's illustration based on *Schleip et al. (2016)*

2. Consequences of Climate Change for Agriculture and Grazing

The development of new management strategies for grassland is of global interest, as almost half of the world's grassland is in a degraded state [1]. In the EU and Germany, about one-third of agricultural land is used as grassland [2]. Further climatic changes are expected in the future, including extreme weather, drought and heat. Adapting the use of grassland to these changes and making it more resilient is therefore of great importance. What changes are anticipated in Central Europe that could impact agriculture, particularly the grazing of grasslands and arable lands?

Increasing temperatures

Global warming is causing average annual temperatures to rise in most regions of Europe. From 1961 to 1990, the average temperature in Germany was 8.2°C, according to measurements by the German Weather Service (DWD). This average has since increased significantly. The mean temperature was 10.3°C in 2018 and 10.5°C in 2019, which is two degrees higher. Not only is it getting warmer overall, but there are also more hot days and heatwaves. How will temperatures develop by the year 2100? This is shown in Figure 3.

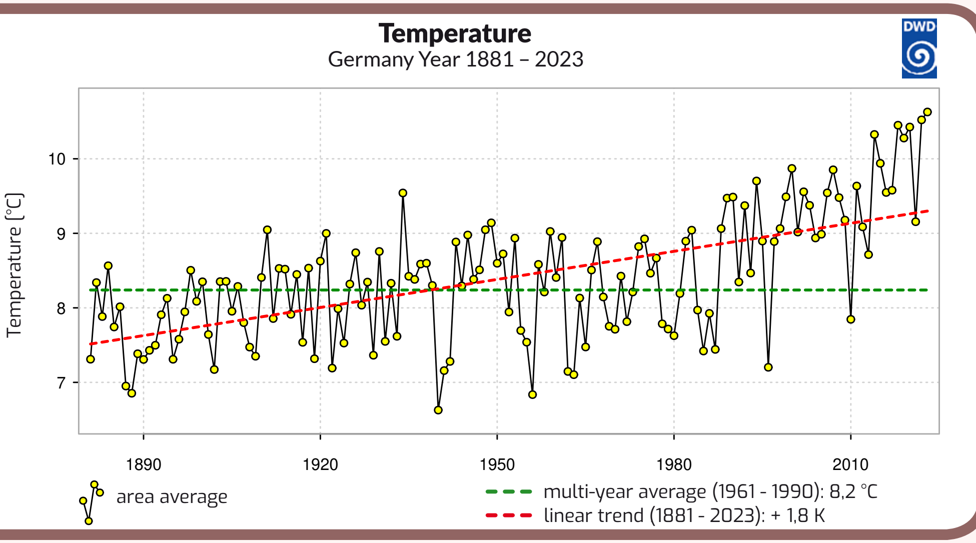


Figure 2: The average temperature in Germany has increased since the beginning of weather records. *Deutscher Wetterdienst (2024)*

Historical and projected 30-year average near-surface air temperature

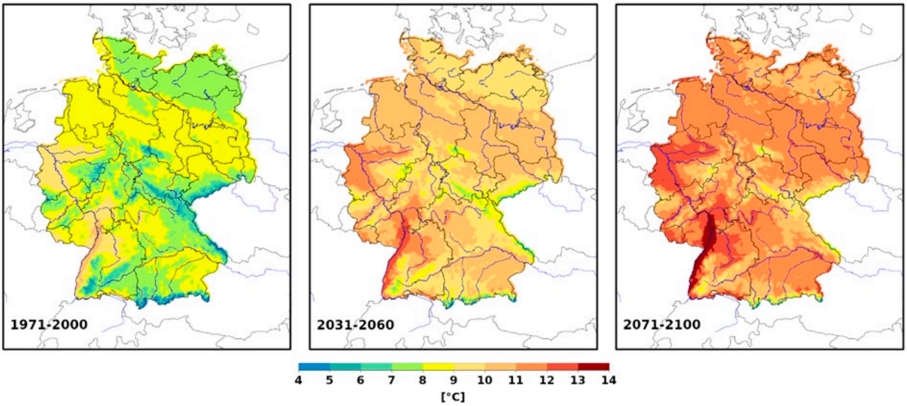


Figure 3: Climate simulations project further increases in average temperatures in Germany for the future. *Deutscher Wetterdienst (2024)*

Irregular precipitation

Germany loses 760 million tons of water every year, for example due to decreased soil moisture, loss of groundwater, and glacial melt. A worryingly large loss of water! More information on this can be found at **https://www.globalwaterstorage.info/en/**. The way climate change affects the quantity and distribution of precipitation is very complex. Analyses and statements should therefore be made primarily at the local level, as fluctuations within seasons and between different regions are significant. While winters have become significantly wetter in many places (see Fig. 4), the average amount of rainfall in summer has hardly changed (see Fig. 5). For plants, however, the consequences of rising temperatures can be serious: as it gets hotter, more evaporation occurs through the leaves of plants, meaning that – despite constant precipitation – they need more water to compensate for this increased evapotranspiration. If there is too little plant-available water due to climate change, there will be a lack of water for plant development.

Moreover, rainfall is becoming increasingly irregular. This leads to more frequent heavy rainfall events, pre-summer droughts, or extreme weather trends, such as the summer of 2024, which was the wettest twelve months since weather records began in 1881. Current nationwide information on plant-available water in Germany is provided by the Drought Monitor of the Helmholtz Centre for Environmental Research in Leipzig (UFZ).

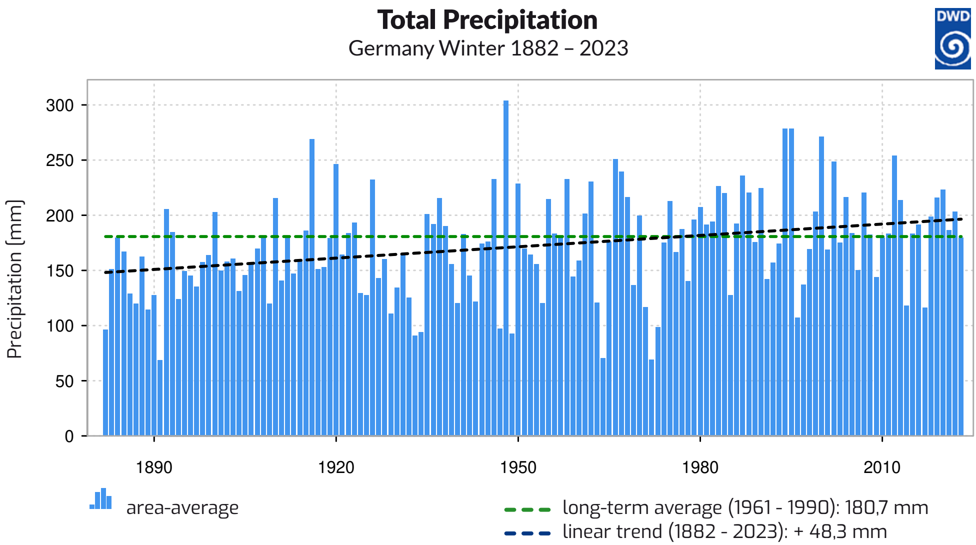


Figure 4: The total precipitation in the winter months (December to February) increased slightly from 1882 to 2023. *Deutscher Wetterdienst(2024)*

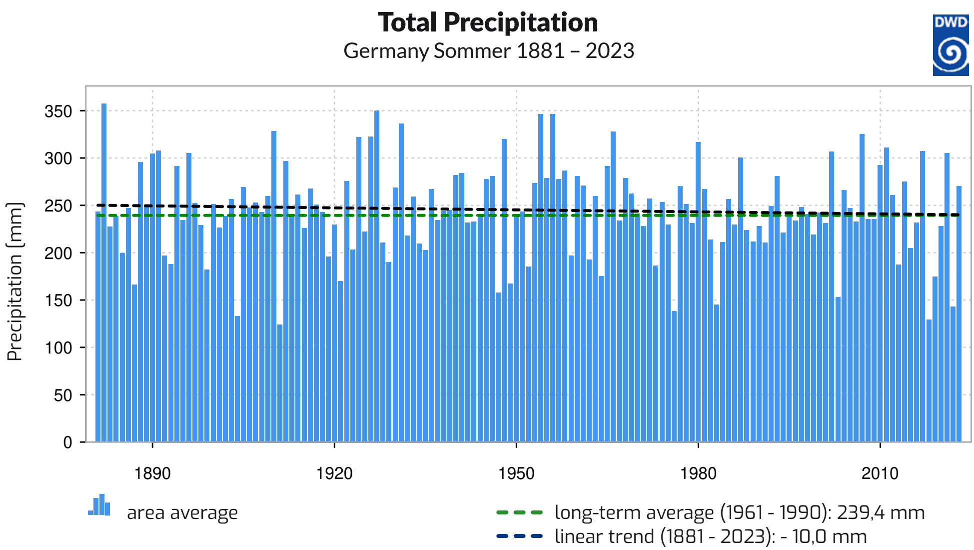


Figure 5: The total precipitation in the summer months (June to August) hardly changed from 1882 to 2023. *Deutscher Wetterdienst (2024)*

Effects on forage quantity and quality

Changes in climate also have implications for forage production, particularly affecting yields more than the quality of the feed. Whether there will generally be more or less forage available due to climate change depends on various factors and can vary significantly by region. For instance, regions in low mountain ranges may hope for increased rainfall, where rising temperatures could enhance yields, while in other regions, the already tense situation is expected to worsen in the coming decades. Drought stress in spring could be particularly problematic: if the essential first regrowth is low, it can lead to significant harvest failures and may even jeopardize the supply for grazing animals. Fluctuations in precipitation and temperatures will become increasingly pronounced and less predictable in the future. As a consequence, yields, regardless of site conditions, may either be exceptionally good or face severe losses [3]. This ultimately leads to considerable planning uncertainty regarding forage supply, which could have potentially existential consequences for livestock and the associated farms.

Will there be semi-arid climate zones in eastern Germany?

On our planet, we distinguish between different climatic regions based on the amount of precipitation and evaporation. These include arid, semi-arid, sub-humid and humid zones. A region is classified as semiarid when, for seven to nine months of the year, more water evaporates than falls as rain, and this pattern persists over several years. This is the case in North Africa, South America, Central Asia, the southwest of the USA and in southern Europe in parts of Spain and Italy. What is new is that parts of eastern Germany, particularly Brandenburg, are now on the edge of the semi-arid zone (see Fig. 6) [4]. It is likely that this development will continue due to the climate trends described. Thus, regions in Brandenburg could approach a semi-aridic climate conditions in a few years.

This is scientifically represented by the so-called aridity index (AI). This index is calculated by dividing the annual precipitation by the potential evapotranspiration, thereby accounting for changes in temperature and precipitation over the long term. Semi-aridity has an index of 0.5 or less.

What are the implications for pasture management? Should we now orient ourselves towards Australian or North American strategies in the dry areas of Brandenburg rather than traditional Central European concepts? (see also page 42). If we want to manage our grassland stocks sustainably and economically in the future, we cannot avoid rethinking our approaches.

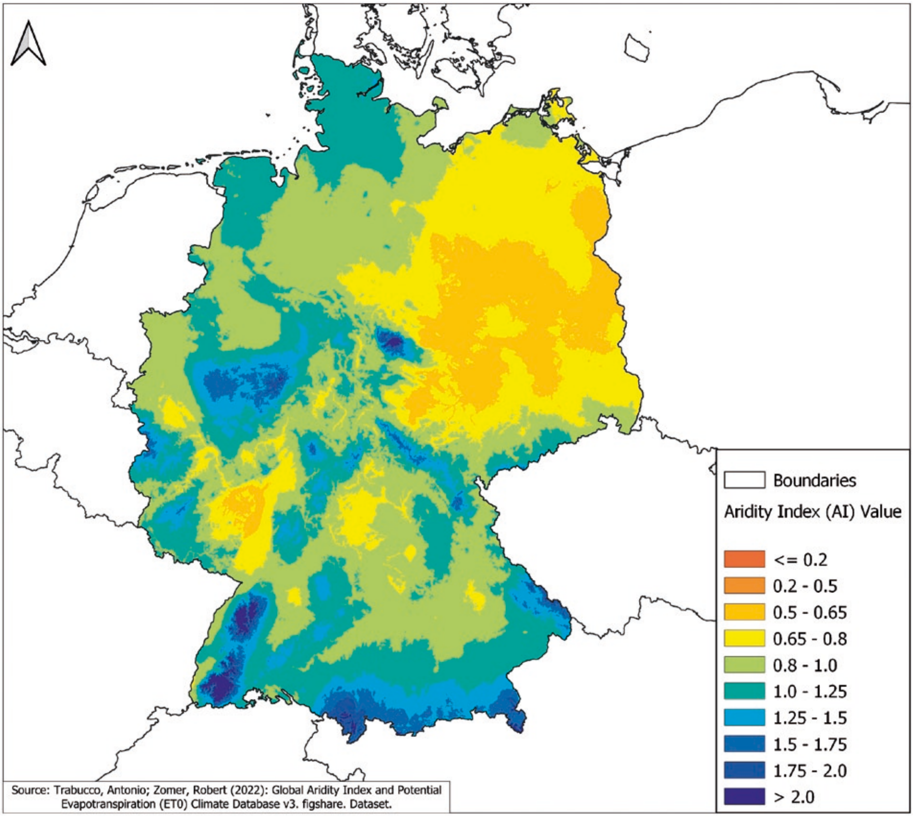


Figure 6: On average for the period from 1970 to 2000, the Aridity Index (AI) for Germany shows that Brandenburg is in transition to the semi-arid zone.
Own presentation based on data from *Zomer et al. (2022)*

3. What is Mob Grazing and when is it appropriate?

What is Mob Grazing?

For a clear understanding of Mob Grazing, we define the grazing system for the Central European context with the following five criteria [5]:

1. Long resting period of regrowth:

The main aim of Mob Grazing is to extend the dormancy phases of the plants. In conventional rotational grazing systems, the regrowth can take between two and six weeks to recover [6].
On Mob Grazing pastures, the rest periods are significantly longer and may range from around one month to one year [7].

2. High regrowth:

One consequence of longer recovery times is that plant stands grow taller, which offers several advantages: livestock selectively grazes the nutrient-rich parts of the plant while the often fibrous residues are trampled down. This may make the forage easier to digest [8/9/10]. A greater biological diversity is possible when the plants grow taller and are grazed less frequently, leading to a greater structural diversity.

3. High stocking density:

To achieve the desired ‚trampling effect', an area should be grazed by a herd of cattle with a live weight of at least 100,000 kilograms (equivalent to 200 livestock units) per hectare [11]. Practical experiences show that stocking densities of more than 200,000 kilograms live weight per hectare are even more suitable [12/13/14].

4. Short grazing duration:

It is crucial that plant stands are grazed only briefly, usually between a few hours and a day. The duration depends on the stocking density, the available forage and the desired plant residues. Short grazing duration prevents the regrowth from being grazed again. For this purpose, the back fence is typically moved after one day, but no later than three days, so that the animals can no longer access the areas that have already been grazed.

5. High plant residues:

It is desirable for about half of the growth to be trampled down so that a mulch layer can form from the grazing residues. This forage residue mixed with cow dung could form a water and nutrient buffer, allowing forage to regrow even during drought periods or enabling quicker recovery afterward. Current research projects show that the plant residues amount to between 40 and 60 percent [13/15/16].

Under what conditions is Mob Grazing appropriate?

1. On extensive sites

When we have marginal yield and arable sites with relatively low soil rating, the management approach is usually quite different from that used for more productive sites. High inputs – such as tillage, fertilizers, and irrigation – are often not worthwhile, as corresponding revenues cannot be generated. Mob Grazing could represent a sensible low-input alternative in this context. With high pasture residues, which account for around half of the yield, the primary aim is to actively promote soil development. The goal is to stabilize yields rather than maximize them. If soil fertility can be improved in poor soils, for example through increased humus, plant-available water remains accessible for longer during dry periods. This can reduce the yield depression in the summer months. According to initial results, ongoing research indicates that Mob Grazing can enhance soil life (in this case, earthworms) as a fundamental component of soil fertility.

2. In plant communities dominated by tall grasses and legumes

Tall grasses are usually more drought-resistant than low-growing grasses. They thrive with long recovery periods of at least 30 days, such as is typically found in meadows, which encourage substantial growth. Establishing alfalfa, an extremely drought-resistant forage plant, can also be very beneficial depending on the location. Some German grazing guidelines mention that alfalfa is generally not suitable for grazing, since in many conventional grazing systems, the rest periods are often too short, causing alfalfa to be quickly outcompeted. In contrast, North American literature, for example, even recommends alfalfa for grazing. Here, a recovery period of 28 to 35 days and a grazing duration of no more than three to five days is aimed for [17]. Trials from the EIP-project „Mob Grazing in Arable Forage Production" confirm that alfalfa persists in arable forage grazing. At Gut Temmen, alfalfa persisted in both a rotational grazing system with five rotations per year and in Mob Grazing with up to three rotations per year.

3. In regions with low precipitation

In regions with low precipitation and less than 600 millimetres of rainfall per year, tall grasses have a significant advantage, as their deeper root system allows them to access water better (see also page 19). Due to their pronounced height growth and the coarse fiber structure required for it, they are ideally-suited for Mob Grazing systems and the establishment of a mulch layer. In drier regions, there is minimal risk that a pronounced mulch layer will develop a musty or moldy odor, which could negatively impact the palatability of the forage.

4. Strategically at certain times

Mob Grazing is best understood as a strategic tool within an adaptive grazing system, used to achieve a specific goal on a given area. For instance, a mulch layer can be established to cover the soil. This strategy is particularly beneficial in spring: the typically high yields of the first regrowth can establish a robust mulch layer that, in turn, protects the soil from heat and drought during the summer months. Furthermore, Mob Grazing should only be applied under favorable yield conditions and when there is no shortage of forage, following the principle: We invest in the soil when we can afford to!

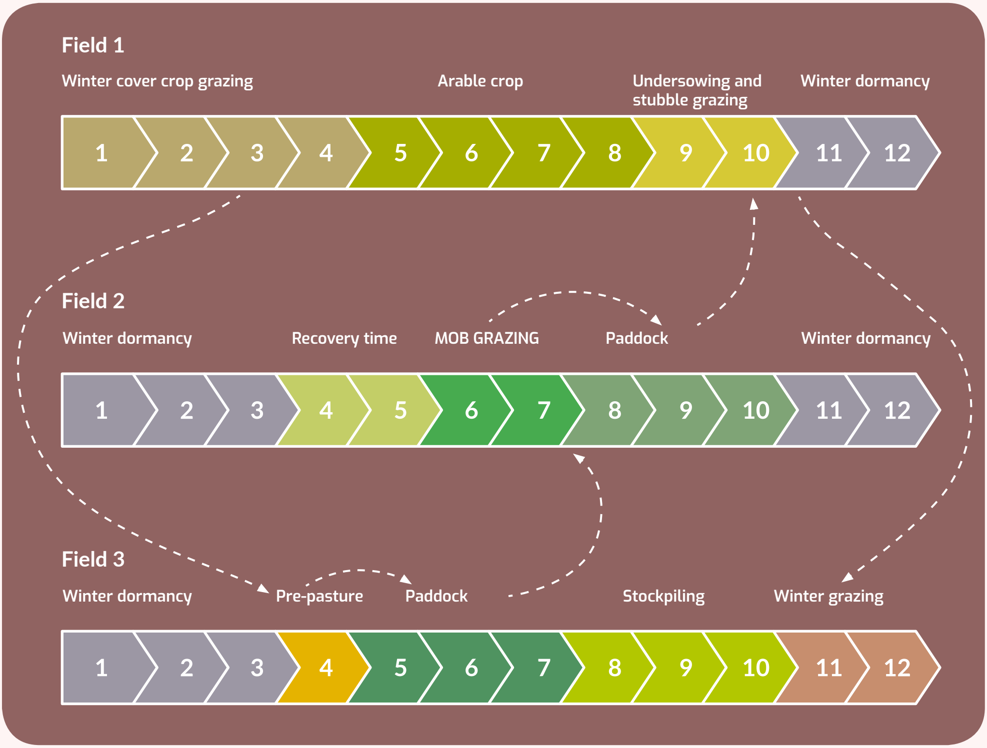


Figure 7: This is an example of how a grazing plan might look for a farm with arable forage production. Mob Grazing is intentionally used as a strategic tool. The arrows indicate the herd's movement between fields throughout the year. It is essential to consider that additional grazing areas are needed to maintain the required recovery periods; these are not shown here for clarity.

Is Mob Grazing appropriate for arable forage?

Mob Grazing could have several advantages as an adapted grazing strategy for arable forage stands. Arable forage is often rich in legumes, so frequent rotations – as are typical in Mob Grazing and other strip/portion grazing systems – are essential to reduce the risk of bloating. The smaller, regularly allocated plots mean that forage is constantly available. This way, ruminal tympany, also known as bloating, can be avoided [18]. Additionally, in the project „Mob Grazing in Arable Forage Production", it was observed that the distribution of manure in this system is more even and does not concentrate as much around resting and watering areas as it does in paddock grazing. When manure and consequently the nutrients are evenly distributed, this usually has a positive effect on subsequent crops and is generally desirable in arable farming. However, the extent to which the soil building aimed at through Mob Grazing has a long-term effect on soil fertility in arable farming systems (in this case with tillage) has not yet been sufficiently studied. More precise insights will be gained from the evaluations of the project „Mob Grazing in Arable Forage Production" in the coming years.

For arable sites in dry regions and with relatively low-yielding soils, for example below 30 soil points (according the German soil ranking scheme), establishing forage stands with small-seeded legumes like alfalfa or red clover and grasses can be challenging. This is especially difficult when spring drought coincides with spring sowing. In such cases, it may be advisable to adjust sowing strategies to include undersowing and autumn sowing, as well as to extend the utilization period of a successfully established forage stand. This can minimize the number of necessary sowings. In arable farming without livestock, for example, clover-grass cultivation often results in negative profit margins, making a longer utilization phase uneconomical. However, the productivity of arable fodder or clover grass can be significantly improved through grazing, especially with a tailored grazing plan. This simultaneously increases the added value in the form of milk or meat. As a result, soil-conserving and often nitrogen-fixing crops can be grown for longer periods. Consequently, this can positively impact subsequent crops, especially in locations with poor soils, thus enhancing nutrient cycling and the overall profitability of the crop rotation.

4. Drought-adapted Plant Stands

Drought-adapted forage stands require plant species with deep root systems to access water in deeper soil layers. In addition, roots and rhizomes are essential storage organs for energy, proteins, minerals and water, becoming increasingly important during dry periods when nutrient absorption is reduced due to a lack of soil moisture. As plants absorb nutrients along with water, the release of nitrogen from organic matter, for example, is inhibited during droughts because microorganisms do not function effectively in dry conditions. Conversely, there is a lack of moisture to enable the plant to absorb the nitrogen in the first place.

If plants are used intensively, especially in dry regions, the root mass decreases (see Fig. 8) and shifts to the upper soil layers [19/20]. On the other hand, research shows that extensive use of grassland positively influences root biomass and soil fertility [21]. Mob Grazing, despite its high stocking density, therefore has great potential to promote deeper root development and soil formation due to the long recovery periods and substantial pasture residues.

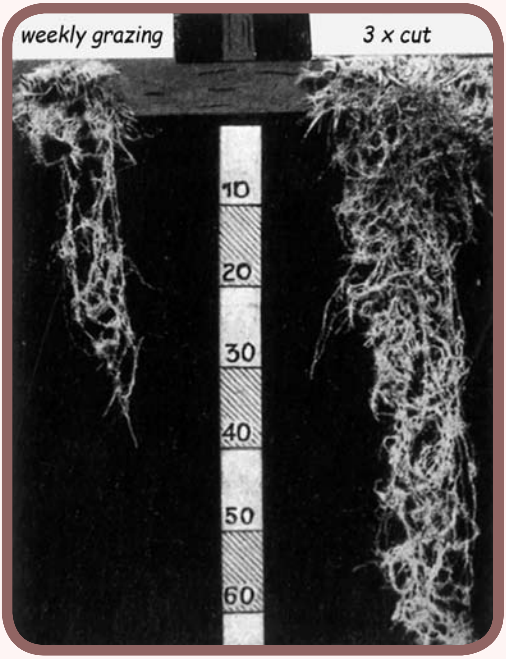


Figure 8: This illustrates the impact of grazing on root mass. On the left, the root mass of a four-year intensive pasture with weekly usage is shown. On the right, the root mass of a meadow with three cuts per year and an originally uniform sward is depicted. A three-cut system is roughly comparable to a Mob Grazing system, as experiences from the EIP-project „Mob Grazing in Arable Forage Production" indicate that up to three grazing uses per year can also be effectively implemented here. *Klapp (1971, S. 81)*

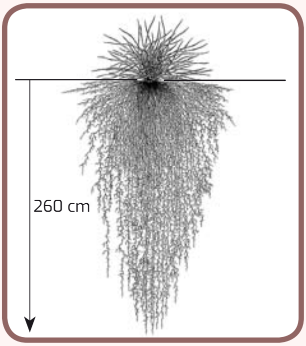
The plant species should be carefully selected depending on the location and grazing system. Advice, for example from the DSV (German Seed Association), can be helpful.

The following exemplarily selected grasses, herbs and legumes are suitable for drought-adapted sites in Central Europe and for cattle grazing.

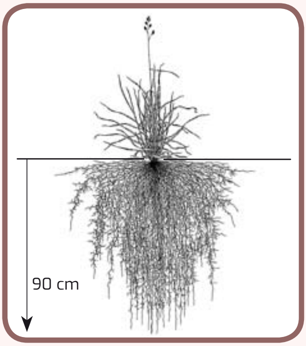
Grass species	Drought resistance	Forage value	Trample resistance	Other characteristics
Tall fescue *(Festuca arundinacea)*	high / very high	medium/ high	high	very deep rooting, tolerates waterlogging and alternating moisture
Cocksfoot *(Dactylis glomarata)*	high	high	medium / high	fast-growing, good regeneration capacity
Smooth oat *(Arrhenatherum elatius)*	high	medium / high	medium	very adaptable
Festulolium *(Festulolium spp.)*	high	high	high	very persistent, tolerates alternating humidity
Timothy *(Phleum pratense)*	medium	high	medium	fast-growing, good regeneration capacity

Herb species	Drought resistance	Forage value	Trample resistance	Other characteristics
Chicory *(Cichorium intybus)*	very high	high	high	high endurance on pasture, can significantly reduce methane emissions
Caraway *(Carum carvi)*	high	medium	medium	high endurance on pasture, good digestibility (IVOMD)
Ribwort plantain *(Plantago lanceolata)*	very high / high	mediuml / high	high	high in minerals, antibacterial and anti-inflammatory
Small meadow button *(Sanguisorba minor)*	high	medium	medium	Indicator plant for nutrient deficiency and drought
Dandelion *(Taraxacum officinale)*	medium	high	high	promotes digestion, high adaptability

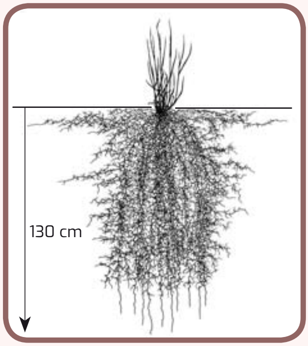
Grasses



Tall fescue *(Festuca arundinacea)*



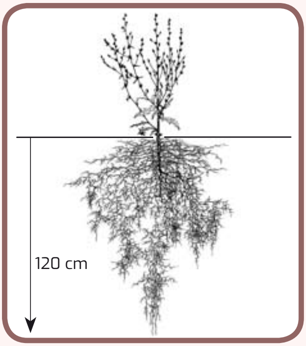
Cooksfoot *(Dactylis glomarata)*



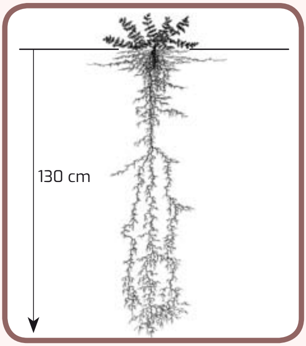
Smooth oat
(Arrhenatherum elatius)

Figure 9 to 11: *Kutschera and Lichtenegger (1982)*

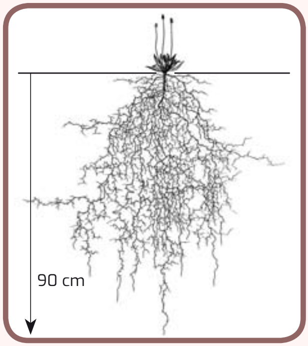
Herbs



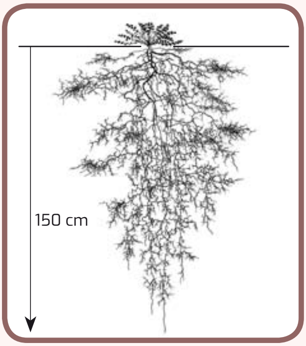
Chicory *(Cichorium intybus)*



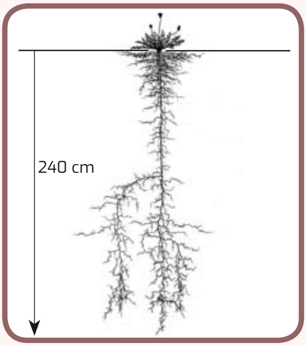
Caraway *(Carum carvi)*



Ribwort plantain
(Plantago lanceolata)



Small meadow button
(Sanguisorba minor)

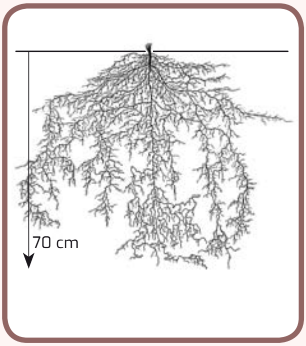


Dandelion *(Taraxacum officinale)*

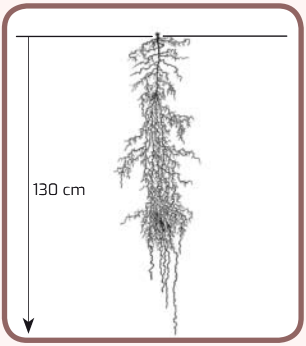
Figure 12 to 16:
Kutschera and Lichtenegger (1992)

Legume species	Drought resistance	Forage value	Trample resistance	Other characteristics
Seed sparrow *(Onobrychis vicilifolia)*	very high	high	low / medium	nitrogen-binding
Alfalfa *(Medicago sativa)*	very high	very high	low / medium	nitrogen-binding
Red clover *(Trifolium pratense)*	high	high	medium	nitrogen-binding
Horn clover *(Lotus corniculatus)*	high	high	medium	nitrogen-binding, little bloat
Yellow clover *(Trifolium dubium)*	medium / high	medium	medium	fast growing

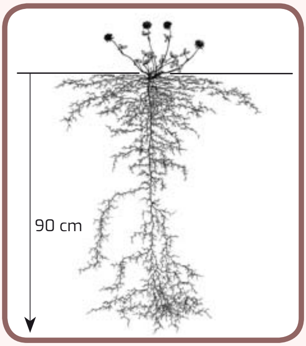
Legumes



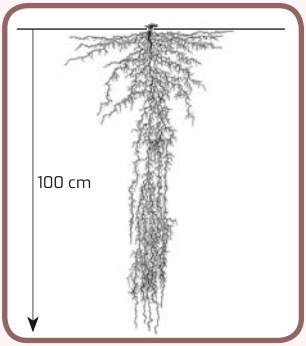
Seed sparrow
(Onobrychis vicilifolia)



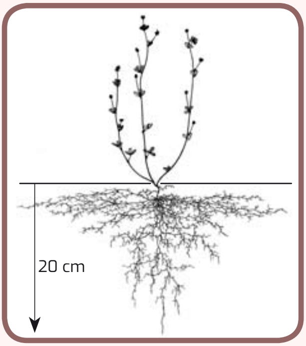
Alfalfa *(Medicago sativa)*



Red Clover *(Trifolium pratense)*



Horn clover *(Lotus corniculatus)*



Yellow clover *(Trifolium dubium)*

Figure 17 to 21: *Kutschera and Lichtenegger (1992)*

Other grasses

Warm zone grasses

Almost all grasses in our latitudes are so-called cold season grasses. Most of them can realize their growth potential even at low temperatures down to 7 °C and some grasses even below that. However, there are also warm season grasses which, by definition, are better adapted to high temperatures and pronounced dry periods. In many cases, they use C4 photosynthesis, require at least 15 °C and can reach their full potential especially when many of our native cold season grasses become inactive due to the heat, i.e. usually between July and September [22]. For most warm season grasses, it is not warm enough to overwinter, als frost events occur frequently. Nevertheless, there are studies on some of these grasses, such as Bermudagrass (perennial), Sudangrass (annual catch crop) or sorghum (annual forage crop), to assess their potential in a warming climate.

Bermudagrass (perennial cultivation)

Dog's tooth or Bermudagrass *(Cynodon Dactylon)* prefers to grow in warm (approx. 24 °C) sun-exposed locations with dry, sandy soils [23] and is now also occasionally found as a neophyte in Brandenburg [24]. In North America, this trample-resistant grass is recommended for both grazing and mowing and has a good forage value, with crude protein levels of around twelve percent. Many ecotypes still die in severe frost events. However, there are also ecotypes that can survive severe frost events in April and resumed growth after three days [25].

Figure 22: Bermudagrass (Cynodon Dactylon), *Stefan Lefnaer (2016)*

5. Pasture Planning

Good pasture planning is the key to successful grazing management. In this chapter, the five criteria essential for defining Mob Grazing are revisited and supplemented by additional aspects. We refer to these as grazing system parameters. Determining these individually can be more effective than committing to a specific grazing system from the outset. The most suitable type of grazing is usually determined once the individual grazing system parameters have been clarified.

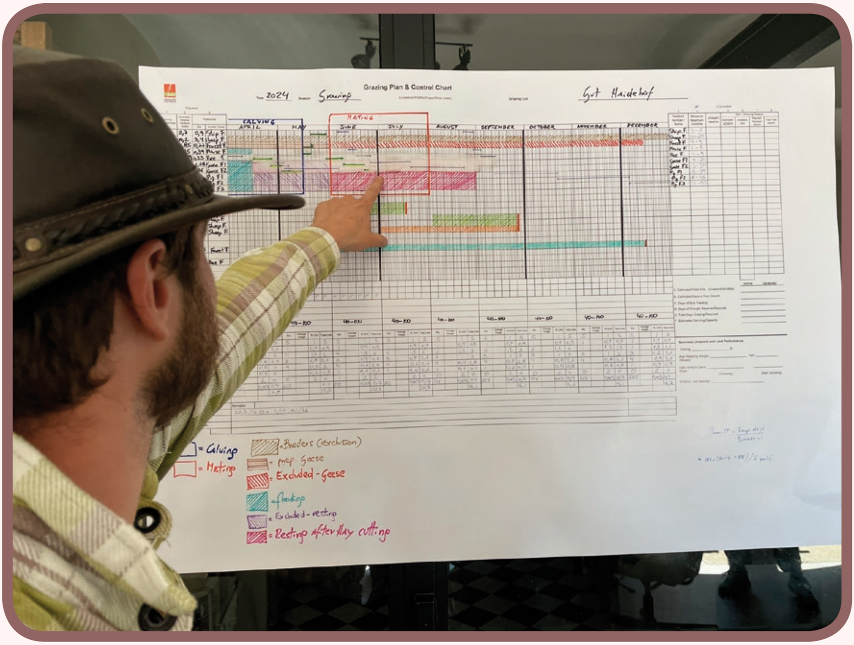


Figure 23: The comprehensive Holistic Management® grazing plan of Gut Haidehof, shown by Hannes Höhne.

1. Recovery time

The recovery or rest period is very important in pasture management. It influences the health of the plant stand, the build-up of root biomass, soil fertility, and the promotion of biodiversity. Therefore, it should be long enough for the plant stand to fully recover, for example, by reaching the payback time (see also page 26). At the same time, the quanti-ty of the feed can suffer if the recovery time is too long, which is easily avoidable.

The length of the recovery time depends on various factors (see Fig. 24), which allow a rough estimate to be made for individual sites. To determine the exact recovery time, it is advisable to regularly check how high the regrowth is and the developmental stages it is in (e.g. through monitoring). If this does not correspond to the individual objective at the time the pasture is grazed, the recovery time should be adjusted accordingly. Once a recovery time has been set, the length of stay per area can be derived from it (see also page 33).

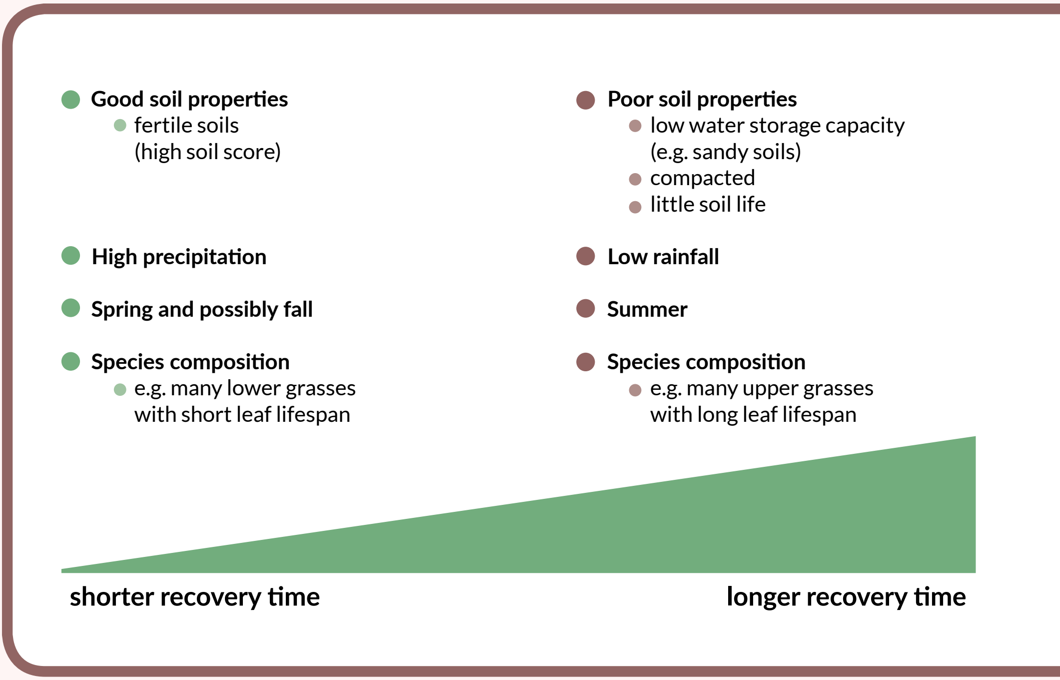


Figure 24: The length of the planned recovery period depends on several factors.

Payback Time

If a grass is bitten or cut, it begins to form new leaves to increase its photosynthetic capacity and at least cover its maintenance requirements. Stored sugar reserves are primarily used for this purpose. The plant's energy balance can now initially become negative. This means that more energy is required for new leaf formation than can be generated by the initially still weak photosynthetic performance. The payback time is the point in time from which the energy deficit is compensated for by an in increase in photosynthetic output. From then on, the plant produces more energy than is needet to form new leaves. Adhering to the payback time is an important prerequisite for maintaining a healthy crop (see Fig. 25).

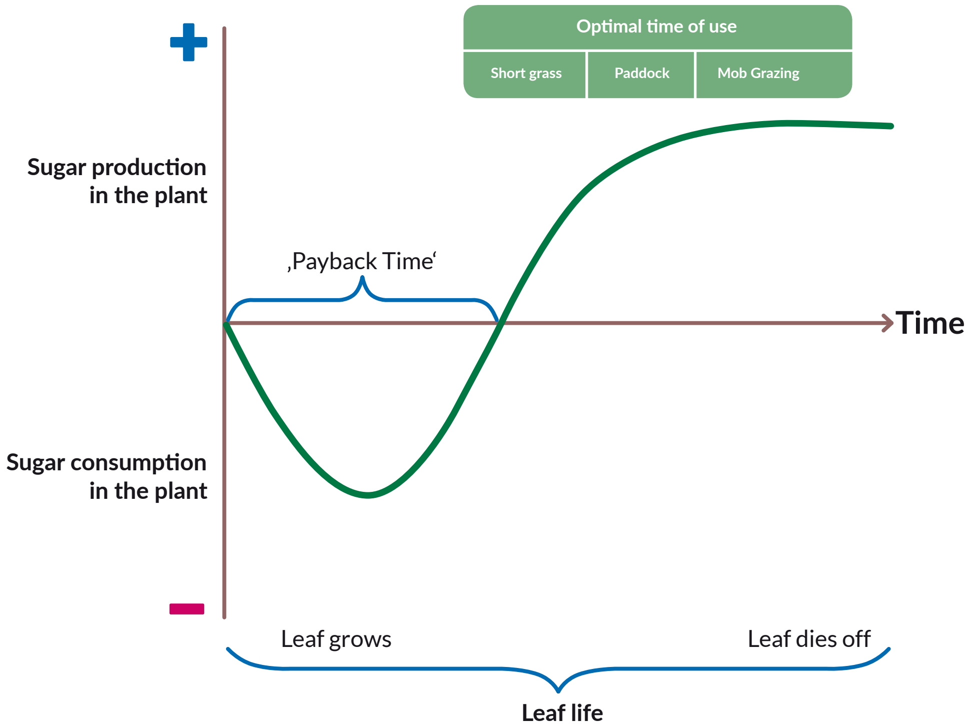


Figure 25: The relationship between leaf lifespan, payback time and grazing method. Own illustration based on *Steinwidder and Starz (2015)*

2. Regrowth height

The height to which plants grow is significantly influenced by the recovery period. Therefore, the desired height can be achieved by adjusting the recovery time. The possible height also depends on the prevailing plant community. In addition to monitoring the height, the developmental stage should also be observed, as after a certain point – usually at the end of the year or panicle emergence – the plant will no longer grow taller, and the forage quality generally decreases more significantly (see also page 45).

Experience from the „Mob Grazing in Arable Forage Production“ project has shown that sufficient growth heights are crucial for achieving a substantial mulch layer. The height of the plants is even slightly more important than increasing the stocking density. In the case of cocksfoot, which grows to a height of one to two meters (see Fig. 26), the grasses are flattened directly by the trampling effect and quickly form a closed mulch layer. Growth heights of this magnitude are primarily to be expected during the first growth phase in spring. In this phase, Mob Grazing can be particularly beneficial, as it helps protect the soil, especially during the hot summer months.

Figure 26: In the EIP-Projekt „Mob Grazing in Arable Forage Production“, cocksfoot almost reached shoulder height at about 1.60 meters in the generative stage.

In the future, plants in many areas may reach flowering and seed maturity more quickly due to drought stress and the associated premature ripening, without achieving the typical species-specific growth heights or yields. In such cases it is essential to determine the stages of development (see also pages 46 to 48) as the biomass of the plant stand shows minimal growth once flowering begins, while forage quality simultaneously declines.

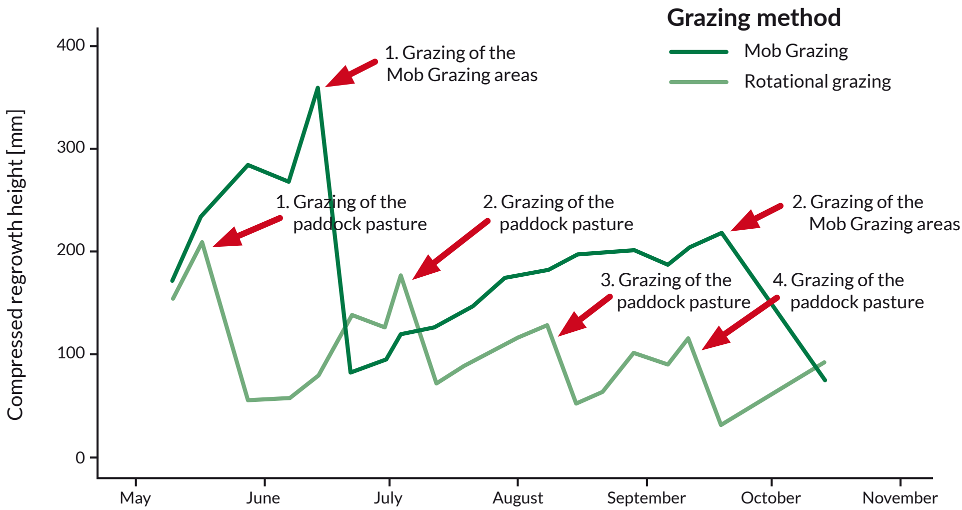


Figure 27: The illustration of the regrowth heights in the second trial year (2023) of the EIP-project „Mob Grazing in Arable Forage Production" shows the timing regrowth height at which the paddocks were grazed in rotational grazing and Mob Grazing. The regrowth was highest before the first grazing.

3. Stocking density

How high should the stocking density be and how does it affect the plant stand?
To define this parameter, it is important to understand the difference between stocking rate and stocking density, and to be familiar with the units LU and live weight.

LU or live weight?

The livestock unit (LU) is a measure used to compare different types of livestock based on their live weight. In Germany, one LU corresponds to a live weight of 500 kilograms. Most adult cattle, therefore, weigh at least 1.2 LUs. Since this unit is only an approximation, it is more precise and internationally common practice to work with the actual determined live weight (LW). To record this, farms have various methods: they can weigh the entire herd in the livestock trailer during regular shifts or in the sorting facility using a livestock scale. The latter can be carried out in a stress-free and labor-efficient manner, especially when combined with electronic ear tags.

Stocking rate

The stocking rate is the total average LW (or LU) of grazing animals per hectare on a farm. This means that all grazing animals and possible grazing areas are taken into account.

The following applies: stocking rate = total livestock / total farm area

Stocking density

The stocking density indicates how much LW (or LU) of a single herd is present on a defined plot at the time of grazing. It is expressed in LW (or LU) per hectare.

The following applies:
stocking density = weight or LU of the herd / size of the (current) plot

It is possible for a farm with high stocking densities, for example, over 100,000 kilograms of LW (200 livestock units) per hectare, to have an overall stocking rate of only 1,000 kilograms of LW (2 livestock units) per hectare, if the farm has sufficient grazing areas.

Determining the correct stocking densitiy

The stocking rate is usually limited by law, for example, to comply with threshold values for organic nitrogen in fertilization regulations, or it has been adjusted over time to local site conditions. However, when determining stocking density, there is much more flexibility, and several options are available. For instance, stocking densities in paddock grazing systems typically reach up to 30,000 kilograms of live weight (LW) per hectare, while in Mob Grazing systems, they can, in some cases, reach up to 1,000,000 kilograms of LW per hectare.

In the „Mob Grazing in Arable Forage Production" project, we established 100,000 kilograms per hectare as the minimum stocking density for Mob Grazing systems. However, our understanding of how different stocking densities affect the plant stand is still limited and a sufficient data basis has yet to be developed. In our project, for example, stocking densities were increased from 200,000 to 400,000 kilograms of LW per hectare after the first year of the trial (see Fig. 29). The aim was to ensure that the majority of pasture residues were trampled down, leaving fewer islands of standing grass. This has proven to be a successful strategy.

The large grazing residues that are desirable in Mob Grazing can lead to increased selective forage intake, which also favors the growth of weeds. For instance, plants such as dock can grow older and are not readily eaten at this stage. At the same time, the opposite effect can be observed: the herd effect with small plots and high stocking density increases competition among the animals. As a result, the animals have less time to choose their food. If the stocking density is increased by reducing the area for the same herd size, the feed can consequently be consumed less selectively [16].

This effect could also have a long-term impact on the plant stand and serve a valuable tool for grassland management. Especially in tall and older plant stands, a high stocking density can be beneficial.

If the stocking density is increased, the number of plots required also increases proportionally (see Fig. 28), along with the amount of work involved. Therefore, the advantages of a high stocking density should always be weighed against the workload, the operational objectives and the site-specific conditions (see also page 49).

An example for calculating the stocking density:

100 cattle x 500 kg (LW) = 50.000 kg LW

50.000 kg / 0,5 ha (plot size) = 100.000 kg LW / hectare

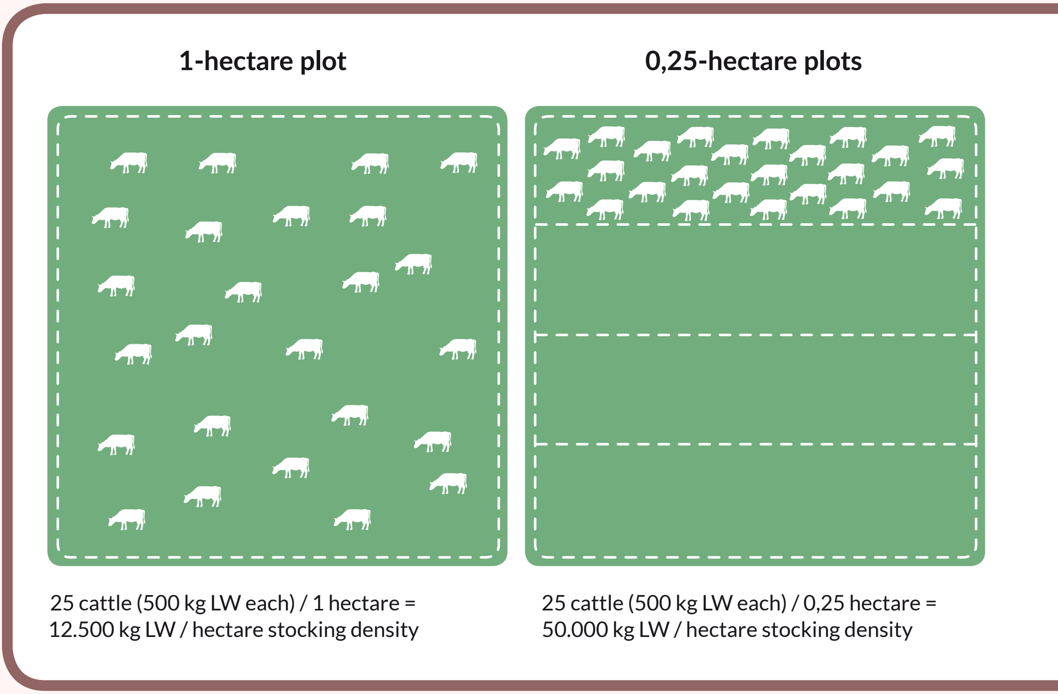


Figure 28: These grazing units demonstrate how, for example, a quadrupling of the stocking density might look like. To do this, the pasture is divided into plots.

Figure 29: This is what a Mob Grazing system with a stocking density of around 400,000 kilograms live weight per hectare looks like in June. On the left, the tracks created by the cattle on the neighboring paddock are clearly visible as a direct comparison.

Figure 30: On this paddock pasture, the animals graze at the end of July with a stocking density of about 30,000 kilograms of live weight per hectare.

4. Length of stay

Even though the length of stay (stocking time) may seem self-evident when setting other grazing parameters, it should still be chosen carefully, following certain guidelines. The length of stay also determines the recovery time. It is primarily limited to minimize the risk of animals consuming the regrowth in the pasture. In general, young shoots become visible after about three days and can be grazed again. Particularly when drought stress is prevalent, yields can be disproportionately reduced if the length of stay is exceeded [26]. As Mob Grazing systems are often implemented in areas with low rainfall and risk of drought stress, the back fence should be moved no later than three days. Additionally, the length of stay influences the amount of pasture residues and the mulch layer (see also page 35).

Determining the length of stay per paddock

The length of stay can be calculated once the desired recovery time and stocking density have been defined. The desired stocking density determines how many plots a paddock is divided into (see also page 28). The length of stay per paddock is calculated using the following formula (see Fig. 31):

The following applies:

Length of stay per paddock =
Desired recovery time / (numer of all paddocks -1)

The ‚number of all paddocks -1' refers to those paddocks that are in a recovery phase at the given time, as at least one paddock is always being grazed (unless the animals are temporarily in the barn).

For a more precise calculation, the pasture calculator from the Austrian research institution Raumberg-Gumpenstein or the grazing planning method of Holistic Management® can be used (see also page 43).

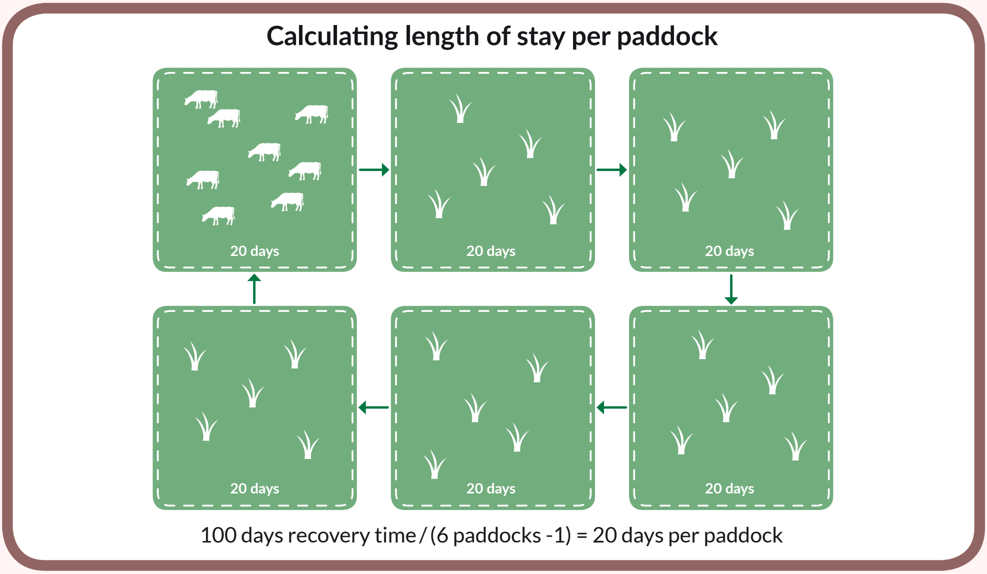


Figure 31: A recovery period of one hundred days corresponds to an average length of stay of twenty days for a grazing unit with six identical paddocks.

Determining the length of stay per plot within a paddock

The following applies:

Length of stay per plot =
(length of stay per paddock / number of plots)

Since the plots within a paddock must be small enough to allow for several rotations per day when high stocking densities are desired, the calculated length of stay per plot serves as a useful guideline. At this small scale, the decision can also be influenced by the following factors:

- What is the current feed requirement, which can be assessed by the rumen fill and recognized by the hunger pit?
- Are the animals currently in a feeding, sleeping or chewing phase?
- Is the plant stand at this location dense or sparse? Are the animals going to a bare ridge or a lush depression?

- Are they animals with a high feed requirement, such as lactating cows and fattening animals, or do they have a lower requirement, like dry cows?

The more frequently the animals are moved, the more their natural rhythm is disrupted. If the rumination phases are interrupted too often, it can negatively impact animal performance. Additionally, the trampling effect may be worse if the animals enter the new plot with a full rumen, graze selectively, and then quickly lie down instead of moving around a lot.

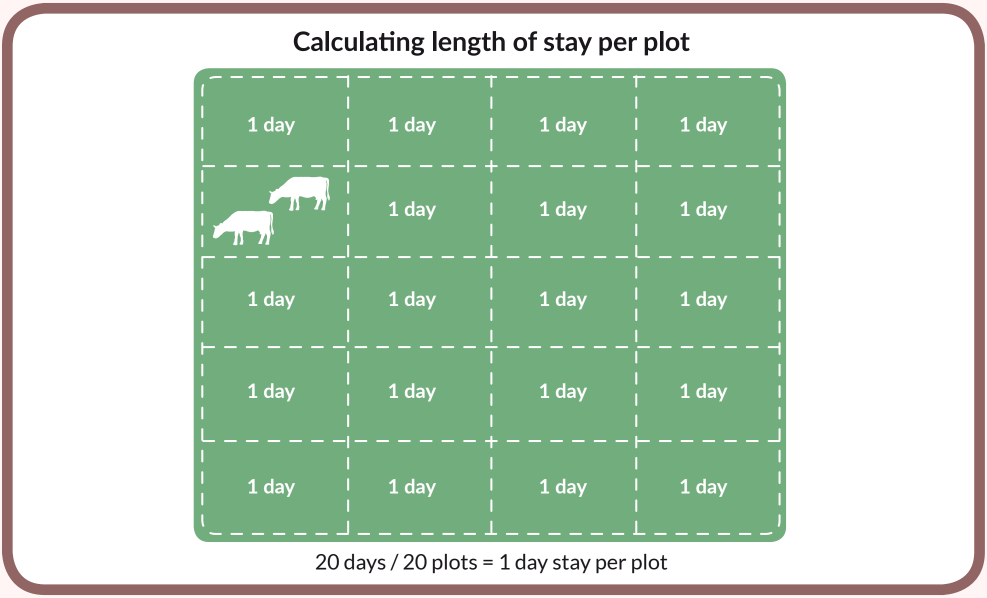


Figure 32: If the length of stay per paddock is twenty days, for example, the paddock can be divided into twenty plots, each of which is grazed for about one day.

5. Mulch layer

In times of climate change, a mulch layer can serve as a fundamental tool for building and protecting the soil. It helps block heat and solar radiation, potentially reducing soil water evaporation. Furthermore, the high organic inputs can promote life and improve the carbon balance in the soil. Building up a mulch layer, as is possible with Mob Grazing, should be used as a targeted strategy. The high regrowth in spring is particularly suitable for establishing a distinct mulch layer for soil protection, which can then be very useful during the following summer months.

Contrary to the common concern that a thick mulch layer could limit regrowth, the research project „Mob Grazing in Arable Forage Production“ observed that both grasses and legumes were able to grow back through the mulch layer after each grazing (see Fig. 33). To successfully establish a mulch layer, it is crucial to regularly assess it during grazing (visual assessment). This allows for a good estimate of the amount of pasture residue during grazing, and when the desired amount is reached – such as half of the pasture stock – the animals can be moved to the next plot. The previously calculated length of stay may need to be adjusted.

The following figures (see Fig. 33 to 38) from the project „Mob Grazing in Arable Forage Production“ illustrate various extents of pasture residues and the associated mulch layer.

Figure 33: The regrowth here grows back through the mulch layer about one to two weeks after grazing.

Figure 34: In a well-developed mulch layer, as seen in this Mob Grazing area, the soil should no longer be visible.

Figure 35: With deep grazing of the stand and a low mulch layer, as seen in this paddock, the soil is usually visible.

Figure 36: The tussocks have been grazed relatively deeply here. Although a mulch layer is present, the grazing residues are somewhat lower as a result.

Figure 37: If the tussocks are not grazed very deeply, the grazing residues are higher than in the previous image. A mulch layer can be established.

Figure 38: In paddock grazing, deep grazing with longer grazing periods is common. Accordingly, only little mulch is present.

6. Further aspects of pasture planning

Plot shapes

Grazing can also be influenced by the shape of the grazing plots (see Fig. 39). Narrow plot shapes, for example, can encourage the movement of grazing animals, which promotes the trampling down of pasture residues into a mulch layer. However, this also increases the length of the fence in relation to the grazed area, resulting in more work [26]. On the other hand, a wide plot shape can encourage uniform grazing behavior. This can be achieved by regularly adding a strip two to three meters wide to a plot that is already being grazed, possibly using a fence spider, although this method may not be suitable for higher growth. In plots that are not rectangular but taper to a point, trampling effects can become concentrated in the narrow sections, as the animals have limited room to move aside and tend to follow the same paths repeatedly. This should be avoided as much as possible. However, this plot shape could be strategically used in areas with heavy weed infestations to enhance the trampling effect on undesirable plant stands.

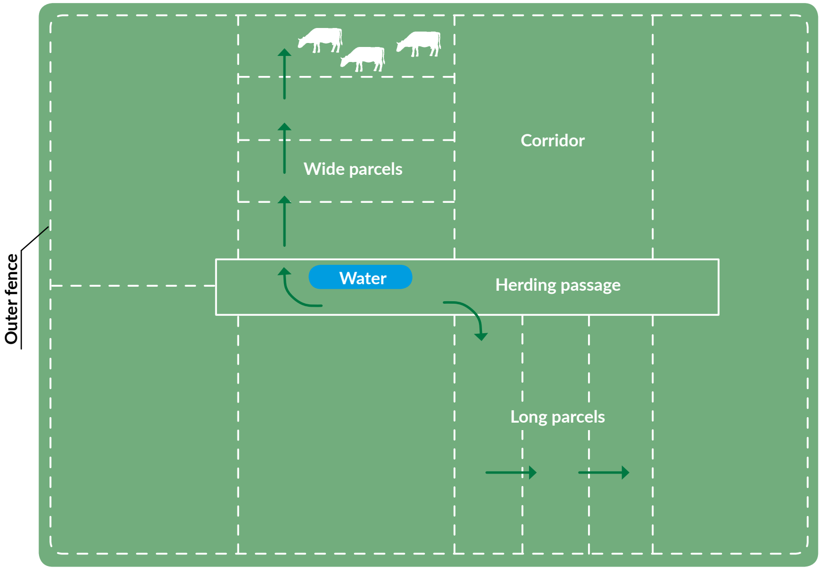


Figure 39: Example layout of a paddock into corridors, parcels, and herding passages. The natural conditions and water supply are usually decisive for a sensible division of the paddock into plots. Different plot shapes can influence grazing as well as the trampling of pasture residues.

Stand maintenance

The various grazing methods can be specifically employed to manage the plant stand. For instance, if one aims to fill the gaps in a patchy stand, plants can be trampled down at seed maturity (stage 7) with a high stocking density, allowing for a sort of reseeding and enabling new plants to emerge. When frequent Mob Grazing and the associated long recovery periods have led to increased tussocks, it can be beneficial to allow the stand to be grazed down very low again. This rejuvenates the plants and prevents further lateral development of the tussocks. By leveraging the strengths of different grazing systems, operational goals can be achieved. With the appropriate method, results can be obtained with the help of animals that would typically require machinery, leading to associated ecological benefits.

Year-round grazing

When the growth phase of grasses ends in late autumn, the grazing period typically comes to an end as well. To extend this period and allow for winter grazing, various methods can be employed. It is essential to ensure that the forage quality meets the nutritional needs of the animals. Some winter forage areas are of high quality and can be grazed by fattening animals, while others are only suitable for dry suckler cows.

If a forage reserve is intentionally established, such as through the stockpiling method (see also page 43), the grazing period can be extended [32]. This method can be applied in both arable forage areas and grassland. The prerequisite is the presence of frost-resistant species, such as tall fescue, which maintain their forage quality even at sub-zero temperatures.

Winter cover crops on arable land can also be grazed. The selection of suitable mixtures varies depending on whether grazing is planned for late fall or deep winter. Cover crop mixtures for late autumn grazing consist of moderately frost-tolerant plants such as ryegrass and incarnate clover, which can be used before the first significant frosts. For deep winter grazing highly frost-tolerant species like winter rye and kale are chosen, as they can survive even under extreme frost conditions. The species composition is designed to provide a continous supply of available forage depending on the season.

When grazing in winter, there is an increased risk of soil compaction, especially if freeze-thaw events are frequent in the region. Therefore, the weight of the grazing animals, stocking density, and length of stay should be selected according to the soil conditions and monitored closely.

7. Creating a grazing plan

Creating and visualizing a grazing plan is a fundamental tool for managing a complex graziing system. When planning, a wide variety of factors are considered, such as the quality and size of the pastures, recovery times, growth rates, additional herds, conservation programs, harvest times, vacation periods and much more. Furthermore, the grazing plan serves as a control during ongoing grazing. If the actual grazing increasingly deviates from the planned grazing, this is a sign to take a closer look. This allows for the right course to be set early on, for example to minimize the effects of a feed shortage by selling animals early.

In German-speaking countries, the Land Regeneration Network, for example, offers courses on „Holistic Management ®", which teach a method for creating pasture plans. The English-language books „Holistic Management ®" and „Holistic Management ® Handbook" by Allan Savory and Jody Butterfield also provide a good basis for creating your own grazing plan. The apps „Pasture Maps®" and „MayaGrazing ®" offer a digital version.

What can we learn from grazing systems and drought management in semi-arid climates?

What can we learn from other countries in semi-arid climate zones for our pasture planning in drought-prone regions of Central Europe? What strategies have been used there for a long time, for example in the USA or Australia? The following examples illustrate drought management strategies. Many of these approaches have not yet been implemented or studied in Central Europe, but they could provide valuable insights into how grasslands in (increasingly) drought-prone regions could be managed in a climate-adapted manner in the future.

In semi-arid grazing systems, the most important phase within the vegetation period is often the rapid growth phase. Depending on the plant stand, this phase lasts around 30 days and typically occurs in spring in Central Europe [27]. Although the growth cycles of grasses vary by location and species, 30-day intervals serve as a good average for these fluctuations, providing a time frame that can be easily planned for by farms. During the rapid growth phase, a large proportion of the annual forage is produced, which is usually essential to bridge possible periods of drought in summer. Therefore, regular rotations in these grazing systems are of paramount importance, as it is essential to avoid damaging vegetative runners in grasses during this rapid growth phase due to prolonged periods of stay: on the one hand, to exploit the full yield potential and, on the other hand, to build up forage reserves for a possible drought (e.g. by stockpiling). Areas that are subjected to grazing or rotation during this period should be grazed last in the following year to preserve them as much as possible and allow for recovery [27]. In principle, it is important to optimize the health and yield potential of the pasture before a drought to mitigate possible negative effects as much as possible.

During a drought, a closed grazing plan for example, can be aimed for as part of Holistic Management©, which is based on a growth stop and only considers the existing plant stocks in its calculation (see also page 41).

In the event of a drought, the most significant impacts on plants and animals are usually observed when a drought period extends into the main growth phase of the grasses. If the livestock stand is not reduced in a timely manner, potential overgrazing combined with drought can cause severe and long-term damage to plant stands and consequently also to yield potential [27]. Options for recognizing this in a timely manner are offered by apps like „Maya Grazing©" (www.maiagrazing.com) or „PastureMap©" (hello.pasturemap.com), which create models of forage availability based on various parameters, such as historical and current weather data. These are constantly compared with the feed requirements of the livestock. Acting as a kind of early warning system, critical points in time, for example to reduce livestock numbers, can be predicted at an early stage both during and outside the main growth phase. On the one hand, this counteracts overgrazing and, on the other hand, the sale of animals is likely to yield better returns than would be the case during a drought.

Stockpiling

Stockpiling is the term used to describe the creation of a forage reserve on pasture, sometimes also known as ‚hay on the stalk'. This method estimates when the growth phase of the predominant plants will come to an end, either due to a dry period or the onset of winter dormancy. Based on this point in time, planning is conducted to determine when grazing or cutting should take place, ensuring that the last growth achieves an optimal balance of quantity and quality before entering the dormancy phase. This approach allows the forage to be preserved at high quality and prevents it from becoming overmature, as the plants stop growing. In a summer stockpiling system, six to nine and a half tons of forage can be stored per hectare [28/29]. These are then typically grazed at stocking rates of around 66,000 kilograms per hectare in a strip grazing system, with the back fence moved after three days. According to reports from the USA [28/29], up to 60 grazing days can be provided in the summer months, which can make a significant contribution to preventing a growth depression in summer.

Own experiences from the Eberswalde University for Sustainable Development and Gut Temmen are not yet available; further research is necessary.

Cattle breeds adapted to drought and heat

To better adapt a grazing system to drought and heat, genetic factors should also be considered and, if necessary, adapted. While robust breeds may promise less performance, they often cope better with extreme weather conditions. Moreover, they have lower requirements for feed quality compared to intensive breeds. Their good health even in harsh environments often leads to reduced labor and veterinary costs, making them well-suited for extensive grazing systems. In many arid regions of Africa, Australia and the USA, zebus (Bos Indicus) in particular are crossed with the domestic cattle we know (Bos Taurus). One example is the Australian Droughtmaster breed which has been developed by crossing zebu cattle with European Hereford and Shorthorn breeds. Droughtmasters are excellently adapted to hot and dry climates and can still produce good quality meat even under these difficult conditions. The potential of this breed for the drought-prone regions of Central Europe has not yet been investigated, but it becomes clear that new breeding programs could perhaps lead the way here.

Is Mob Grazing suitable for drought-prone areas in Central Europe?

Due to the generally longer recovery times in grazing systems located in drought-prone areas, taller regrowth heights and lower forage quality can be expected in the forage stock. In this context, it could be quite effective to utilize this forage through Mob Grazing, depending on the forage needs, allowing for the overmature forage to be either trampled down or – by implementing longer stay durations and/or larger plots – be consumed. More frequent rotations also provide greater flexibility to adjust grazing parameters, such as recovery time and length of stay, at short notice, enabling a quicker response to extreme weather conditions.

6. Monitoring of Plant Stocks

Monitoring the regrowth heights

Measuring the height of regrowth is commonly used to estimate the amount of forage available in an area, as each centimeter of growth height corresponds to a certain amount of forage. In the cover method, for example, one centimeter of regrowth height corresponds to approximately 130 to 200 kilograms of dry matter, depending on the density of the stand, the plant species, and the stage of development (detailed method of Lfl. [30]). However, it should be noted that with cover methods and the Rising Plate Meter (RPM), the estimation of forage quantities becomes less accurate as growth increases, since the stands become more heterogeneous and can vary between very soft and hard or woody. Therefore, the method may not be sufficiently reliable for stands over 25 centimeters in height (see Fig. 40). For this reason, the HNEE is working on further developing the method.

Figure 40: In the EIP-project „Mob Grazing in Arable Forage Production", the *Rising Plate Meter Grasshopper© from TrueNorth Technologies* was used. With the help of an ultrasonic sensor, growth heights can be measured in the millimeter range and sent to the cell phone via Bluetooth. Due to the high, yet loose growth, the disk of the instrument sinks relatively far down. Further methodological developments are therefore necessary for tall crops.

Monitoring the stages of development

Grasses

The developmental stages of grasses are quick and easy to determine (see Fig. 41) and, in addition to growth height, provide further important information on forage quality. For instance, the forage quality of a plant stand can be assessed using the leaflet „Evaluation of Meadow Forage – Nutrient Content for Milk and Meat Production“ [31]. It should be noted that as the development stage progresses, the cell walls become reinforced with lignin. This increases the cellulose and lignin content while simultaneously decreasing the protein and energy content, which is particularly relevant for grazing in Mob Grazing systems. Characteristic stands are usually found in later developmental stages, for example, between panicle emergence and flowering (see Fig. 43), where reduced forage quality can be expected compared to younger pasture stands. In the case of even later grazing, such as during seed maturity, the forage quality continues to decline.

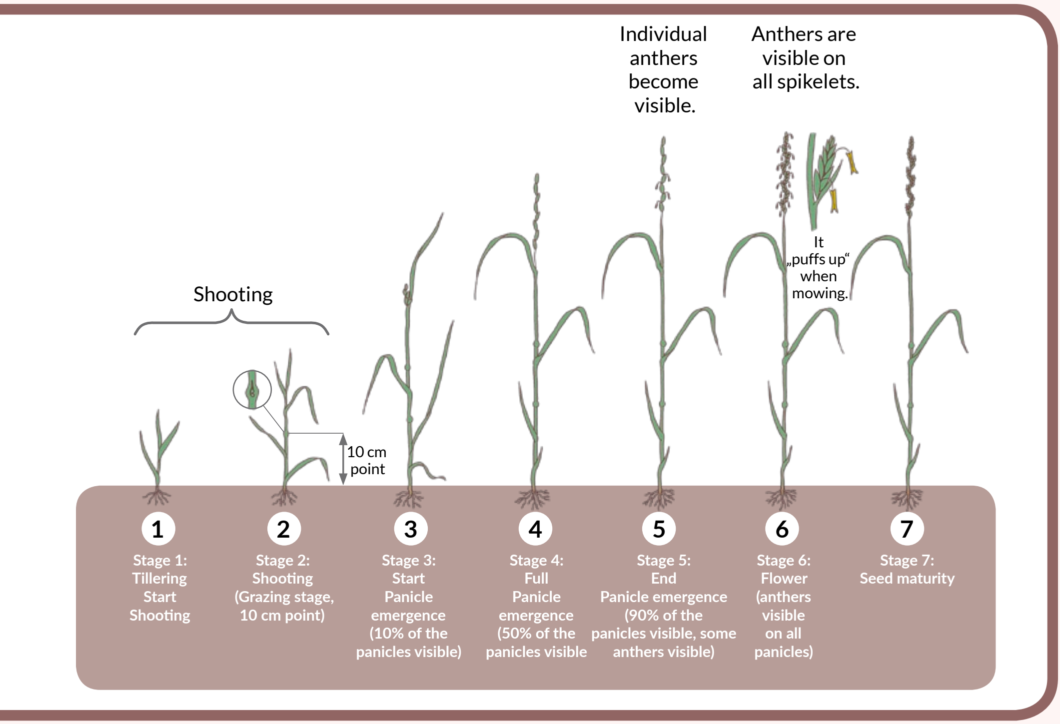


Figure 41: The developmental stages of grasses. Own illustration based on *AGFF (o.D.)*

Figure 42: Cocksfoot in the vegetative state (stage 2). No panicles are yet visible.

Figure 43: A cocksfoot in flower (stage 6). The anthers are clearly visible.

Alfalfa

Since alfalfa plays a major role in arable forage production, especially in dry regions, its developmental stage should also be determined. Alfalfa quickly loses forage quality as it begins to flower. Additionally, the progression of developmental stages in grasses, such as cocksfoot, can differ significantly from that of alfalfa. Therefore, in some cases, we must decide whether to prioritize optimal grazing timing for cocksfoot or for alfalfa.

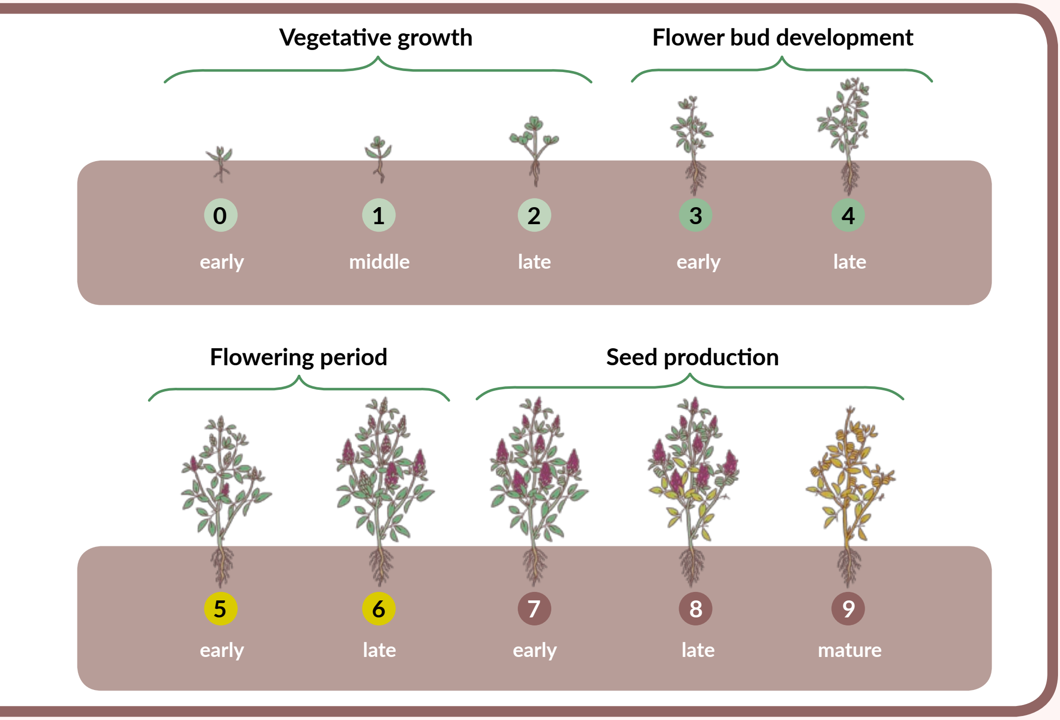


Figure 44: The developmental stages of alfalfa. Own Illustration based on *Nutrien LTD (o.D.)*

7. Farm Structural Prerequisites

Successful grazing requires awareness and readiness for planning. These two elements enable better structuring of workflows and continous improvement. Good planning is always followed by an evaluation of the results, which forms the basis for planning in the following year. The quality of decisions depends on access to good, comprehensive information. Personal prerequisites for successful implementation include flexibility, reflective capability, and the willingness to make mistakes and learn from them. Through targeted and regular planning, a high quality of work can be achieved, resulting in precise and effective grazing, regardless of the system used.

Water supply

A flexible grazing system also requires flexible infrastructure, particularly concerning fencing and water supply. It is recommended to use easily transportable drinking troughs that are compatible with transportiation options, such as the loading areas of vehicles. This allows for the quick and easy movement of drinking troughs with the herd and ensures sufficient back fencing. A sufficient number of withdrawal points is important and their quantity depends on both the size of the herds and the area.

Figure 45: Mobile drinking troughs

An ideal option is a frost-free underground water pipe, with regional depth specifications for frost-free conditions taken into account. In arable forage areas, the connection points can be buried and marked with a GPS device, allowing them to be uncovered again after arable use. The diameter of the water pipe must be carefully calculated based on herd size; if in doubt, a larger diameter is preferable for long-term flexibility. To determine the optimal watering points, a temporary above-ground water supply can initially be used in summer. Once suitable locations have been identified, the pipe can be laid underground using an excavator or a laying plough, provided that the area is free of stones and drainage. It is advisable to lay an underground cable simultaneously to ensure a low-maintenance power supply for the fences.

Power supply and fencing system

To fence off parcels, one needs a herding-proof outer fence and mobile intermediate fences. By further subdividing the paddocks with intermediate fences that remain in place throughout the year, daily working time can be minimized. A single strand of wire is usally sufficient for these intermediate fences, making it easier to mow them free.

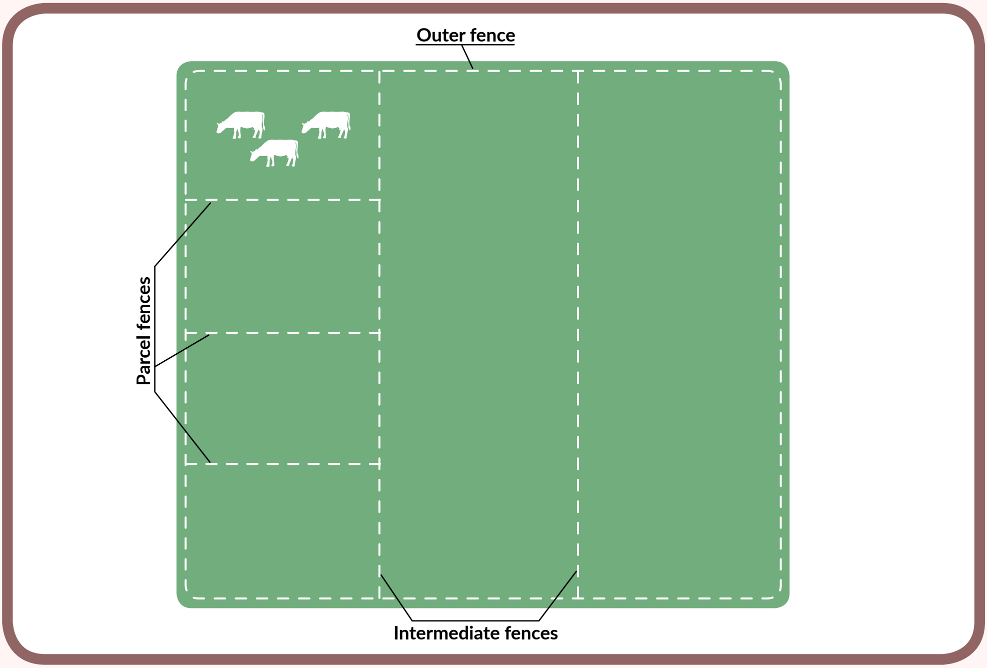


Figure 46: Fencing system of a Mob Grazing or portion grazing system.

For flexible fencing, a vehicle such as an ATV or quad is very useful. Reels with gear ratio of 3:1 facilitate the quick rolling up of the fences. Lightweight fence posts are suitable for everyday fence construction so that as many as possible can be transported at once. Tools that automate the opening of the fences, such as the Batt-Latch® or fence lifter, are also available. It is important to know the rhythm of the herd well, especially when frequent portions are added. Even with automated openings, it's crucial to consider the animal's ruminating and feeding phases.

Figure 47: Lightweight fence posts can be easily carried in a self-made quiver.

Herd size

Basically, any of the grazing methods can be implemented with any herd size. However, it is advisable, especially in systems that operate with high stocking densities, to have a larger number of animals per herd and consequently a low total number of herds. This increases work efficiency, as herds typically require work, not individual animals. Thus, the increased workload of regular movement can be offset by the lower total number of herds.

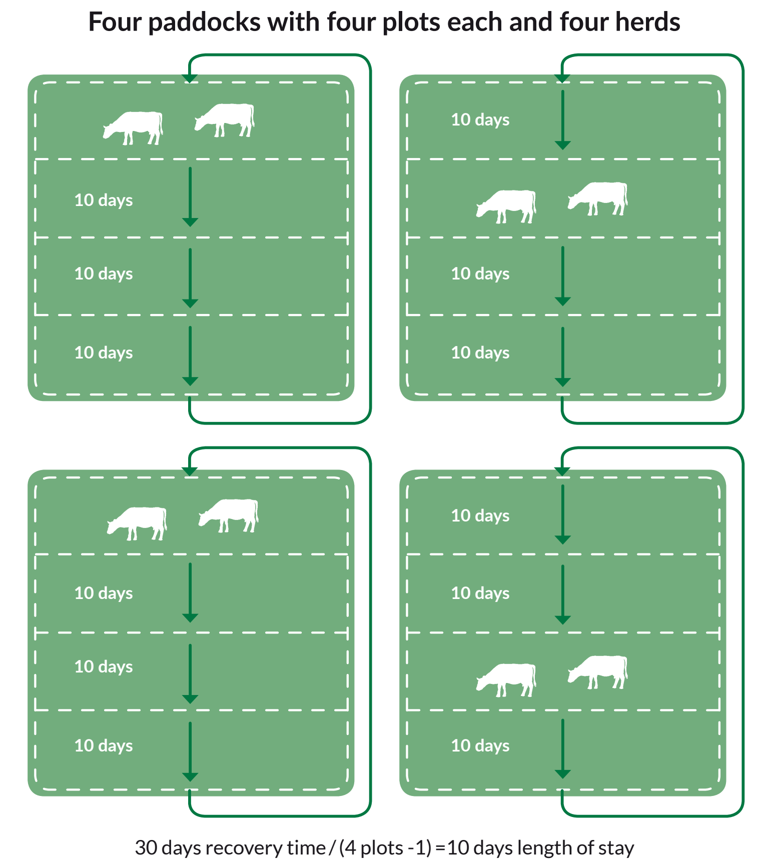


Figure 48: To guarantee thirty days of recovery time per plot, the length of stay for four herds per plot is ten days.

Additionally, the recovery time of the paddocks can be increased by reducing the number of herds while increasing the stocking density (see Figs. 48 and 49). There are only a few situations where separating herds is absolutely necessary. For example, to prevent unwanted mating of young animals during the breeding season, they only need to be removed from the herd for a six-week breeding phase and can then be reunited into a single herd afterward. The farm infrastructure, including the sorting system, water supply, and land sizes, must be adapted accordingly to accommodate the herd size.

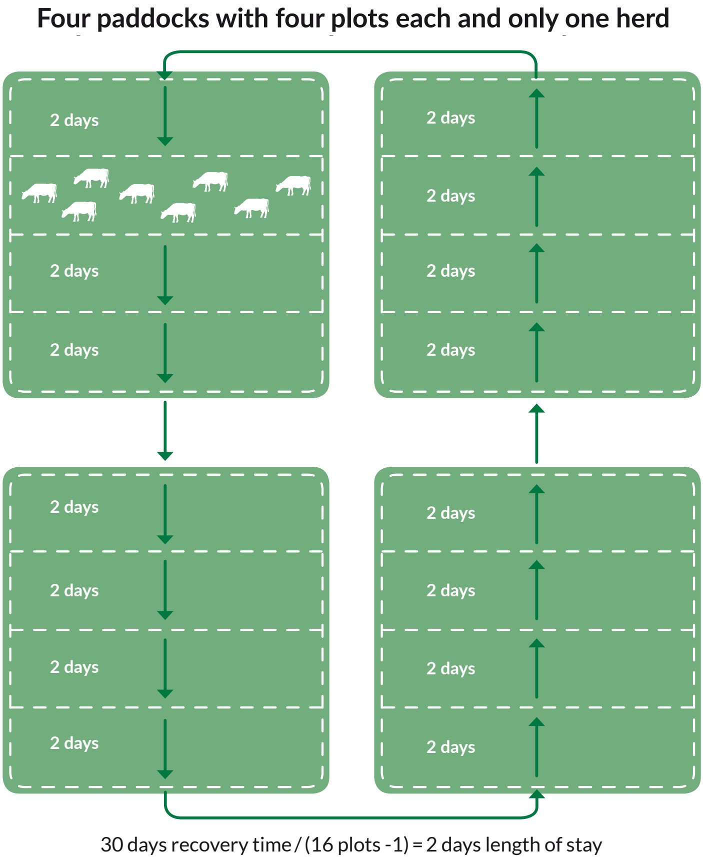


Figure 49: To guarantee thirty days of recovery time per plot, the length of stay for only one large herd per plot is two days.

Stockmanship

When grazing cattle, the method of Stockmanship is very helpful. The method is based on a deep understanding of their natural reactions. By using position and movement through precise body language and movements, cattle can be moved in a highly controlled manner. This method is also referred to as ‚Low Stress Stockmanship' or ‚Low Stress Livestock Handling' – thus emphasizing that unnecessary stress is avoided and that at the end of the day animals are either relaxed or, if not, they are worked so that the stress is taken off from them.

Stockmanship can be implemented in any type of husbandry and grazing method, wherever people work with cattle: in grasslands or stables, with dairy cattle or suckler cows, in bull fattening or in calf rearing.

Stockmanship is based on the ‚language' of cattle. It is a language without words. It uses posture, body language, position and movement. Bud Williams (USA) has succeeded in observing this language, extracting core concepts and putting them into words so that this way of cattle handling can be understood and learned by others. Nevertheless, as the language is ‚rooted' in the cattle, it is a universal language and many animal keepers know parts of this language.

Two core elements of Stockmanship are the zone concept and the concept of pressure and release.

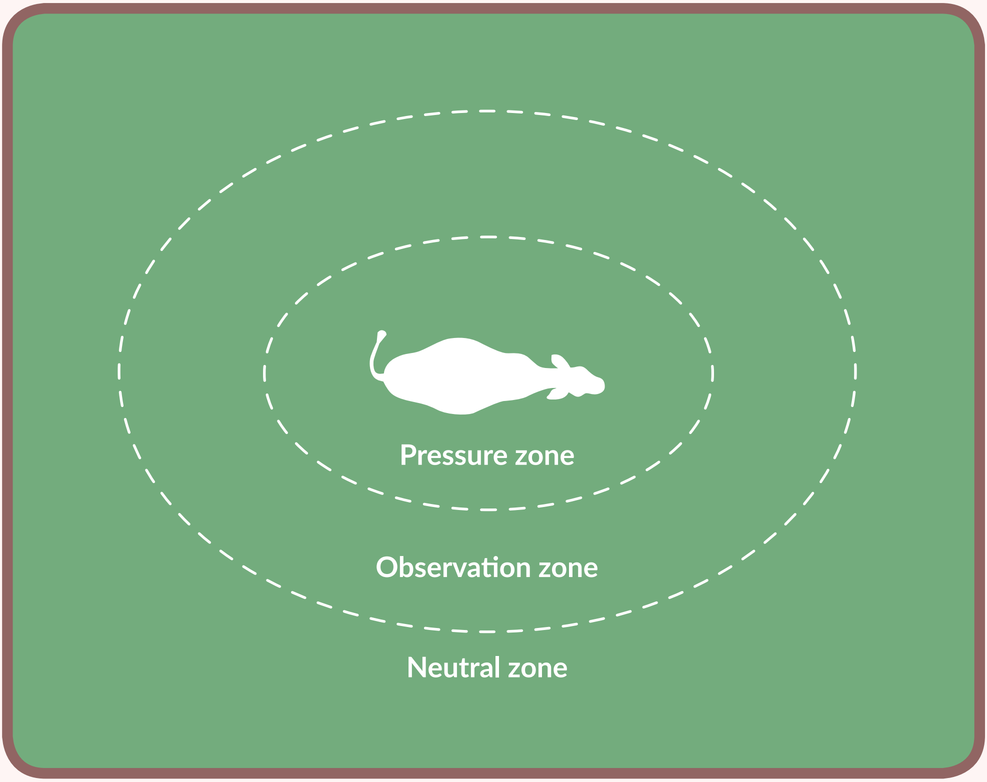


Figure 50: Zone concept. Own illustration based on *Cote (2019)*

The zone concept defines three distinct zones around the animals. Whoever is in the neutral zone has no relevance for the animal in question. Anyone who enters the observation zone of an animal is observed by the animal. Anyone who moves closer to the animal enters the pressure zone and can thus set the animal in motion.

When using Stockmanship, one works at the edge of the pressure zone with pressure and release: By coming closer to the animal with physical presence, pressure is built up; by moving away, pressure is released. Applying pressure is usually known quite well as part of cattle handling. Adding release at the moment the animal reacts in the desired way opens up new dimensions. The interplay of pressure and release at the edge of the pressure zone creates an increasingly subtle interaction between animal and human.

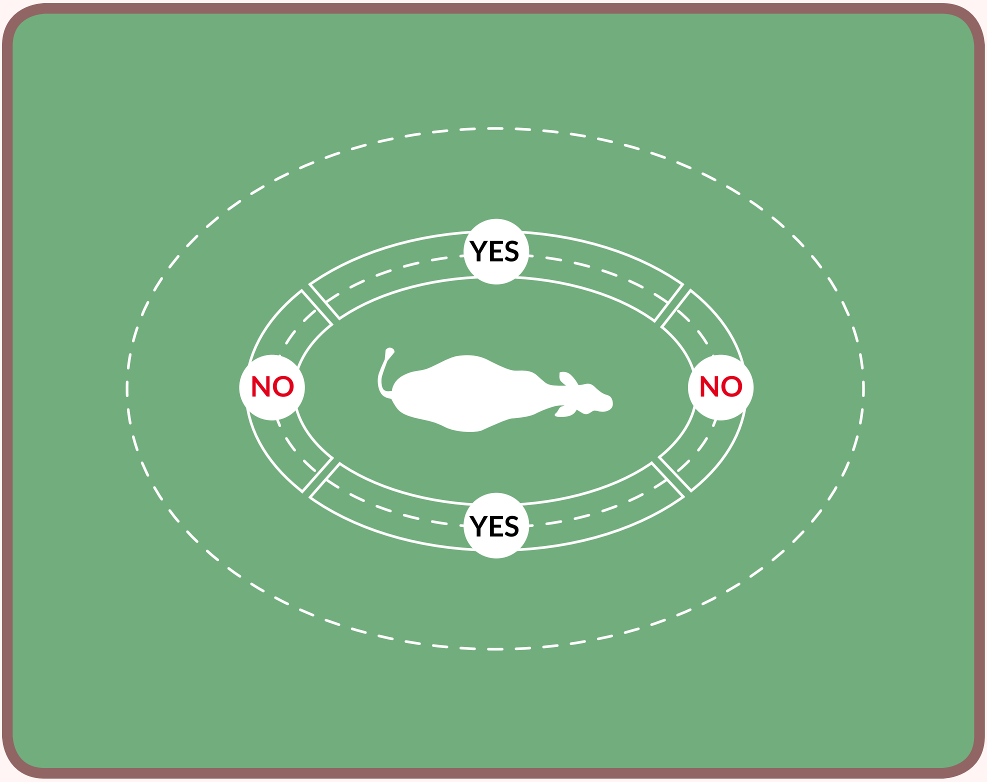


Figure 51: Areas for pressure build-up and pressure reduction at the edge of the pressure zone. Pressure should only be applied and removed in the YES-zone. Own illustration based on *Cote (2019)*

The advantages of Stockmanship are manifold. The well-being of the animals noticeably increases, and the herds generally behave more calmly. It reduces the risk of injury for both the animals and the people working with them. Additionally, working with calm animals is more efficient. Pasture changes become much easier, grazing becomes more precise, and Mob Grazing can be effectively implemented.

The basic principles of Stockmanship can be learned through texts or videos, while seminars offer a deeper insight and the possibility of discussing open questions. Patience and a willingness to closely observe and respond to animal behavior are essential.
Stockmanship trainer Philipp Wenz describes the core of the method as follows:
„Learning to read the animals – and working with their reactions".
Further information at **www.mob-grazing.de/stockmanship**

Personnel

The personnel effort required for the implementation of Mob Grazing is context-dependent, but it can be significantly reduced with good planning and preparation, such as through the use of intermediate fences. Setting up the infrastructure is therefore an investment that pays off in the long term. A basic understanding of the animals – nutritional physiology, health, behavior – and the plants, such as their growth pattern, is necessary for personnel qualification. A great willingness to learn, curiosity and an open mind are essential, as is a readiness to always learn further as you go. Unfortunately, most resources in this field are primarily available in English, so language skills are beneficial.

Initially, the increased need for documentation and planning can be challenging, especially when experience is still limited and there is resistance in the social environment. It takes time and commitment to establish new methods and question existing ways of working. Another hurdle may be the need to leave old paths and embrace new perspectives, especially when the pastures look different from what is familiar.

Defining a clear operational approach and shaping collective learning are crucial. Field days, farm visits, and educational opportunities, such as participation in specialized courses and seminars, encourage exchange and collaborative learning. Additional training courses such as ‚Holistic Management' from the Savory Institute offer valuable methods for improving grazing and overall farm management.

8. Conclusion

Mob Grazing is an effective method for sustainably using pasture land and improving soil fertility in drought-prone areas. With high stocking density and short grazing periods, extended recovery times are possible, promoting root growth, enhancing soil life, and improving water retention. However, due to the high stocking densities, Mob Grazing requires careful planning and continuous monitoring to prevent overgrazing from extended stays. Additionally, the farm structure should allow for mobile and flexible fencing and water management.

Adapting grazing management to specific regional conditions is crucial for success. Flexibly adjusting grazing strategies to changing environmental conditions is becoming increasingly necessary in the face of climate change. The selection of suitable plant species is also a crucial step towards more resilient grazing systems. Overall, integrating Mob Grazing into a holistic management system in suitable locations can enhance the resilience of grazing areas to drought and heat in the long term.

Mob Grazing	 Further development of portion grazing with high stocking densities, a very short grazing period, tall growth, long rest periods and a high proportion of trampled grazing residues.
Where suitable?	Mob Grazing was developed for drought-prone locations. It is also suitable for arable land in order to maintain or improve soil fertility by grazing forage crops.
Where not suitable?	In areas of permanent grassland with high precipitation, the desired mulch layer can lead to disadvantages.

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Pasture planning at Gut Temmen

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