V –VALUE OPTIMIZATION METHOD FOR FOREST PLANNING

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The traditional v-value tells whether it would be economically more rational for the forest owner to let a forest stand grow for one more year (positive v-value) or to cut it (negative v-value) and invest the cutting income to an alternative investment object offering a certain rate of return for the invested money. V -value is calculated by using the following formula: v=Ia-p(At+Al), where Ia is the value increment of the stand, p is the rate of return (%) offered by the alternative investment object, At is the timber value of the stand and Al is the value of the bare land.

This paper introduces a v-value optimization method where the calculation of traditional v-values for individual forest stands is integrated with a modern forest planning system. Hence, one can calculate the v-values of individual forest stands for any forthcoming year, and the v-values can then be utilized when producing a forest plan. Some simplifications to the traditional v -value calculations and economic optimization of forest use have been done due to practical reasons. First, when determining decision proposals, v-values are used only for mature stands (regeneration cutting allowed). For determining the treatment schedules for young forest stands (thinning allowed) and open forest land areas (reforestation required) Finnish forest management recommendations are straightforwardly applied. And secondly, the value of bare land is not included into the v-value calculations, because the option to sell the land is excluded from the standard version of the method. In general, the method optimizes forest rent among treatment alternatives restricted by the Finnish forest management recommendations.

In the case study, we used v-value optimization method for producing five different cash flow estimates for 120 hectares of private forest property in southeast Finland. The cash flow period consisted of three sub-periods; the first sub-period being 5 years, and the second and the third being 10 years. Constant timber prices and labor, machine and material costs were used in the calculations.1,2,3,4 and 5% requirements for the rate of return were set for mature stands and the official Finnish forest management recommendations were straightforwardly applied for young forest stands and open forest land areas. Also the value of forest property in the beginning and the end of the cash flow period, and the estimates for internal rates of return were calculated. Furthermore, we solved the planning problem by using linear programming. The cash flow estimates produced by linear programming and the V-value optimization were very close to each other.

The basic idea of v-value optimization is very simple and straightforward which makes the method easy to understand for forest owners. V-values calculated for individual stands and presented to the forest owner make the method transparent; one can easily see the reasoning behind the treatment proposals. However, non-economic values offered by the forest property may also have effects on the forest owner's decision making. Hence, none of the cash flows estimated are not necessarily followed as such, but the cash flows still lay the grounds for the forest ownership strategy and the v-values calculated for the individual forest stands help the forest owner to make rational decisions. Furthermore, different additional analysis can be done by using the method. For example, capital transfer taxes can be included into the calculations in cases of forest ownership changes.

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