

## Windbreaks, Shelterbelts and Hedges

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### Introduction

Hedges, windbreaks, and shelterbelts are unsung heroes of landscape and agricultural management. These meticulously arranged rows of trees, bushes, and other plants are essential for shielding crops, soil and building materials from the damaging impacts of wind, bad weather and soil erosion. These vegetation barriers have the potential to greatly increase crop yields, support biodiversity and strengthen the overall resilience of ecosystems by lowering wind speeds, preserving soil moisture and establishing microclimates. Discover how installing windbreaks, shelterbelts and hedges may significantly improve our environment and way of life as we examine the advantages, design considerations and best practices for doing so in this article.

### Windbreaks

Windbreaks are single or several rows of plants arranged strategically to block winds that could otherwise impair the production of crops and livestock and possibly cause damage to structures. Living (plants) or structural (non-living, man-made materials) barriers that filter and slow potentially harmful winds that enter a particular location can be used as windbreaks.

### Windbreak design considerations

- 1. Recommended orientation:** In order to effectively safeguard vegetation, livestock, and/or buildings, the windbreak needs to be oriented perpendicular to the direction of the predominant wind.
- 2. Height:** Windbreaks should ideally be twice as tall as the object they are shielding. A windbreak tree will typically slow down the wind for ten times its height in front of it.
- 3. Length:** It is advised that the windbreak be five times as wide as it is tall (the maturity height in 20 years). If the space is sufficiently large to allow for side expansion, this is feasible.

### 4. Density

The density of the windbreak is determined by the quantity of leaves, branches, and trunks present. The wind-speed reduction increases with windbreak density. Since air circulation controls the temperature around the plants, animals, and structures being protected, the windbreak should only partially obstruct the wind rather than entirely block it.

### 5. Number of rows

Windbreaks may be single or multi-row depending on the strength of winds, the area to be protected, and the amount of space available on the lot.

### 6. Continuity

A windbreak functions better when it doesn't have any big, unexpected gaps in it. By replacing dead trees as soon as possible, you may prevent holes from forming, which could act as tunnels through which potentially harmful concentrated wind flow could penetrate the protected area. An excessively dense windbreak will cause concentrated wind flow to rise over the barrier and penetrate the field more forcefully than it would if it were less dispersed. Give shrubs and trees room to grow together to create a continuous barrier, but avoid making the growth too dense as this will limit the necessary air circulation.

- 7. Species:** Tree species that are being evaluated for planting should be adaptable, long-lived, and well-suited to their intended location. Recognize the intended species' growth characteristics to ensure appropriate spacing and density.

### Types of windbreaks

**Farmstead windbreaks:** Strong winds are prevented from damaging buildings, barns, greenhouses, and

other structures by using these windbreaks. Additionally, they design cozy living spaces, farmstead windbreak efficiency is influenced by vegetation density. Generally speaking, medium density is preferable. When windbreaks are densely planted, they can offer excellent protection across a relatively limited area, such as a house plot or farmstead.

### Field windbreaks

These windbreaks have the dual purposes of preventing soil erosion and shielding the crop from strong winds. The density of these windbreaks is medium. An agricultural field or other big area can be protected by a windbreak with a density of 40 to 60%. The ideal place for this kind of windbreak is on the north and west edges of the field, where a single row of tall variety vegetation should be planted. For this kind of windbreak, species suited are like silver maple.

### Living snow fence

The purpose of these windbreaks is to catch snow before it blows into farmyards or laneways. The windbreaks with a high density are these. It is observed that two rows of spruces or a single row of white cedar are better for establishment. Snow piles up most of the time within 10 to 15 meters of a windbreak. This kind of windbreak should be placed roughly 20 meters away from the closest structure, road, or farmyard.

### Benefits of windbreaks

- Besides protecting plants and structures, windbreaks:
- Improve the crop/pasture quality
- Conserve moisture and reduce erosion
- Intercept potential salt spray, dust, and chemical drift
- Reduce noise levels and unpleasant odors

### Shelterbelts

The purpose of a shelterbelt is to provide general protection to cultivated areas against wind erosion and the desiccating effect of hot winds on the leeward side. It is a wide belt of trees, shrubs, and grasses planted in rows that crosses the land at a right angle to the direction of the prevailing winds. The triangular cross-section of a conventional shelterbelt can be created by placing towering trees in the center,

followed by lesser trees, tall shrubs, low spreading shrubs, and grasses on either side.

### Height and spacing

The height of the shelterbelt is crucial since it determines how far the leeward side will be protected. The zone of impact on the leeward side is larger the higher the trees are in the shelterbelt. The shelterbelt spacing is also impacted by this. The second belt should be placed slightly ahead of the location where the wind on the leeward side of the first shelterbelt frequently reaches damaging velocity if wind erosion is to be totally controlled. Taking 20% reduction in wind velocity as the basis of usefulness of a shelterbelt, effective protection zone extends up to 15 to 20 times the height of the belt.

### Length

The length of the shelterbelt is a crucial factor to take into account because eddies are created at its ends, which raises the wind speed there. This is the reason a road is normally prohibited from passing over a shelterbelt. Because of the protection they provide, shelterbelt usage has increased nationwide in a few western nations. The minimal length of a shorter shelterbelt that is still functional is 24 times the height of the shorter one.

### Soil preparation

Soil preparation should be done at least a year in advance to build up sufficient reserve of soil moisture. It may be done either mechanically or by manual labour. Leguminous crops may be raised for the first few years in between the rows of trees and shrubs for improving the fertility of the soil.

### Choice of species

The choice of species to be raised in shelterbelt is governed by the climate, soil and topography of the area. It is better to raise local species because of their easy establishment. Exotics may also be used to improve the efficiency of the shelterbelts.

### Advantages

- ❖ Moderating effect on temperature and increase in humidity
- ❖ Reduction in evapo-transpiration and increase in soil moisture
- ❖ Reduction in wind velocity and wind erosion
- ❖ Protection of damage to public and private property

- ❖ Livestock productivity and welfare
- ❖ Carbon storage

### Managing existing shelterbelts

- ☐ Maintain fences
- ☐ Keep dead trees and fallen timber
- ☐ Add new plants
- ☐ Control pests and weeds

### Hedges

A hedge or hedgerow is a row of shrubs and occasionally trees that are planted and trained to form a barrier or to demarcate an area, such as the gap between neighboring homes, at a distance of three feet or less. Hedgerows are defined as hedges that are old enough to contain larger trees and are used to divide one field from another or a road from nearby fields. A hedge functions as a "live fence" and is referred to as such frequently.

#### Protective

This entails defense against trespassing, theft, etc. A hedge plant that falls into this category should be fast-growing, hardy—including drought resistance—thorny, dense, responsive to regular trimming and clipping, and propagable from seed or cuttings.

#### Ornamental or screening purposes

This type of hedge needs to have eye-catching foliage or blossoms, grow densely, and withstand frequent trimming.

#### Basics for selecting hedge plants

Plants with lovely flowers, foliage, or both. Easy to grow from seed or cuttings, it requires less maintenance for lush growth and is resistant to pests and illnesses. Goats and cattle have thick branches and foliage, but they are sedentary animals. Able to survive severe drought and strong rain, as well as regular and severe trimming. Plant should be long lived perennial and grow quickly.

### Classification of hedge according to its nature

- ☐ Hedge with beautiful foliage
- ☐ Hedge with beautiful foliage and flowers
- ☐ Hedge with strong branches and spines

### Classification of hedge on the basis of purposes

- ☐ Tall hedge
- ☐ Low height hedge
- ☐ Protective hedge
- ☐ Ornamental hedge
- ☐ Wind break hedge
- ☐ Screen hedge

### Maintenance of hedge

The hedge bed should constantly be kept tidy and clean, and irrigation should be applied as needed. Soil should be kept moist in areas where white ants are present. A hedge's gaps should be filled in with mature plants. Running ought to be done on a regular basis. Winter is not the best time to undertake any trimming. Applying well-decomposed cowdung (4 kg/running meter) and fertilizers (30 g each of urea and tsp/meter hedge row) to the hedge once a year is recommended. It is necessary to take the proper precautions against infections and insects.

### Conclusion

Simple yet efficient ways to lessen the effects of wind, soil erosion, and extreme weather include windbreaks, shelterbelts, and hedges. We can increase biodiversity, increase agricultural production, and build more resilient ecosystems by integrating these vegetation barriers into our landscapes. These natural buffers, whether found in rural or urban areas, have a number of advantages that may have a long-term effect on our communities and the environment. One tree or shrub at a time, we can create a more sustainable future by embracing the power of windbreaks, shelterbelts, and hedges."

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