40th Annual Conference of the Australian Agricultural and Resource Economics Society, University of Melbourne, 13-15 February, 1996

Assessing the Value of Trees on Farms in the Harnham Landcare Group District

Kate O'Brien and Kevin A Parton

Victorian Institute for Dryland Agriculture, Horsham and Department of Health Studies, University of New England, respectively.

Abstract

A case study of farmers in the Harnham Landcare Group at Uralla, in the New England Tablelands, was developed to ascertain the economic viability of planting trees for shade, shelter and aesthetic purposes. The study attempted to measure the following benefits of trees: increase in farm resale value, the value of the increase in pasture productivity and the decrease in animal maintenance energy requirements, the value of beneficial and non-beneficial wildlife, the value of the fenced off areas as a pasture storage for drought and the value of protection of sheep at the stressful times of shearing and lambing.

Introduction

By developing a case study of farmers in the Harnham Landcare Group at Uralla, in the New England Tablelands, the objective of the study was to ascertain the economic viability of planting trees for shade, shelter and aesthetic purposes.

Tree decline is one of the major concerns of farmers in the group. For more than a century trees have been removed from the farms to increase output. In the 1860's farmers were required to clear their farms as part of a land tenure agreement with the government. During the 1950's farm productivity nearly doubled with the introduction of pasture improvement and new pasture species. This coupled with high wool prices was continued incentive for farmers to convert trees to pasture. More recently dieback is a phenomena that has caused tree death. While the cause of dieback has been linked to Christmas and leaf beetle attack, possible other causes are root rot, bark beetles and old age (Duggin 1981).

Farmers are planting trees with several objectives in mind. Firstly they want to increase productivity via the shelter benefits of trees. Trees reduce windspeed which increases pasture production and decreases animal maintenance requirements. Trees provide an aesthetic appeal to farms and previous studies (Bird 1984, 1988, Croft 1994 and Pitt 1994) have claimed that trees increase farm resale value. Finally, farmers are looking at trees to restore a natural balance to their farms. The idea is to link up tree plantings on farms to form a corridor of trees across the farms in the landcare group. This corridor would provide increased shelter benefits as well as provide habitat for native wildlife such as birds, echidnas and koalas.

Previous research on the subject in Victoria was conducted by Bird (1984, 1988) and the Victorian Farmers and Graziers Association (1988). Bird (1988) used annuities to find the most economic arrangement of trees on a 400 ha farm in Hamilton. The results could not be transferred to Uralla because of the different farm systems, tree establishment costs and the change in wool prices since the study. Similarly the Victorian Farmers and Graziers Association (1988) study which assessed the effect of trees on the land value of a 130 ha paddock could not be used to value shelter on an entire farm of 400 to 800 hectares.

More recent local studies by Pitt (1994) and Croft (1994) gave a closer insight to the cost and returns of trees for farmers in Uralla. However, neither of the studies gave a comprehensive analysis of the economics of trees to shelter an entire farm.

This research used previous economic studies of shelterbelts, as well as data from farmers to address the economic problem specific to farmers in Uralla. This study combined the different measures of the economics for trees as shade and shelter whereas previous studies had only looked at a single aspect of the viability of trees. Thus the study attempted to measure the following benefits of trees: increase in farm resale value, the value of the increase in pasture productivity and the decrease in animal maintenance energy requirements, the value of beneficial and non beneficial wildlife, the value of the fenced off areas as a pasture storage for drought and the value of protection of sheep at the stressful times of shearing and lambing.

Two methods were used to assess the net benefits of trees. A cost benefit analysis was based on data from farmer interviews and a regression analysis was used based on land valuations obtained from real estate agents. It was expected that the results from the regression analysis would be higher than the results from the cost benefit analysis: land valuations by real estate agents should include the aesthetic value of trees as well as other productivity benefits while the farm survey would include productivity benefits only.

Previous Studies

Bird (1988) used a model of a 400 ha farm carrying 5 000 sheep to assess the most economic way of planting trees on a farm. The results compared discounted annuities from the investment to a base gross margin of $160 per hectare. The model assumed that it would take 16 years for the trees to completely protect the farm. The discount rates used were two, six and ten per cent.

The study found that planting 1.25 per cent of the farm to a woodlot to protect sheep after shearing was not economic, neither was dedicating 20 per cent of the farm to shelterbelts. Allocating five per cent of the farm to three row shelterbelts 500 m apart was economic at all discount rates. However this was uneconomic when subjected to a sensitivity test (halving the maintenance energy requirements saved) at the highest discount rate. Ten per cent of the farm dedicated to three row shelterbelts 250m apart was economically viable whereas if the trees were six rows wide and 500 m apart, the investment was only viable at the lowest discount rate (two per cent).

Bird's study was a good indication of the most profitable way to plant trees. However, the work looked at moving from a base of no trees, to a farm completely protected by trees. However, most farmers in Harnham have already planted trees. Also, the study was conducted when wool prices were booming and therefore not relevant to today's low wool prices.

Work by Croft (1994) was more relevant to farmers in Uralla in terms of some of the above problems. Croft (1994) produced a model which assessed the net benefits of planting 1 km of trees which would eventually shelter an area of 12.5 ha. The model assumed that only a portion of the shelter benefits would be utilised as the stock were able to wander in and out of the paddock.

On a 20 and 40-year time scale the results showed that the best returns were achieved when there was a high proportion of multiple bearing ewes in the flock combined with high wool prices (NPV $8500). High stocking rates (10 dse/ha) guaranteed the viability of the project; the project was not economic when there were medium to low stocking rates combined with low wool prices.

Pitt's (1994) study on the advantage shelterbelts for pasture storage in drought showed the economic benefits of trees. Five per cent of a farm was fenced of for two years for shelterbelts. The areas were grazed in the 1994 drought saving the farmers $17 000 in feed costs.

All of the previous studies mentioned alluded to the economic benefits of trees in terms of increase in farm resale value. However, the only study that attempted to value this benefit was done by the Victorian Farmers and Graziers Association (1988). In this study a licensed valuer valued a 130 ha paddock that was sheltered and a 130 ha paddock that was not well sheltered. The sheltered paddock was valued at $110/ha (14 per cent) higher than the unsheltered paddock. Ten per cent of this increase in land value was attributed to the shelter and appearance of the trees and four per cent was attributed to better fencing and dams. This study gave an insight on how the increase in farm resale value could be used to analyse the net benefits of trees to farmers in Uralla.

The above studies gave partial analyses of the economic costs and benefits of trees. However none gave a total picture relevant to farmers in Uralla. The present study used ideas and information from these previous studies to clarify the economic problem facing these farmers.

Methods

The study used two methods to analyse the net benefit of trees on farms. These methods were cost-benefit analysis and contingent valuation.

Cost-benefits analysis

Cost-benefit analysis was used to measure the marginal benefits and costs of the project. The study was limited to assessing private benefits and costs (to farmers). Once these benefits and costs were valued by farmers, the net benefit was calculated and discounted to a net present value.

Due to seasonal conditions, farmers could not say whether trees had shown benefits such as increased lambing percentages, increased pasture production or decreased deaths of sheep at shearing. Thus past studies and scientific data were relied upon to assess these productivity changes. Five farmers were asked if they thought the data was realistic and were then asked to place a monetary value on the benefits and costs of trees (see farmer survey Appendix 1).

The data from the farmer survey were used to formulate a model farm that was representative of the five farmers interviewed. The data were also used in the design of the land valuation survey for real estate agents.

One of the difficulties of the survey was the valuation of intangibles. Farmers perceived one of the benefits of trees to be the increase in native wildlife. However this benefit can be outweighed by the costs of attracting undesirable pests such as rabbits, foxes and kangaroos. This intangible was difficult to value but was addressed by asking the farmer if he/she thought that the benefits of desirable wildlife outweighed the costs of undesirable wildlife as a result of the investment.

Two discount rates were used in the study. The first (4.75 per cent) represented equity financing and the second (10.5 per cent) debt financing.

Contingent valuation

Multiple regression analysis was used to analyse the land valuation data from a contingent valuation survey of real estate agents. A mixture of stock and station, real estate agents, bank managers and licensed valuer who were familiar with the area and land values were interviewed. Eight people were asked 22 questions each giving a total of 175 land valuations.

The design of the survey questions was based on Smith's (1975) contingent valuation study of forest landscapes. The questions addressed four factors that affected land value (property size, distance from town, stocking rate and tree cover). These characteristics were varied at three levels. Thus the respondent was able to give incremental answers for each level of each characteristic. This allowed the person to give a realistic answer as the questions were relative to a base farm (see Appendix 2) which was valued first. Smith's model was modified by allowing two factors to be varied at once to account for interactions between factors (see Appendix 3). The survey was designed so that the effect of tree cover on land value could be isolated from other influences.

It was important that the design of the survey represented as closely as possible the actual situation so that the agents would give realistic valuations. This was done by providing a written and visual description of the farm which had been gleaned from farmer surveys. The survey was tested on a farmer in the group and then by a stock and station agent after which the survey design was refined. The visual description of the farm was a computer drawn colour scale map of the farm with three colour overlays showing one, four, eight and 12 per cent tree cover.

Results

The farm model was 800 ha, and had a carrying capacity of ten dse/ha with five per cent tree cover in the form of shelterbelts. This was the base to analyse the economic viability of planting more trees.

The study assumed that benefits from trees would not occur until year 16. It was assumed that the fencing around the trees would be replaced in year 30 over 10 years. The life of the investment was 60 years for natives and 40 years for pine trees.

Cost-benefit analysis

The investment of moving from 5 to 10 per cent tree cover in the form of shelterbelts on the representative farm gave a NPV of $238 000 (4.75 per cent discount) and $25 000 (10.5 per cent discount). This corresponds with an IRR of 13.42 per cent. This suggests that trees are a viable investment for farmers in the long term. This investment was still viable when landcare did not subsidies the investment.

One of the key assumptions of the cost-benefit analysis was that good shelter would increase wool cut by 30 per cent over five years. Since this level was achieved under experimental station conditions, the cost-benefit analysis was run again assuming that wool cut increased by 15 per cent over five years. In this case the investment was still viable at 4.75per cent discount rate (NPV $114 000). However at the higher discount rate, the investment was not viable (NPV -$680). The IRR was 10.4 per cent

The study assumed that the farm would be fully protected in year 16. This assumption was relaxed to year 21. In this event, the investment was still viable at both discount rates (NPV $172 000 at 4.75 per cent and NPV $1 500 at 10.5 per cent discount). This indicates that the investment was still viable if benefits occurred later than expected. In this scenario if landcare did not subsidise the investment, it was not viable at the higher discount rate, but was at the lower discount rate (NPV $157 000).

The study assumed that trees would be planted every year. Due to constraints, farmers may plant trees only every second year. If the trees were planted every second year, the investment was viable at low discount rate (NPV $133 000), but not at the higher discount rate.

Pinus radiata are faster growing trees than the natives and also have a shorter life. They were analysed in a cost-benefit analysis over a 40 year time period. The investment gave a NPV of $221 000 (4.75 per cent) and $44 000 (10.5 per cent). The IRR was 16.88 per cent. When the wool productivity benefits were halved the investment was still viable at both discount rates (NPV $113 000 at 4.75 per cent and $14500 at 10.5 per cent). If the investment was not subsidised by landcare, the investment was still viable.

Contingent valuation

The economic model of the relationship between trees and land value was:
land value = f(distance from town, tree cover, stocking rate, property size, improvements). Since the level of improvements was held constant, this variable was dropped from the analysis.

The first statistical estimate of the model was the linear model (see Table 1).

TABLE 1: Relationship between various factors and land value

	const	dist	tree	s/r	prop size	D1	D2	D3	R^2	Var
linear model	0.76	-0.02	0.039	1.18	1.61				0.46	6.42
t-statistic	0.90	-0.72	0.86	4.83	10.34					
dum var model	0.12		0.044	1.26	1.65	1.37	1.01	-1.93	0.59	4.01
t-statistic	0.20		1.14	6.79	13.8	4.16	3.06	-5.84		
log log model	1.17		0.036	0.57	0.66	0.16	0.094	-0.35	0.75	0.06
t-statistic	24.1		1.94	13.5	19.6	3.86	2.45	-8.93		

These results showed the tree cover and distance from town variables to be statistically insignificant. *A priori* real estate agents expected distance from town between 5 and 20 kilometres to have little effect on land value. Thus this variable was omitted from the model. Since it was expected that tree cover did affect land value, tree cover remained in the model. Omitting distance from town variable did not affect the explanatory ability of the model (R^2) or variance of the estimator (var), however increased the t-ratio of tree cover from 0.86 to 0.94 (175 degrees of freedom).

A possible source of variation in the model was a result of variation between real estate agents. Thus dummy variables were included in the data. Three dummies were required to isolate the data from the eight individuals surveyed (see Table 1, dum variable model). The explanatory ability of the model increased ($R^2 = 0.59$) and the variance of the estimator decreased (4.01). Also the statistical significance of tree cover rose (t-ratio increased from 0.94 to 1.14, 175 degrees of freedom).

It was considered *a priori* that a non-linear relationship existed between tree cover and land value: the first increase in tree cover would give a greater increase in land value than subsequent increments in tree cover. After testing several non-linear models, the loglog model gave the best fit of data to a mathematical relationship (R2 of 0.75, variance 0.06). Tree cover was very close to statistical significance with a t-ratio of 1.94, which was only slightly less than the critical t value of 1.98 with 175 degrees of freedom. Thus this was the model used to assess the benefits of trees.

Substituting the values of the representative farm gave a land value of \$1.19 million for five per cent tree cover and \$1.22 million for ten per cent tree cover. Thus the gross benefit of moving from five to ten per cent tree cover was \$30 000.

Since this was a measure of gross value of benefits it was then converted to a Net Present Value by subtracting the present value of costs from the data in the cost-benefit analysis.

TABLE 2: Calculation of NPVs from the contingent valuation data

Natives			Pine trees		
	4 75%	10.5%		4.75%	10.5%
PV Benefits	\$30 000	\$30 000	PV Benefits	\$30 000	\$30 000
PV Costs	\$46 000	\$35 000	PV Costs	\$35 000	\$27 000
NPV	-\$16 000	-\$5000	NPV	-\$5 000	\$3 000

These results seem counter-intuitive since the higher discount rate gives the more attractive scenario. This is because benefits are already in today's values, while costs are future costs discounted to today's values- the more heavily discounted costs make the investment more attractive. The only economic scenario was planting pine trees using an overdraft.

Discussion

A priori it was expected that the two methods were different ways of measuring the net benefits of trees. Thus it was expected that the market value of trees (as measured by the land valuation survey), would be higher than the farmer valuation of trees. This was because the market study included shelter and aesthetic value of trees, whereas the farmer survey valued shelter benefits only.

The results however, showed the opposite: the NPV's from the real estated agents were much lower than those from the farmers (see Table 3). However, the benefit of trees are uncertain because they occur late in the project. This leads to the conclusion that either: the farmer survey results overvalued benefits of trees or the land valuation survey undervalued the benefits of trees. It is also possible that both these occurred.

In the land valuation survey agents were asked to value land at different levels of tree cover. These benefits of tree cover could be undervalued for two main reasons. Agents, who are a proxy for the market may be unaware of the size of benefits of trees in terms of shelter, pasture storage and decreased stock mortality at critical times.

The survey of farmers' valuations of benefits and costs of trees may have overvalued benefits. One of the sensitive parameters of the study was that wool production increased by 30 per cent over five years. Since this was achieved under scientific conditions, the analysis was run again, halving the wool production over the same period of time.

TABLE 3: A comparison between the methods of valuation

	Native		Pine trees	
	4.75%	10.5%	4.75%	10.5%
Cost-benefit 1	$238 000	$25 000	$221 000	$44 000
Cost-benefit 2	$114 000	-$680	$44 000	$14 500
Regression	-$16 000	$-5 000	-$500	$3 000

The results showed that the original cost-benefit analysis (cost benefit 1) has given much higher NPV for each scenario than the regression analysis. The results from the regression analysis all show the projects to be undesirable except for pine trees when funded by an overdraft. Halving the benefits from wool (cost-benefit 2) has brought the cost-benefit values towards the regression values. However there is still a significant gap between the two results.

Conclusion

The purpose of the study was to assess the net economic benefits of planting trees for farmers in the Harnham Landcare Group, Uralla.

This was assessed by using a model farm to measure the net marginal benefits and costs of the investment. The farm was representative of Uralla farms. It was 800 hectares, stocking ten dse per hectare and already had five per cent tree cover in shelterbelts. The investment involved increasing the area of shelterbelts to ten per cent of the farm.

The benefits of the investment were measured in two ways. Increase in farm resale value was one measure of the present value of benefits. Farmer valuations of scientific data and previous research was the other method of valuing benefits. Benefits of trees to farmers did not occur until year 16 of the investment. Costs were valued by farmers and occurred in the first ten years of the project. Equity and debt discount rates were used to calculate the NPVs.

The farmer cost-benefit analysis showed that a long term investment in trees was highly desirable. However, subjecting the result to a sensitivity test (halving the wool benefits) showed the investment to be undesirable at the overdraft discount rate. The results from the real estate agent were counter intuitive as they were lower than the NPVs from the farmer survey: the only desirable result was when pines were planted using an overdraft.

One of the reasons suggested for the difference between the two results was that agents as a proxy for farmers, are not fully aware of the benefits of trees. On the other hand, valuations by farmer, based on scientific data and previous research, may be higher than what is actually achieved in the field.

References

Bird, P. R. 1984, 'Effect of trees on agricultural productivity' in *Proceedings of the Second National Conference on Decline of Trees in the Rural Landscape*, Armidale, 14-16 May 1984, Canberra Publishing and Printing Co., ACT, 13-29.

Bird, P.R. 1988, Economic benefit of shelter on farms, Paper presented to the seminar on Farm Trees for Protection and Profit, Penola, April.

Croft, T. J. 1994, Financial benefits of windbreaks to woolgrowers, Tableland Tree Services, Uralla (Mimeo).

Duggin, J. A. 1981, 'The use of ecological provinces and land symptoms in the study of eucalypt dieback on the New England Tablelands', in Old, L.M., Kile, G.A. and Ohmart, C.P.(eds.),*Eucalyptus Dieback in Forest and Woodlands*, CSIRO, Australia, pp. 245-260.

Pitt, M.W. 1994, "The Hill", revisited. The value of reafforestation areas in the 1994 drought. Northern Tablelands, N.S.W., Economic Notes, Department of Conservation and Land Management, AGPS, Canberra.

Smith, R.K. 1975, Evaluation and integration of landscape management into land use planning, Dip. Nat. Res. Thesis, University of New England, Armidale.

Victorian Farmers and Graziers Association and Victorian Garden State Committee 1988, Financial benefits of farm trees, Australian Rural Communications, South Yarra.

Appendix 1

Farmer questionnaire

(1) What is the size and tenure of your farm?

(2) What distance are you from Uralla?

(3) What is the history of pasture establishment and improvement on your property? What are your plans for future pasture establishment and improvement?

(4) What is the current carrying capacity of your property?
What is the long term average carrying capacity of your property?
What is the maximum and minimum carrying capacity for your property?

(5) How many acres would you presently have in the form of shelterbelts on your property? What is the age structure of the shelter belts? What would be the shortest/average and longest time for a shelterbelt to become effective? What would you expect the life of your shelterbelt and surrounding fencing to be?

(6) What is the current level of shelterbelts on your farm? What is your desired amount of trees in the form of shelterbelts on your farm? Do you think the extra trees will change the stocking rate on your farm? Do you think the trees will change the capital value of your property? If yes by how much?

(7) What are the desired purpose of the shelterbelts? eg shelter for lambing, pasture protection, timber for sawmills or posts. What proportion of the shelterbelts are permeable and non-permeable?

(8) What are your guidelines for the placement of a shelterbelt/woodlot?
row spacing
width
orientation
distance from other shelterbelts
gaps
link up with other shelterbelts and remnant vegetation
species

(9) What time of the year do you shear? Have you ever lost any sheep off shears? If so how many? How often do you expect to lose sheep off shears? If you had a woodlot or dense shelterbelt, what would you expect the survival rate of sheep to be off shears on a cold, wet and windy night? Do you shed the sheep if bad weather conditions prevail? If you had your desired level of shelterbelts, how much do you think this would decrease the cost of feeding sheep at shearing?

(10) What is your current lambing strategy? What would your lambing percentage have averaged for the past 20 years? What would have been the worst lambing percentage and why? What was the best lambing percentage? How would your ideal lambing paddock look? An expert on shelterbelts suggests that by effective shelterbelts weaning numbers could increase by 10% at least every second year. Do you agree with this? What would be your best, worst and average expectation for this increase? If yes what would be the increase in gross income for the year? What would you do with the money? eg reinvest on farm: fencing, plant more trees, go on a holiday?

(11) Have bushfires ever been a problem on your property? What kind of protection do you think a shelterbelt would give your property? How often do you think a bushfire would threaten your property? Would you take out fire insurance if there was a potential fire danger on your property? If so how much would you be willing to pay for this insurance?

(12) A study at the CSIRO, Armidale showed that windbreaks increased wool production at the highest stocking rate by 31% over a five year period. Do you think this is a reasonable figure to apply to your situation? If yes, how much would a 5% increase in wool production affect your net income. Do you feed cattle over winter? Say 4% of your farm was under effective shelterbelts. Research shows that this should increase pasture production by 5% which is assumed to increase animal production by 5%. Do you think this will change the cost of feeding cattle over winter? If yes, by how much?

(13) What have been your costs in establishing shelterbelts so far? (Fencing, tree costs, ripping, yearly maintenence). Did you use your own labour or hire a contractor? Do you work off farm?

(14) How often do you expect to have a drought like the present one? What is your normal drought policy? What did it cost you to keep sheep alive in the last

drought? If you had shelterbelts or woodlots fenced off with pasture, would you open these up to let the stock graze the grass during a drought? Jon and Vicky Taylor were able to increase the weight of 200 weaners in this last drought, over five months by grazing them in the areas which had been fenced off for trees for two years. This area was 36 hectares and represented 5% of the property. Thus 2000 dse's were maintained during the drought for six months by grazing the areas fenced off for trees. If you reached your desired level of shelterbelt, how much do you think this will decrease your costs of feeding stock in a drought?

(15) When planting more trees how will this be financed? eg loan, landcare grant. How much of the cost is covered by landcare?

(16) When you reach your desired level of tree cover, do you expect wildlife to be a problem? Do you expect extra beneficial wildlife to outweigh the costs of the wildlife that are not beneficial?

Appendix 2

SURVEY FOR CONTINGENT VALUATION OF ECONOMIC BENEFITS OF TREE PLANTING

The base property

The property is located 5 kilometres South of Uralla on the top of the great dividing range. This is well renowned fine wool growing country on the Salisbury Plain. It is a family farm that has been well maintained and improved.

The mean annual rainfall is 740 millimetres and is dominant in summer. The property is 1000 acres (400 hectares) of unrestricted freehold land. The soils are generally light and limit the carrying capacity of the farm to one dry sheep per acre. The property has predominantly native pastures of red grass, microlina and danthonia which have also been improved with clover.

The property carries 1000 dse. This comprises fine wool breeding ewes. Cattle are bought on an opportunistic basis for summer fattening. The sheep produce between three to five kilograms of 17 to 179 micron wool.

A comfortable three bedroom modern brick house is a feature of the farm. This house is surrounded by a well-maintained garden. The farm also has a workers' cottage in good order. Other improvements include a three stand shearing shed, steel sheep and cattle yards, a silo, a 4 metre by 10 metre workshop and a hayshed. The property is divided into ten paddocks. Internal and boundary fences are in reasonable condition. The property is well watered by dams and a permanent creek.

The property has 1% tree cover in the form of shelterbelts and woodlots as shown in the first diagram. These shelterbelts are well established. The shelterbelts are 15 metres wide and vary in length. The woodlot is 50 metres wide and 300 metres in length. The tree species are mixed to give the most effective shelterbelt.

Questions

(1) The base picture shows the property that has just been described. What do you think the value of the property is?

(2) This first overlay shows the property covered with 4% of trees is shelterbelt formation. What do you think would be the value of the property now? (If property value has changed) What would you attribute this increase in value to?

(3) The second overlay shows the property covered with 8% of trees. These trees are shelterbelts and woodlots as well as a fenced off area for regeneration. What do you think the value of the property would be?

(4) The third overlay shows the property covered with 12% trees. These trees have been planted in shelterbelt formation. What do you think the value of the property would be now?

(5) The property remains unchanged however now has a different combination of soils and pastures that it can carry 2000 dse (2 dse per acre). How will this change the value of the property?

(6) The property carries 3000 dse (3 dse per acre) due to better soils and pastures, what is the value of the property now?

   (a) The property carries 3 dse which totals 3000 dse. The property remains unchanged otherwise from the base farm. What if this farm now has 4% tree cover as show on the first overlay?

   (b) What if the above farm has 8% tree cover as shown in the second overlay?

   (c) Above farm has 12% tree cover, what is the value of the property?

(7) The base property carries 4000 dse (4 dse per acre), what is the value of the property now?

(8) What if the property is the same as the base property, however now it is 10 kilometres from Uralla or 30 kilometres from Armidale?

(9) The property is the same as the base, however now it is 20 kilometres south of Uralla (40 kilometres from Armidale). What is the value of the farm?

(a) The property is 20 kilometres from Uralla. What is the value of the property with 4% tree cover as shown in the first overlay?

(b) 8% tree cover

(c) 12% tree cover

(10) The property is located 30 kilometres south of Uralla (50 kilometres from Armidale). What is the value of the property?

(11) The property is exactly the same as the base property, however it is 2000 acres, what is the value of the property?

(12) The property is 4000 acres what is the value of the property?

(a) The property is 4000 acres, however otherwise unchanged from the base property. What is the value of the farm with 4% tree cover as shown on the first overlay?

(b) 8% tree cover

(c) 12% tree cover

(13) The property is 6000 acres, what is the value of the property?