

# Agroforestry Design Template

## Alley Planting Design

This design looks to incorporate rows of productive trees into fields, in a way that maximises the benefits of the trees whilst reducing any potential negative consequences. The design sees trees planted in straight rows at set intervals to facilitate farming (either arable or pasture) between the rows. The tree component of the system can be productive, through producing an income from fruit, nut, biomass or timber. In addition, the trees will provide benefits to the non-tree farming operation. Benefits could include providing shelter and shade (for both livestock and crops), acting as habitat strips for insects that predate on pests or offer pollination services.

**Design Applications:** Crop diversification, Reducing soil erosion, Livestock shelter, Crop shelter.

**Design Applications:** Livestock Shelter, Crop shelter, habitat connectivity, Farm biosecurity, shelter & food for biodiversity.

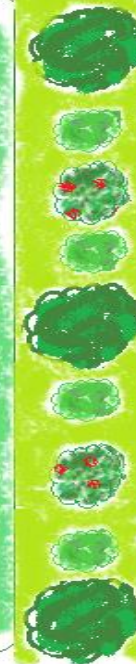
### Finding the correct Tree Row Spacing

Planning the correct spacing is a farm and tree specific detail. The space between tree rows ideally needs to be divisible by the width of all the machinery likely to be used between the tree rows. E.g. cultivation equipment, combine/mower etc. Other considerations of tree row spacing are height of tree and interrow cropping species and also how far pollinator insects will travel.



### Managing Vegetative Tree Strips

Reducing plant competition is important when establishing trees. Though vegetative control on the tree strips becomes difficult for large machinery or livestock due to the presence of the trees. Managing the vegetation has a few options: Regular mowing, productive perennial interplanting to suppress vegetative growth e.g. Rhubarb, fruit bushes etc, Mulching with Sheep's wool or woodchip or perhaps establishing a longer-term pollination strip. Establishing longer term pollinator strips requires less maintenance whilst also bringing beneficial biodiversity into the field.



### Selecting the best tree species

Consider the most appropriate tree species and varieties to offer future system resilience and maximise potential agroforestry benefits to existing farm enterprises. E.g. will it offer shade, shelter, wind break etc. For productive trees, less species diversity tends to reduce management time and cost (E.g., one harvest period) but also potentially decreases system resilience.

**What to Consider When Placing this Design in Landscape**



**Sunlight Efficiency**

**Water Use Efficiency**



Designing for optimum sunlight, it is suggested that aligning tree rows from North to South will give as much sunlight to the non-tree crop as possible. Depending on the size and shade density of the tree and tree row spacing this might not be an issue. Some tree species like Walnut leaf emergent date is so late in the season that the non-tree crop (Winter cereal) has captured enough sunlight to build yield.

Consideration needs to be given to the demands for water from both the tree and non-tree element of the system. Systems on slopes might be designed to run along contour to slow water runoff and encourage infiltration in the tree row. Research shows tree plantings offer up to 60 times better water infiltration than pasture.

When designing a system, it is worth considering the water requirements of both the crop and the tree species. Thirsty tree species like willow have been seen to reduce neighboring crop yields due to water competition on dry sites.

<b>Examples species composition table</b>		
<b>Design Layer</b>	<b>Example Species (Known combinations that work)</b>	<b>In Row Tree Spacing</b>
1. Nut tree alleys	Sweet chestnut ( <i>Castanea sativa</i> ) & Small-leaved Lime ( <i>Tilia cordata</i> )	Alternate Chestnut & Lime tree (5-meter spacings)
2. Timber tree alley	Wild Cherry ( <i>Prunus avium</i> ), Small-leaved Lime ( <i>Tilia cordata</i> ), Wild service tree ( <i>Torminalis glaberrima</i> ), Oak ( <i>Quercus robur</i> )	Densely planted spacing, (Initially 1 m - with yr. 10 thinning)
3. Fruit tree alleys	Apple ( <i>Malus domestica</i> ), Pear ( <i>Pyrus communis</i> ), Plum ( <i>Prunus domestica</i> )	Planted at 4m intervals depending on rootstock
4. Under storey Planting	Sea Buckthorn ( <i>Hippophae rhamnoides</i> ), Hawthorn ( <i>Crataegus monogyna</i> ), Manuka ( <i>Leptospermum scoparium</i> ).	Planted at 1 - 2-meter intervals