4. Experimental design

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Trial management was also discussed at this workshop. After much debate the consensus was to manage for the optimal growth of each species. Views on understorey management varied from complete exclusion to no control. A split plot design involving both may be a possible option.

The debates on experimental design raised many interesting problems but few firm conclusions.

Plot size: Minimum 20 x 20 m plots with a 10 m buffer for each plot. Smaller plots would limit subsequent design development. The general consensus was that measurement plots would need to be greater than 0.1 ha.

Number of species: Four to six tree species were seen as desirable, plus a control based on current land use. The incorporation of animals into some treatments was also discussed, but was not supported by most people. The use of other controls such as indigenous woodlands and ungrazed pasture was thought to be beneficial.

Mixed species: The use of mixed-species plots was not considered desirable, since different growth rates frequently resulted in one species dominating. While comparisons of single- and mixed-species plots may be possible in associated studies, some information on species interactions may be possible at the boundaries of the single-species plots.

Number of sites: Ideally, there would be two to four major sites to cover main soil and climate variables plus a series of minor sites to study species/site interactions in more detail. It was suggested that the environmental space be divided into two soil depths, two rates of rainfall and two temperature regimes. However, one possible design would be to have major trials at one or two sites with step-out trials at other locations to cover the environmental space. Species by site interactions could be very important.

Replication of treatments: This would depend on site variability and the size of anticipated differences in treatment effects, but generally four replicates would be needed.

Blocking plots was not considered useful in most circumstances, but should be based on the initial survey.

Cost control: The most effective cost control was in the experimental design phase. Practicality and designing for low maintenance were also important.

It was also suggested that a Trust to control the experiment and to ensure future base funding was important.

Timelessness: The design needed to be flexible enough to address future, as yet unasked, questions.