

# Improving grassland

## A systematic approach leads to success

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Many options are available to farmers wanting to improve their grassland, and their use is linked to various conditions. The phrase is often used in quite a narrow sense, but grassland improvement is more than just over-sowing, resowing or sowing for the first time. By definition, grassland improvement includes all agricultural, chemical or mechanical measures aimed at improving a piece of grassland. Consequently, it also includes mechanical or chemical weed removal, increasing the yield of dry matter or of particular substances by the targeted application of nutrients and all types of management changes. In the

narrower sense, grassland improvement includes all measures in which seeds are used with the specific aim of controlling the grassland in the future (figure 1). Resowing and first sowing procedures are sometimes dependent on certain growing conditions, and they are by no means makeshift actions that can be carried out at any time or in any way. In contrast to sowing for the first time, when an existing sward is resown it undergoes little or no chemical treatment or any deep mechanical ploughing. The success of resowing depends on very specific conditions.

### Advantages of resowing:

- The old sward is not destroyed, which means that the new sward will thicken quickly.
- No risk of increased nitrate release.
- The soil structure is retained, which means that the sward is safe to walk on.
- Feed loss is low.
- The sowing risk in cold, wet or dry conditions is low.
- It is inexpensive.
- Valuable species that have adapted to the site (ecotypes) are retained in the grassland.

### Disadvantages of resowing:

- Newly-sown grass faces strong competition from the existing sward. This means that only very tough species are suitable for resowing.
- Resowing is unlikely to succeed if the existing sward is thick and contains a high proportion of competitive grasses such as rough meadowgrass.
- Farmers wanting to improve weedy plots will only be able to apply crop protection products on the first or second growth, if at all. Safety intervals must be respected until the grass is cut. Any gaps in the grassland should be filled in by resowing.

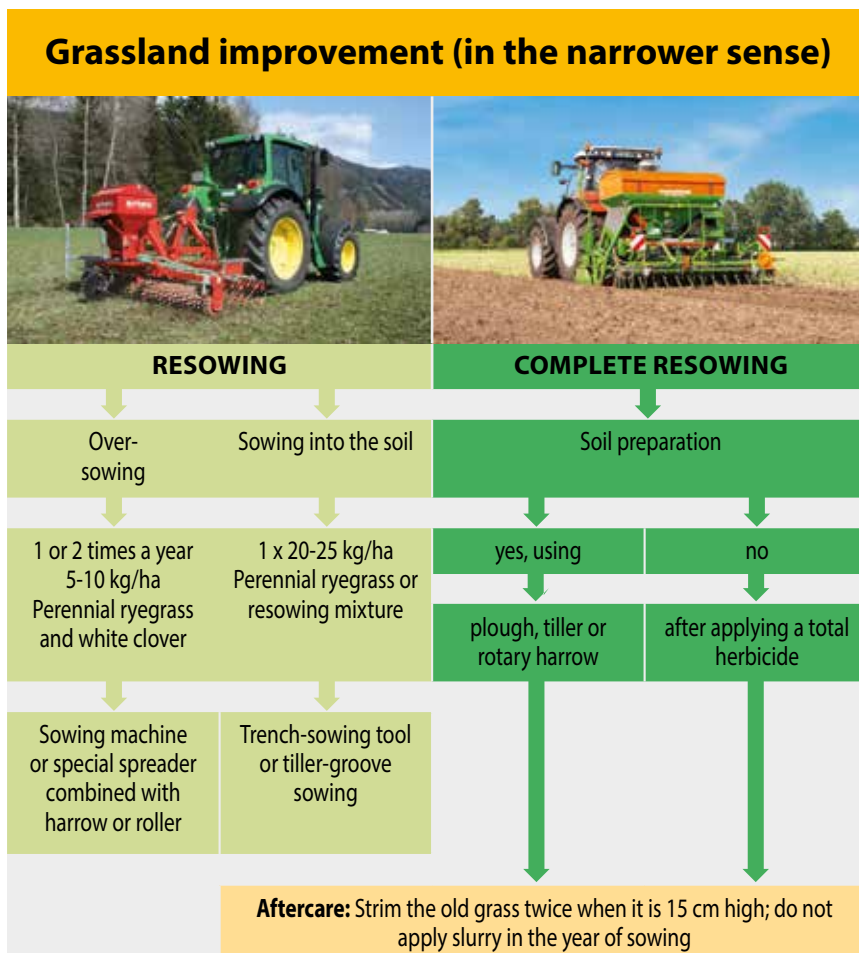


Figure 1: Details of grassland improvement measures in the narrower sense

## Oversowing

is only successful when there are large gaps in the grassland, because the grass sown has to compete against the species already there. The vigour of grasses at an early stage of development is particularly important, which is why only a few types are suitable: perennial ryegrass (*Lolium perenne*), cocksfoot (*Dactylis glomerata*) and to a lesser extent timothy grass (*Phleum pratense*). Small-seeded grasses such as Kentucky bluegrass are very unlikely to thrive and so are hardly ever used in oversowing. If the proportion of gaps is small, new gaps should be created by flat-harrowing before seed is sown.

The high sowing risk means that oversowing must be repeated within a year and for several years afterwards. Oversowing is carried out by sowing 5-8 kg/ha of vigorous grass species using manure spreaders, special tools (hand seeder or slug pellet spreader) or sowing machines (with raised coulters), mixed in with slurry or by hand. The seed should be sown several times a year when manure is being spread. The success of oversowing depends

on adequate rainfall. It is usually most successful on plots with large gaps in sward and where the existing grass contains few competitive species that spread by creeping. Oversowing can be successfully combined with spring work on the land. However, sowing very early in the year has worse results because of low light levels and short-

There are two basic types of resowing: oversowing and resowing.

er days. Heaps of earth thrown up by moles and voles offer enough room for plants to grow successfully if they are smoothed out with a harrow.

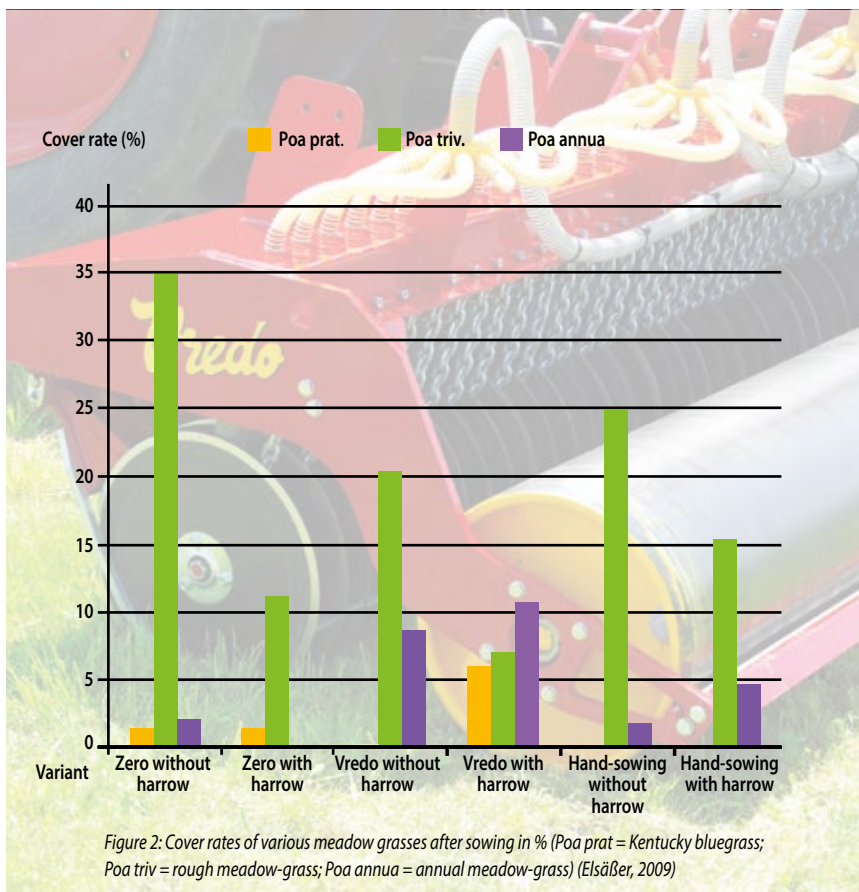
### Sowing into the soil

This technique involves using special sowing tools to place the seed directly into slits or trenches in the soil. The advantage of this is that the seed is in much closer contact with the soil and so normally results in better

emergence. The amount of seed sown in this technique is 20-25 kg/ha, and mixtures of different types of grasses can be successfully used.

In principle, seed does not need to be sown annually, but rather at intervals of 3 to 5 years. As the seed is placed directly into the soil, trench sowing is recommended when the existing grass is denser and does not contain much thatch. Trench-sowing equipment is of little or no use in improving very dense or thatched sward, because although the seed does reach the soil it is unlikely to emerge because the dense sward blocks the light. Thatched swards should therefore be harrowed before sowing, as with oversowing.

The success of such measures has been confirmed by trials carried out at the Baden-Württemberg Agricultural Centre (BWAC) in Aulendorf (figure 2). In all variants tested, harrowing dramatically reduced the proportion of rough meadow-grass, while Kentucky bluegrass only established when trench-sown with a Vredo machine.



### The success of sowing into the soil depends on

- it being carried out when existing grass is short,
- grass cover being fairly patchy, with gaps accounting for at least 20 per cent,
- weed controls being applied beforehand if the plot is very weed-infested,
- the plants which grow being used early,
- adequate base fertilisation being applied and start-up nitrogen being applied at up to 30 kg N/ha,
- no slurry being spread in the year of sowing,
- the grass is strimmed twice.

If water supplies are unreliable, seed must usually be resown every one to two years.

# What else needs to be borne in mind?

The success of resowing, whether as oversowing or sowing into the soil, depends on a whole range of factors. Suitable aftercare is vital, though the use of combination equipment means that some aspects can be dropped.

## Rolling

Seeds need to be in close contact with the soil if they are to grow properly. Ring (Cambridge) rollers are better than flat rollers for rolling resown land. Prismatic rollers have proven very effective. Rolling is not necessary if the soil is wet enough.

## Early cutting

The first and second crops grown from resowing must be cut in good time (strimmed when the grass is about 15 cm high).

## Fertiliser

Slurry should not normally be spread in the year of sowing as it could burn the emerging seedlings.

## Crop protection

Any weeds in the crop should immediately be strimmed.

## Complete resowing

Complete resowing is mainly performed to restore very poor grass, for example grass which contains a high proportion of weeds or has been destroyed by wild boar.

### **Complete resowing is appropriate if:**

- the existing grass contains a high proportion (over 50 per cent) of poor-quality grasses such as couch grass, tussock grass, rough meadow-grass, annual meadow-grass, tufted grass and weeds,
- grassland production is to be changed to meet new farming, conservation or feed production requirements,
- there is significant wild boar damage.

Complete resowing can be carried out with or without prior working of the soil. It may be necessary to use chemicals to control any deep-rooted weeds. Whatever technique is used, it is vital to ensure that the seed is spread evenly (1 cm).

**Complete resowing with mechanical destruction** of the sward is currently prohibited in some German regions, and has very serious consequences. Mechanical working releases the carbon bound in the humus. It also mineralises nitrogen in the soil. This means that yields are usually higher in the first few years after sowing but decline once the nitrogen released has been used up (these are called the hunger years) until the humus has become re-established. This makes complete resowing a risky and expensive undertaking. In addition, if seed is sown after the soil has been tilled or harrowed with a rotary harrow, there is a significant risk of dock seeds emerging and outperforming the grass.

## **Sowing in isolation or under a covering crop?**

Covering crops will inevitably compete with the new grass. However, they may be useful if the farmer needs to protect the seed sown for a permanent crop, for instance on rough, hilly land and if the seed can be sown in spring with an adequate water supply. Possible covering crops include green oats and short-live varieties of annual ryegrass. Covering crops should be sown at no more than two-thirds the usual rate. Problems are likely on sites that tend to become weed-infested. Seed should be sown into a seed bed with a fine tilth after preparing the soil with a plough, tiller or rotary harrow on a broadcast setting with the coulters raised. A sward will establish quickly if seed is sown at right angles or diagonally, using half the seed in each direction. Good soil preparation is particularly important on moorland soil. The soil should therefore be rolled before and after

sowing, preferably with a cam roller or ring roller. Flat rolling encourages erosion because it produces a flat soil surface.

## **Complete resowing without soil preparation**

Complete resowing can also be carried out without soil preparation once the sward has been killed off by chemicals. This involves spraying the old sward, which must be at least 10 to 15 cm high, with a total herbicide. Any regrowth can be removed after two to three weeks and trench-sowing equipment can be used to sow fresh seed. Glyphosate has so far been found to be effective because the waiting period is shorter. It remains to be seen whether any side-effects need to be borne in mind. The application rate is 4 to 5 l/ha, especially in dense sward, or 3 l/h mixed with 10 kg of ammonium sulphate.

### **This approach has a number of benefits:**

- Grassland can be restored even on sites vulnerable to erosion.
- Creatures living in the soil are not disturbed. The soil structure is retained.
- The technique is particularly suitable for moorland soil and other sites where ploughing is not an option.
- Nitrogen release is minimised.

### **The disadvantages:**

- The emergence of grassland plants is delayed. Cocksfoot in particular is sensitive to glyphosate.
- The technique requires large volumes of water.
- It is tricky if the land is already heavily infested with certain types of weeds, such as deadnettle, red fescue and umbellifer species.



### Sowing times at a glance

The best time for complete resowing depends primarily on the amount of water available. If seed is sown after tilling the land, sowing at the time of first growth seems to be less successful than sowing after the first cut (June to early September) because of strong weed competition. In areas which experience dry summers, sowing after tilling should be done in late May/early June. Farmers need to make sure that they have enough time to control any weed regrowth. The nocturnal temperatures needed for successful application of herbicide must also be borne in mind. In areas which experience dry summers, a total herbicide

can be applied in autumn and new seed sown the following spring. However, there is a risk that weeds which germinate at low temperatures may spread more quickly.

### Seed mixtures for complete resowing

Seed is used in different proportions within a mixture than when resowing (contact official bodies for advice). Suitable mixtures should be selected according to how intensely the crop is to be managed and in the light of the site conditions. The only plants that can be grown in all conditions are perennial ryegrass (*Lolium perenne*), meadow fescue (*Festuca pratensis*),

cocksfoot (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratense*), timothy grass (*Phleum pratense*) and white clover (*Trifolium repens*). Meadow foxtail (*Alopecurus pratense*) is a good choice for wet sites, while red fescue (*Festuca rubra*) is suitable for less intensely-managed meadows and tall oat grass (*Arrhenatherum elatius*) suits valley sites. Good choices for dry sites are Kentucky bluegrass (*Poa pratense*) and tall fescue (*Festuca arundinacea*); the latter variety grows strongly but suffers if eaten by meadow-dwelling creatures.

