CENTRE FOR APPLIED BUSINESS RESEARCH

CENTRE FOR APPPLIED BUSINESS RESEARCH

A REPORT TO THE FORESTS DEPARTMENT OF WESTERN AUSTRALIA ON FARMERS' ATTITUDES TOWARDS A PINE AFFORESTATION SCHEME IN THE SOUTHERN REGION OF WESTERN AUSTRALIA

GEOFFREY N. SOUTAR

YVONNE M. WALLIS

DECEMBER, 1984

TABLE OF CONTENTS

INTRODUCTION

The major objective of the present study was to determine the attitudes of farmers in the Southern Region of Western Australia to a pine afforestation programme and to subsequently determine the features of such a programme that might encourage farmers' participation.

A secondary objective of the study was to describe the current structure of farms in the area in terms of their land usage, current profitability, and availability for afforestation. A final objective was to determine farmers' attitudes towards a number of the local and government authorities with administrative responsibility in the area.

The Sample

To obtain the information for this study a questionnaire was distributed to a random sample of farmers in the Southern Region of Western Australia. A total of 390 respondents were selected from the electoral rolls of the Manjimup and Bridgetown - Greenbushes Shires for properties exceeding 20 hectares in area, within 70 kilometres of Manjimup, and having an annual rainfall in excess of 700 mm. The selection process required every sixth name to be taken from the electoral rolls of these shires. Where this property did not satisfy the selection criteria, the third listed property above or below this property was instead included in the sample. A further 19 properties were selected in similar fashion from the Boyup Brook Shire for which the rainfall criteria was lowered to 650 mm.

Data collection began in July 1984 and was completed in September 1984. Sample members were initially contacted by mail to advise that interviewers would be calling on them within the following seven day period. When contact was made, the interviewers remained to give instructions and assistance while respondents completed the questionnaire.[1]

Three hundred and thirty two (332) completed questionnaires were finally obtained, giving a response rate of 81 per cent. Non response was typically because landowners could not be contacted and only 2 per cent of sample members actually refused to complete the questionnaire. The locations sampled and number of questionnaires obtained from each are given in Table 1.

Table 1

Location	Number of Questionnaires Returned	% of Sample
North Ward	73	22
North Perup	30	9
Warren	44	13
Pemberton	51	15
Northcliff	45	14
Bridgetown	46	14
Boyup Brook	18	5
Perth Resident Owners	25	8
	332	100

[1] The questionnaire is provided in Appendix A.

THE RESULTS

Preference for Hardwoods versus Softwoods

Data were initially obtained on the type of afforestation scheme farmers would prefer to see in the area. While farmers were asked only to indicate whether they would prefer to see a hardwood or a softwood afforestation scheme, some farmers clearly indicated alternative options. These included a preference for no afforestation scheme, a preference for a balance of both hardwoods and softwoods in such a scheme, and an indication of no strong preference for either timber types. Table 2 gives the percentage of farmers responding in each of these categories.

Table 2

Preferred Timber	%
1. Hardwood	61.5
2. Softwood	19.0
3. Neither	4.2
4. Balance of Hardwood and Softwood	9.3
5. Either - No strong preference	6.0
	100.0

A clear preference for a hardwoods afforestation scheme is indicated with 61.5 per cent of farmers giving this preference. Nineteen (19) per cent of farmers would prefer to see a softwoods scheme, 9.3 per cent felt that a mix of both hardwood and softwood would be appropriate, while 6 per cent had no strong preference for either hardwoods or softwoods. Four (4) per cent of farmers rejected the idea of an afforestation scheme of any type. It should be noted, however, that indications of preference do not necessarily imply that the farmers would like their own land to be involved in an afforestation scheme but responses are indicative of the overall attitude farmers hold towards the planting of these timber types in their area.

Reasons for Preference

With 61.5 per cent of farmers preferring hardwoods only, there is clearly considerable resistance to a softwood afforestation scheme. This is further indicated in the reasons given for their choice of scheme. Of those farmers preferring hardwoods, some 60 per cent indicated that their choice was at least partially due to their negative opinions towards pine rather than simply positive opinions towards hardwoods. Alternatively, all respondents who preferred softwoods cited positive attributes of pine as their reason for this choice with little indication of any negativity towards hardwoods.

Most farmers listed more than one reason for their choice of afforestation scheme. For those preferring hardwoods, there were five major reasons given. It seems that most respondents believe that for aesthetic and/or ecological reasons the area is, and should remain, a hardwood area. Fifty eight (58) per cent of those preferring hardwoods included this as a reason for their choice and this pervasive attitude was found to be fairly evenly spread throughout the various locations sampled.

Twenty five (25) per cent suggested that their choice of a hardwood scheme was largely because they felt that hardwoods were a much better timber than pine, while 20 per cent suggested that, in comparison to pine, the future for hardwoods was more highly assured. Such respondents perceived that a shortage of hardwoods was likely to occur in the near future which would increase the value of hardwoods, while a future oversupply of pine was felt to be likely in the near future, with areas such as New Zealand being suggested as likely major suppliers.

Seventeen (17) per cent of those preferring hardwoods indicated that planting pines presented major difficulties in returning the soil to a condition appropriate for agricultural use, while 16 per cent felt that pines presented an excessive fire risk. Some effort to provide reliable information and/or an assurance of assistance may be an appropriate way to discourage this type of negativity toward pine. Other less frequently cited reasons for choosing

hardwoods included: hardwoods are easier to sell, hardwoods require lower maintenance, and pines are too susceptible to disease. Appendix B gives a summary of these reasons for preference.

For those respondents preferring softwoods, the major reason was clearly associated with the perceived economics of pine. Eighty (80) per cent indicated a preference for pine because they felt that monetary returns would be greater and more rapid as the crop reached maturity earlier. Many respondents also indicated that they perceived pines to be more commercially viable whereas there was a considerable amount of doubt as to whether hardwoods represented a commercial proposition. A further 6 per cent considered pine to be a more useful, versatile timber, while 5 per cent indicated that their choice of pine was due to their belief that the area was well suited to pine, and 7 per cent admitted that, while they would prefer pine for economical reasons, for aesthetic reasons they would prefer an afforestation scheme to include hardwoods. These responses indicate that the major reason for a preference for hardwoods was an attitude that the area should retain its natural vegetation, whereas the major reason for a preference for pine was based upon perceived financial return.

The respondents who indicated a preference for both timber types also held this view. Pine was seen as economical but the hardwood nature of the country was seen to imply the need to incorporate both timber types in an afforestation scheme. A large number in this group also suggested that both timber types be incorporated in an afforestation scheme by taking into account the soil type in

each area. Generally it was felt that only poorer soils should be used for pine and that to balance timber planting according to soil type would be most desirable. The six per cent of respondents who indicated that they had no strong preference for timber type used essentially the same arguments as this group, seeing advantages in each type but being reasonably happy to follow whatever trend emerged.

Finally, those respondents rejecting the idea of any afforestation scheme in the area stated that they preferred agricultural uses of the soil, and that in some cases, their farms were too small anyway, (86%); that timber production involved too high a fire risk (7%) or that timber production did not provide sufficient a return (7%). It should be noted, however, that responses to this question of timber preference do not necessarily imply a desire for personal involvement.

Preference for Afforestation Scheme by Area

Responses to timber type preference showed some variation between areas. Table 3 shows the percentage of farmers preferring hardwoods versus softwoods in the locations sampled. (Comparisons of percentages for alternative preferences (Neither, Both, Either) should be treated cautiously as group numbers in these categories are very small.)

In every area, the tendency was to prefer a hardwood afforestation scheme. This may represent a conscience vote and be influenced by peer group pressure or "collective wisdom" as the highest percentage of farmers interested in softwoods (44%) were landowners resident in Perth. Alternatively, this group may also be most likely to view their farm solely as a business proposition and hence be more highly motivated by perceptions of monetary returns. The North Ward also included a higher percentage of farmers interested in pine (28%) than most other areas, while Warren shows the least interest (9%) in a softwood only scheme.

Table 3

Location	Softwoods %	Hardwoods %	Neither %	Both %	Either %
Perth Residents	36	44	8	4	8
North Ward	28	55	1	10	6
North Perup	20	67	7	7	0
Boyup Brook	17	61	11	6	5
Pemberton	16	63	2	12	7
Bridgetown	15	63	6	9	7
Northcliffe	13	69	0	13	5
Warren	9	68	7	9	7

Interest in Involvement in a Pine Afforestation Scheme

Respondents were initially asked to give some general expression of interest in being involved in a Pine Afforestatioin scheme on their own land. The alternatives probed are given in Table 4.

Table 4

OPTION	EXTREMELY INTERESTED %	SOMEWHAT INTERESTED %	NOT AT ALL INTERESTED %
A. Selling some land to Forests Department for pine afforestation purposes	6	7	87
B. Afforesting independently of Forests Department	3	13	84
C. Afforesting with some assistance from Forests Department	4	20	76
D. Leasing some land to Forests Department for afforestation purposes	11	19	70

Overall, farmers were not interested in any of the alternatives offered though a small percentage of farmers expressed interest in each option. Leasing land to the Forests Department was found to be the most popular alternative, with 30 per cent of farmers showing some interest and 11 per cent being extremely interested. Of this 11 per cent, only 44 per cent had previously indicated a preference for a pine afforestation scheme. Therefore, there

are some farmers expressing extreme interest in a pine afforestation scheme for whom hardwoods represent their first preference. This may suggest that, for at least some farmers, if the return is acceptable, the timber type will not be a dominant factor in their decision to be involved. A further section of this report analyses in detail the features of a pine afforestation programme most likely to attract farmer participation.

Present land usage and availability for Afforestation

Respondents were asked a series of questions about the nature of their farm and the amount of land they would consider involving in an afforestation scheme.

(i) Land Usage

Table 5 gives a summary of the major activities engaged in by farmers in this area. The percentage undertaking each activity is given along with the area devoted to, and the percentage of the farm's income derived from, each activity.

Table 5

Land Usage Summary

Activity	Percentage Involved in Activity	Income Earned from Activity		Area Devoted to Activity	
		Mean (%)	Median (%)	Mean (ha)	Median (ha)
Grazing	86.4	73.4	100.0	280	180
Cereal Crops	17.2	14.6	5.0	80	50
Other Crops	4.8	32.5	10.0	14	15
Vegetables	26.5	56.5	60.0	11.5	10
Fruit	13.8	42.3	30.0	6.2	5

Farms are predominantly engaged in grazing activities, with more than 50 per cent of farmers deriving their total income from this source and approximately 95 per cent of farm land being devoted to this activity. It seems likely, therefore, that land which might be considered for afforestation would be currently used for grazing purposes. In these circumstances, financial incentives for participation in an afforestation scheme should use grazing value as a reference point.

(ii) Size of Farms

Farms sampled ranged in size from 4 to 2500 hectares. The mean area was 251ha, while the median showed that 50 per cent of farms were 130ha or less in area. Table 6 gives a breakdown of farm sizes in the area. [2]

---

2 Although only those farms greater than 20 ha were to be sampled, four per cent of the final sample were found to include farms with smaller areas. The interviewer report explains this result further.

Table 6

FARM SIZE(HA)	Percentage of Farms	Cumulative Percentage
1- 19	4	4
20- 50	21	25
51- 100	18	43
101- 200	20	63
201- 300	11	74
300- 500	13	87
500-1000	10	97
1000-2500	3	100

Mean 251 ha

Median 130 ha

(iii) Farm Area Constituting Bush

Farmers were also asked to indicate the percentage of their farm that was still bush. The mean in this case was 20 per cent, while the median indicated that for 50 per cent of farms, less than 10 per cent of the land was still bush. Much of this was also stated to be subject to clearing bans. Table 7 provides this information.

Table 7

% of Farm Uncleared Bush	Percentage of Farms	Cumulative Percentage
0	18	18
1 - 5	17	35
6 - 10	16	51
11 - 20	14	65
21 - 30	13	78
31 - 50	14	92
51 -100	8	100

Mean 20 per cent

Median 10 per cent

(iv) Farm Area Considered for Afforestation

Finally, respondents were asked what percentage of their cleared land they would consider afforesting. Fifty five (55) per cent indicated that they would not consider afforesting any of their land. This would seem to be a lower percentage than might be expected from previous results, although it would appear that in some cases, farmers were inclined to include the following in this response:

1. Land subject to clearing bans.

2. Areas of land inconvenient for alternative productive use.

3. Areas of land as yet uncleared.

4. Areas of land farmers are only willing to afforest in hardwoods.

Therefore, as the data did not clearly distinguish these specific categories, an estimate from this data is likely to be inflated should the Forests Department wish only to incorporate land already cleared by the farmer in a pine afforestation scheme. Bearing these qualifications in mind, and as shown in Table 8, 15 per cent of farmers indicated they would consider afforesting between 1 and 5% of their land, 10 per cent between 6 and 20 per cent, 10 per cent between 21 and 30 per cent and the remaining 10 per cent between 31 and 100 per cent.

Table 8

% of farm considered for afforestation	Percentage of Farms	Cumulative Percentage
0	55.4	55.4
1 - 5	14.6	70.0
6 - 10	7.1	77.1
11 - 20	2.9	80.0
21 - 30	10.0	90.0
31 - 50	4.1	94.1
51 - 100	5.9	100.0
	Mean 10.9%	
	Median 0.0%	

Given the qualifications imposed by farmers upon their responses to this question, data from this question should probably be seen primarily as an expression of interest pending further information and a suggestion that various different land types be considered in an afforestation scheme. Further, from comments made in response to this question, it seems probable that, at this point in time, farmers believe that to afforest land currently used for regular farm activities would result in lower returns. This notion is supported further by the apparent relationship found between the current profitability of the farm and landowners' interest in afforestation. Seventy (70) per cent of farmers who consider their farms to be not at all successful would consider afforestation whereas only 36 and 42 per cent respectively of farmers who consider their farms to be extremely or quite successful would consider such a scheme.

Further, farmers who earn their entire income from their farms (42 per cent of farmers) are less likely to be interested in an afforestation programme than those farmers earning income from alternative sources. Table 9 illustrates these findings.

Table 9

(i) Interest in Afforestation by Successfulness of Farm

	Farm very successful (22%)	Farm quite successful (65%)	Farm not successful (13%)
Not interested in afforestation	63%	57%	30%
Interested in afforestation	37%	42%	70%
	100%	100%	100%

(ii) Interest in Afforestation by percentage of income earned by farm.

	Income earned from farm		
	100% (42% of farmers)	50 - 99% (13% of farmers)	< 50% (45% of farmers)
Not interested in afforestation	70%	49%	43%
Interested in afforestation	30%	51%	57%
	100%	100%	100%

These findings lend further support to the suggestion that, where farm returns are lower than average, afforestation may be seen as a more attractive financial alternative and so is more likely to be considered.

Additionally, for farmers whose total life style is farming and who generate their entire income this way, there is less interest in afforestation schemes.

Opinions of Authoritative Organisations

Farmers were asked to indicate how helpful a number of organizations were perceived to be with respect to farm activities. Table 10 summarises this information.

Table 10

	EXTREMELY UNHELPFUL	SOMEWHAT UNHELPFUL	NEITHER HELPFUL NOR UNHELPFUL	SOMEWHAT HELPFUL	EXTREMELY HELPFUL	NO OPINION	MEAN
	1	2	3	4	5		
Forests Dpt	2.1	4.2	10.5	46.1	28.9	8.1	4.0
Local Shire	7.5	11.4	18.1	42.5	14.8	5.7	3.5
State Government	14.5	12.3	23.2	18.7	3.6	27.7	2.8
State Dpt Agric	1.8	3.6	5.4	38.6	44.0	6.6	4.3
Public Works Dpt	9.3	6.3	15.1	19.0	6.0	44.3	3.1

Overall, the State Department of Agriculture, the Forests Department and local shires are perceived to be helpful, whereas the State Government is viewed less positively. Many farmers were unfamiliar with the Public Works Department, although those aware of this department expressed a wide variation of opinions. In these circumstances the favourable perception held of both the

Forests Department and the State Department of Agriculture might suggest that a united front be presented to farmers with respect to an afforestation scheme. This may be most appropriate if reliable, technical information regarding such issues as the effect of pine on soil is to be distributed for educational purposes.

PREFERENCES FOR ALTERNATIVE PINE AFFORESTATION SCHEMES

Despite the overall lack of interest in pine afforestation schemes, it is clear that there was some interest by a minority of landowners, particularly among those owners who lived in Perth and those who felt that their farms were not very successful. A total of 106 respondents filled out the section of the questionnaire which enables us to establish the importance they attach to the various aspects of a financial package and how they trade off one attribute of the package for another. Sixty two respondents completed this section sufficiently for inclusion in the analysis.

It was clear in initial analysis that not all of these respondents wanted the same things in a financial package. Consequently the first step was to group together those people with similar desires. When this was done using a computerised clustering programme developed by Milligan and Sokol (1980) it was found that there was one large group including 68 per cent of farmers in the analysis and three other smaller groups including 8%, 8% and 6% of respondents respectively. The remaining 10% of respondents could not be analysed as it seemed they filled in the questionnaire randomly. Consequently the subsequent analysis was carried out on the four groups.

The financial packages were made up of five different attributes. Namely:

(1) Annual Rental Paid to Farmer.

(a) 10% less than grazing value.

(b) Same as grazing value.

(c) 10% more than grazing value.

(2) Timing of Rental Payment to Farmer.

(a) Lump sum at beginning of the project.

(b) Every four years.

(c) Annually.

(3) Farmer's Share of Profit of Pine Crop.

(a) No share.

(b) Twenty five percent.

(c) Fifty percent.

(4) Responsibilities for Pine Crop Maintenance

(a) Farmer's responsibility.

(b) Shared farmer and Forests Department.

(c) Forests Department.

(It should be noted that these options were oultined specifically, as can be seen from appendix C.)

(5) Grazing in Pine Plantation.

(a) Allowed.

(b) Not allowed.

From these attributes a set of 16 different packages was developed using a partial factorial experimental design which ensured that all attributes were independent of each other and enabled a test of the additive effects of the

attributes to be undertaken [Green 1974] using a conjoint analysis type procedure.

In this case it was decided to use the LINMAP computer programme developed by Shocker and Srinivasan (1979) as it has been found useful in previous applications and provides good measures of fit [Howieson 1983; Soutar and Savery 1983]. In this case four separate analyses were undertaken for each of the groups previously obtained and the results are outlined in each case.

GROUP 1 - 68% OF RESPONDENTS

The results obtained for this group were very good, suggesting that the additive model, which assumes that there are no interactions between the attributes, is a reasonable assumption in this case. Kendall's Tau, which is a nonparametric measure of fit was 0.875, which is extremely high, and there was no case in which the assumptions of the additive model were strictly violated. Consequently the results obtained can be taken as a reasonable estimate of the trade offs likely to be made by people in this group.

The relative importance attached to the five attributes included in the study can be seen in Table 11.

Table 11: Attribute Importance (Group 1)

Attribute	Importance
Rental Paid	0.250
Time Rent Paid	0.000
Percent of Profit	0.375
Maintenance	0.125
Grazing or Not	0.250

The model cannot distinguish between the various time of payment options suggested within the study. This is not to say that farmers do not think that it is an unimportant issue but rather there are so many differences even within the group that respondents' preferences can best be modelled by leaving this aspect out. Comments on the returned questionnaires suggest that the major reason for these differences was the different tax situation of respondents, which makes lump sum or periodic payments less or more desirable.

The most important attribute for this group was the share of profit obtained, followed by rental paid and grazing rights. The farmer's share of maintenance was also a factor but it was not as important as the other three already mentioned.

In looking specifically at these attributes in turn the trade offs being suggested can be shown diagrammatically. In each case the horizontal axis shows the attribute level while the vertical axis shows the "utility" or "desirability" attached to those levels, with higher scores implying that that level is more preferred.

The result obtained for share of profit, the most important attribute, can be seen in Figure 1. From this figure it can be seen that this group wish to obtain as much share of profit as possible and that each increase offered increases the desirability of the option considerably. It is unlikely that members of this group will be attracted to packages which do not contain profit sharing and that they will be most attracted to those which maximise this aspect.

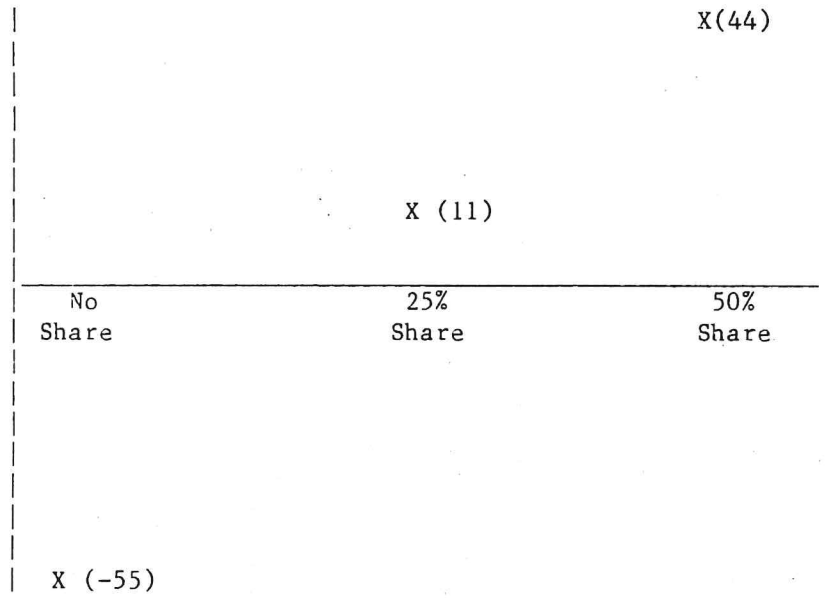

Figure 1: Trade offs for Share of Profit

Rental was also important to this group and the trade offs suggested can be seen in Figure 2.

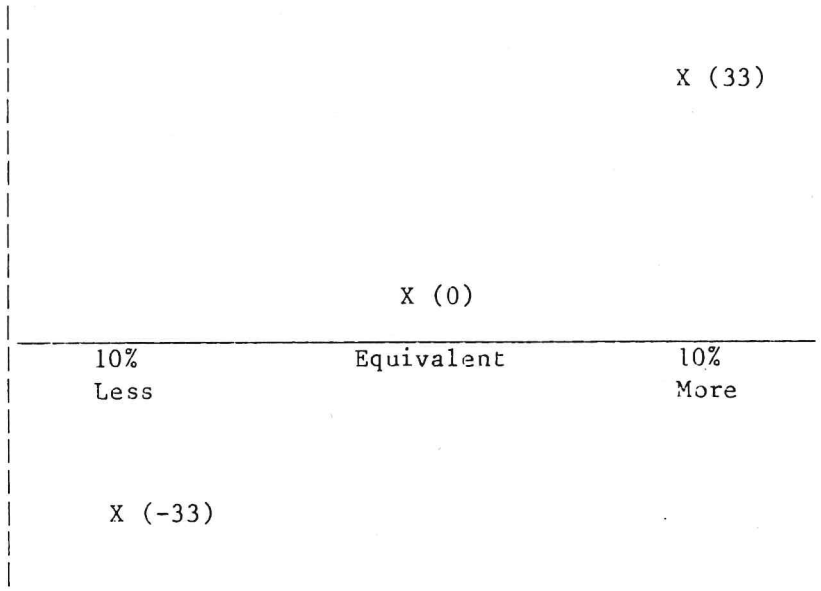

Figure 2: Trade offs for Rental Payments

Once again it is clear that the greater the rental offered the more preferred a package will be. Further, it is also clear that percent of profit share can be traded off against the amount of rental to help the Forests Department cash flow situation.

The trade offs suggested for the allowance or otherwise of grazing in the plantation are shown in Figure 3.

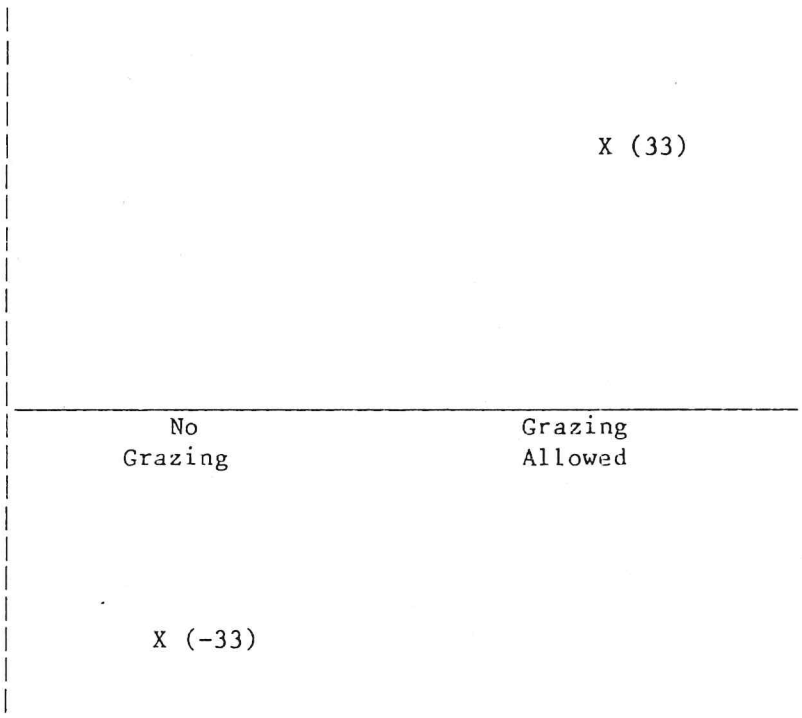

Figure 3: Trade offs for Grazing in Plantation

This group wishes to graze within the plantation and any option which prevents this will reduce its likelihood of acceptance. Interestingly, it may be possible to use this preference to reduce cash ouflows from the Forests Department as farmers are willing to trade off rental and/ or share of profits for such grazing rights.

The trade off results obtained for the share of crop maintenance are shown in Figure 4. As is clear from this figure the sharing of such duties is less important. Interestingly, farmers are indifferent between sharing these duties and allowing the Forests Department to undertake them all but they do not wish to take overall responsibility themselves. It seems that the Forests Department can decide about the costs and benefits of sharing responsibilities without worrying about farmers' preferences in this regard.

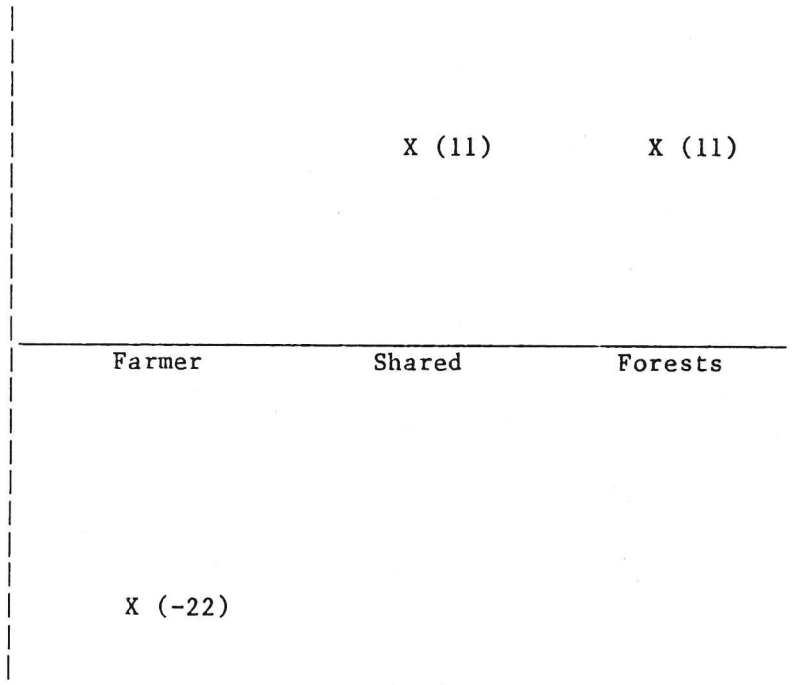

Figure 4: Trade offs for Share of Crop Maintenance

Overall, this group would prefer an option which allowed profit sharing, a high rental, grazing rights and at least some Forests Department share in maintenance. However, these respondents will trade off between these options so it is possible to design a package within likely Forests Department guidelines which will prove relatively attractive. Looking at the 16 hypothetical packages, the most preferred were package 3, package 6, package 15 and package 16.

GROUP 2 (8% OF RESPONDENTS)

The results obtained for this group were also good, with a Kendall's Tau of 0.80, again suggesting that the additive model is a fair representation of the group's preferences. This group was quite different to the previous group, however, as can be seen in the importances they attach to the various attributes, as shown in Table 12, below.

Table 12: Importance Attached to Attributes (Group 2)

Attribute	Importance
Rental Paid	0.091
Time Rent Paid	0.545
Percent of Profit	0.182
Maintenance	0.182
Grazing or Not	0.091

From Table 12, it can be seen that this group is most concerned with the time at which rental is paid, while the other four attributes are equally, although much less, important. The trade offs within these attributes can also be shown diagrammatically.

The results obtained for the time of payment attribute can be seen in Figure 5.

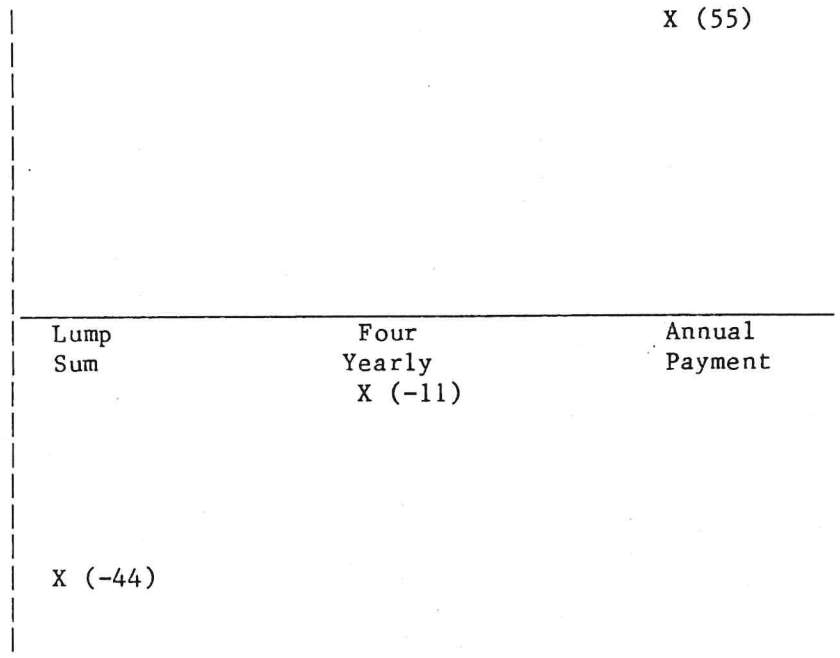

Figure 5: Trade Offs for Time of Payment

From this figure it seems that the least preferred option for this group is the lump sum option, while the most popular is the annual payment. Clearly these respondents hope to use the scheme to provide a steady income for their farms and would gain considerable utility from such an offer.

The trade offs these respondents are willing to make in terms of rentals are shown in Figure 6. This group wishes a premium for rental and is indifferently unhappy about either of the other two rental options. Consequently, the Forests Department does not have to consider the middle ground for this group. That is, an option which provided annual payments at 10% less than grazing value might be viable.

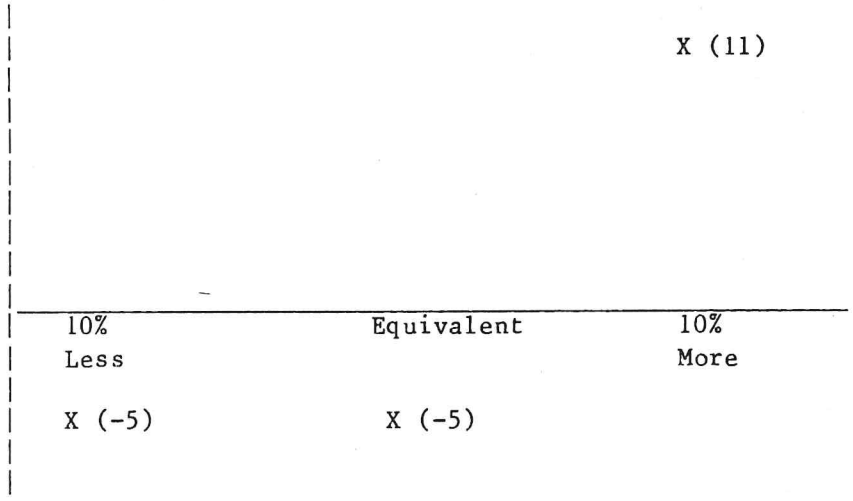

Figure 6: Trade Offs for rental payments

The trade offs for share of profit are shown in Figure 7.

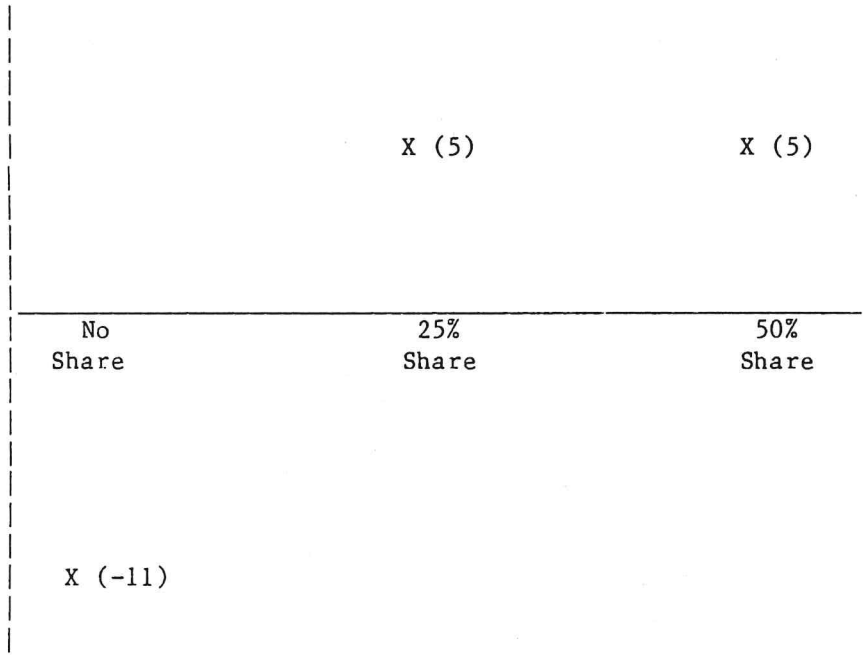

Figure 7: Trade Offs for Share of Profits

Figure 7 suggests that this group is indifferent between 25% profit share and 50% profit share. However, this should probably be taken cautiously, perhaps reflecting respondents' concerns about the likelihood of being offered such a share. The result does suggest, however, that the Forest Department may not need to maximise profit share to this group if it can offer annual lease payments.

The grazing trade offs estimated for this group are shown in Figure 8. From this figure it can be seen that this group prefer a shared arrangement, are less happy with the Forests Department having overall responsibility but are least happy with having to take overall responsibility themselves. Clearly a shared arrangement would attract more of this type of farmer than either of the other possible arrangements.

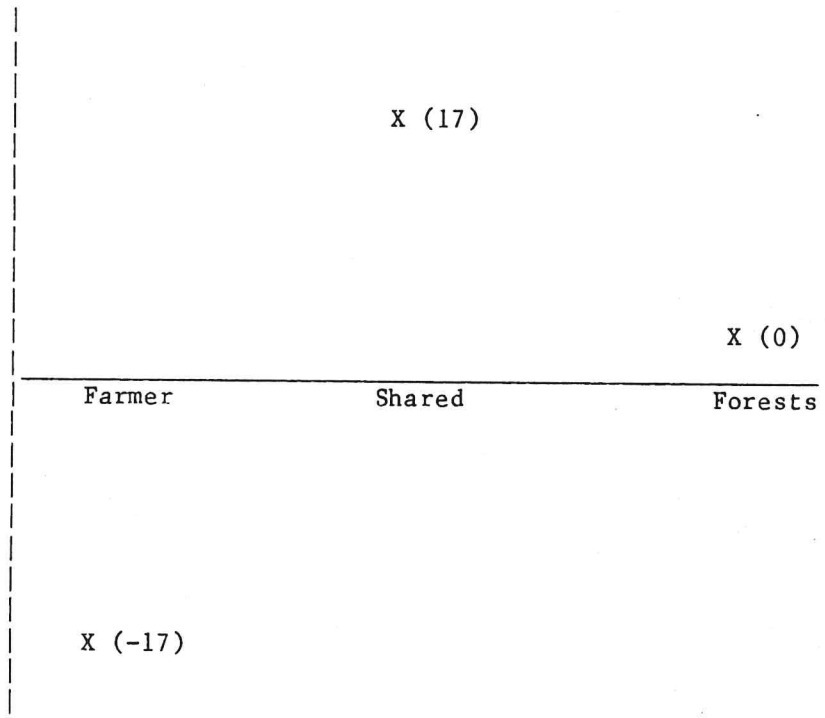

Figure 8: Trade Offs for Share of Crop Maintenance

The grazing trade offs are identical to those outlined for the earlier group. That is, the farmers wish to graze in the plantation. The preferred options for this group are options 16 and 6.

GROUP 3 (8% OF RESPONDENTS)

The fit to the model was not as good for this group as the Kendall's Tau was only 0.59 and this should be kept in mind. However, the major reason for the drop in the fit statistic was that there were many ties in preferences, rather than strict violations to the model. Consequently it seems worthwhile to consider this group further. The relative importance attached to the five attributes in this case can be seen in Table 13.

Table 13: Attribute Importance (Group 3)

Attribute	Importance
Rental Paid	0.167
Time Rent Paid	0.167
Percent of Profit	0.167
Maintenance	0.500
Grazing or Not	0.000

From Table 13 it is clear that this group is most concerned about the crop maintenance contract and not at all concerned about whether or not grazing is allowed. Rental, share of profit and the timing of payment are equally, but less, important.

The trade offs implied for crop maintenance for this group are shown in Figure 9.

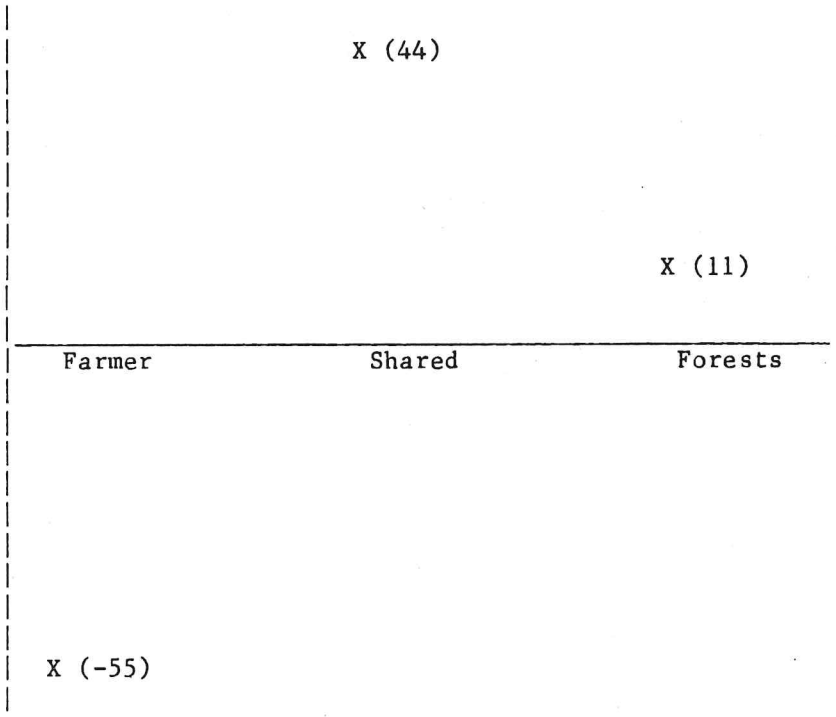

Figure 9: Trade Offs for Share of Crop Maintenance

This figure makes it clear that this group does not wish to have total responsibility for crop maintenance but, like the previous group, would prefer to share in maintenance. Options which allowed such sharing would be much more likely to be accepted.

The trade offs suggested for rental and share of profits were identical to the previous group. That is, these respondents would prefer a rental premium but are indifferent between the lower two rental levels and they would prefer a share of profits but are indifferent between a 25% and 50% share.

The implied trade offs for timing of rental payments are shown in Figure 10. This group is indifferent between a lump sum and annual payments but does not wish to become involved with four yearly options. The option chosen by the

Forests Department can be made on the basis of cash flow considerations when designing a package for this group. The hypothetical packages preferred by this group are packages 4 and 6.

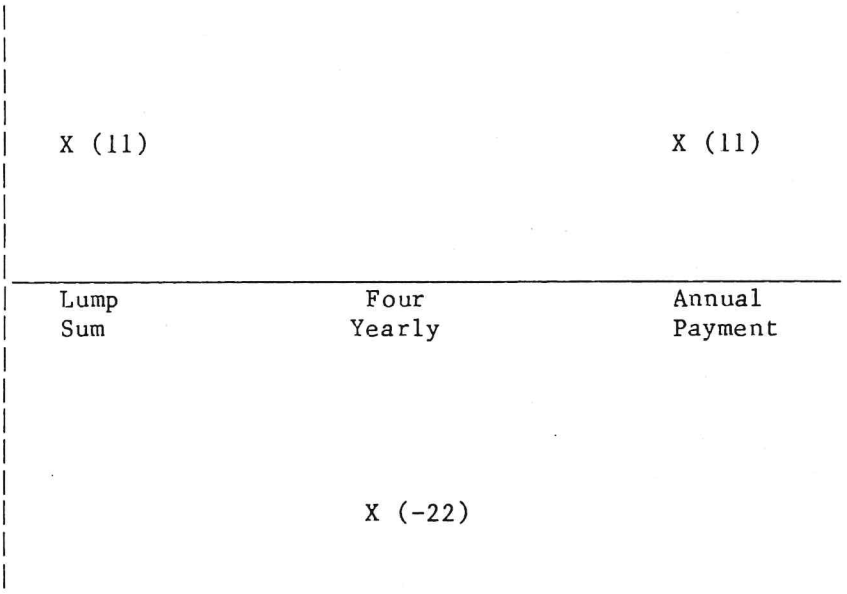

Figure 10: Trade Offs for Share of Profits

GROUP 4 (6% OF RESPONDENTS)

The model fitted reasonably well in this case with a Kendall's Tau of 0.63, again suggesting that the additive model provides a reasonable representation of the group's preferences. The relative importance of the five attributes are shown in Table 14.

Table 14: Attribute Importance (Group 4)

Attribute	Importance
Rental Paid	0.100
Time Rent Paid	0.400
Percent of Profit	0.100
Maintenance	0.200
Grazing or Not	0.200

In this case the timing of rental payment is the most important attribute, followed by share of crop maintenance and grazing rights. Rental and share of profit are less important.

The implied trade offs for the timing levels are shown in Figure 11. This group also wishes for annual payments but, unlike some of the other groups, is very adverse to either a lump sum or four yearly payments, although the latter option is the least preferred.

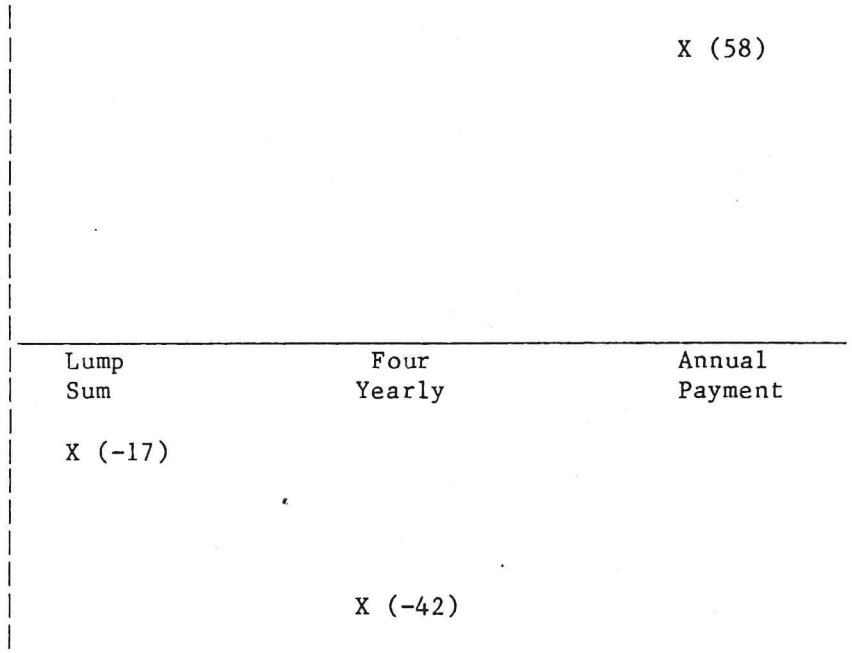

Figure 11: Trade Offs for Share of Profits

The implied trade offs for share of crop maintenance are shown in Figure 12. This group of farmers want to be involved in the maintenance of the crop but are equally adverse to either having overall responsibility or allowing the Forests Department overall responsibility.

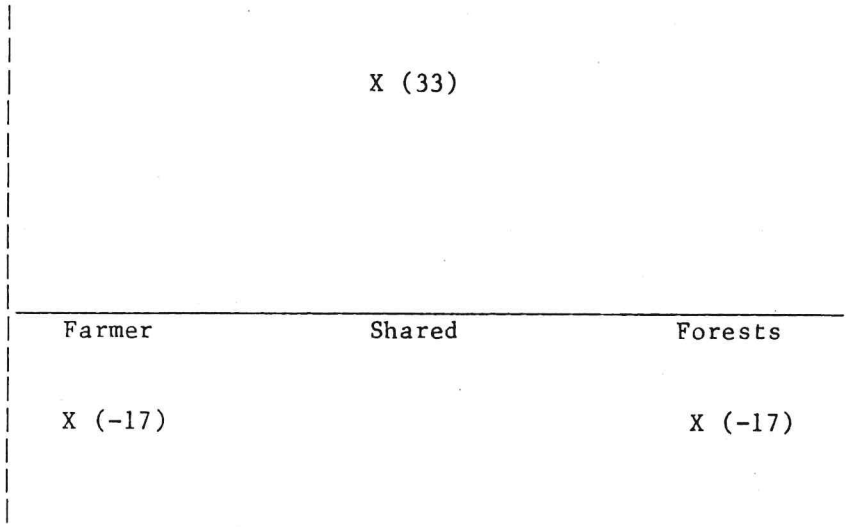

Figure 12: Trade Offs for Share of Crop Maintenance

Like the previous groups, this group:

(1) would prefer a rental premium but is indifferent between the lower two rental levels,

(2) would prefer a share of profits but is indifferent between a 25% and 50% share, and

(3) would prefer grazing in the pine plantation.

CONCLUSIONS

The study results strongly suggest that there is wide spread opposition to pine afforestation in Manjimup and surrounding areas and that there are a number of reasons for this opposition. Firstly, it seems that farmers prefer hard woods over pine for aesthetic and ecological reasons. While most farmers agree that they may make money from pine, they believe that they can make more from the land if it is used for grazing. It is apparent that information about the relative economics of pine and grazing have either been not passed on effectively or that the results are simply not believed. Qualitative information from the two field workers suggests that it is the latter rather than the former reason which is more important. However, it is also true that a more intensive educational programme, perhaps requiring a demonstration plot, could alter this situation.

Many respondents fear an oversupply of pine from the East and from New Zealand. The Forests Department must allay such fears if they are to obtain farmers' support, suggesting the need for firm forward contracts to farmers, even though this may reduce the scheme's profitability to the Department.

It is also apparent that "successful" farmers are less willing to participate in pine afforestation schemes and that farmers are really only willing to provide marginal land or to exchange land for portions of their property which they are not presently allowed to clear. From the farmers' point of view, using this type of land is seen to be a desirable, low risk strategy as it is unlikely to interfere with current farm activities and offers an additional, rather than an alternative, income source. It may well be that the Forests Department will have to accept such land, with reduced profitability if necessary, if it is to obtain farmers' support. If the Department is not willing to take such a course then it is clear that they will have to pay a premium for land which farmers view as better used for grazing, either in the form of rental or in the percentage of profit returned to the farmer.

It is also clear that farmers who are interested in participating in pine afforestation wish to graze within the plantation. Any scheme put forward must allow this privilege if it is to obtain farmers' support and the economics of pine afforestation must take this into account.

The study has shown a major group of farmers who wish to "participate" in the scheme by taking a share of profit, being involved in maintenance and grazing in the plantation. There is another group, mainly absentee owners, who do not wish to "participate" but rather wish to give control of the property to the Forests Department. Consequently, it seems desirable for the Department to offer two quite distinct packages for these groups, with the final packages being determined by the resources available to the Department. The next stage in the process is to determine these packages and inform farmers of what is being offered and the long term implications to them of such an arrangement. Such a step is essential at this point as farmers are requesting exact information before they are willing to commit themselves.

Farmers should be invited to submit the land they are willing to lease under the package and the exact conditions under which they would offer other land. The Department can then determine whether or not there is sufficient appropriate land for the scheme to be economic. If there is sufficient land then offers can be accepted. If there is insufficient land the Department can examine the other land offered and the conditions under which it could be acquired and decisions can be made as to which land, if any, will be accepted.

The survey has shown that the Forests Department has a major job on its hands in persuading farmers to participate in pine afforestation but it is also apparent that many farmers would be willing to participate in a minor way with marginal land. Whether that will prove to be sufficient for the Department's purposes is a question which can now only be answered by offering concrete packages under which land can be obtained.

REFERENCES

Green, PE, (1974), "On the Design of Choice Experiments Involving Multifactor Alternatives", Journal of Consumer Research, Vol 1, September, pp. 61-68.

Howieson, Bryan, (1983), "Conjoint Analysis - A Useful Analytical Tool", Economic Activity, Vol 26, pp. 37-42.

Milligan, GW, Sokol, LM, (1980), "A Two-stage Clustering Algorithm with Robust Recovery Characteristics", Educational and Psychological Measurement, Vol 40, 755 - 759.

Shocker, AD, Srinivasan, V, (1979), "Linmap (Version III): A Fortran IV Computer Program for Analysing Ordinal Preference (Dominance) Judgements and for Conjoint Analysis, Incorporating Multistage Estimate Procedures", Journal of Marketing Research, Vol 16, November, pp. 560-561.

Soutar, GN and Savery LK, (1983), "Using Conjoint Analysis to Determine a Compensation Package", Management Research News, pp. 11-15.

APPENDIX A

The University of Western Australia

Centre for Applied Business Research

28 Broadway, Nedlands
Telephone: (09) 389 1455.
Telex: AA 92992.
Telegrams: Uniwest, Perth.

Address all correspondence to The Director
P.O. Box 351, Nedlands,
Western Australia 6009.

Our ref: 6.01.022

July 1984

Dear Sir

About this questionnaire

This questionnaire is being given to you because the Forests Department of Western Australia is considering an afforestation programme in this area. The Department needs your opinions about such a development because if you like the idea of the project and decide to participate in it, several options will be offered to you for your consideration. These alternative options have yet to be determined and will largely be a result of your ideas about how such a programme would best suit you.

Primarily, the Department is interested in a scheme which, with your approval, would involve the development of some of your land as pine plantations. To do this, we need your opinions on such things as payment to you for undertaking pine afforestation, your role in managing such a plantation and your ideas concerning agro forestry within the plantation. We are also interested in your ideas about the overall suitability of pine afforestation and the role you see the Forests Department might have in such a project.

Please help us to understand your opinions on these issues by taking a few minutes with the research representative to fill out this questionnaire. Your personal identity is not required for the purpose of this study and all of the information you provide will remain strictly confidential. However, we need your support in this research because your opinions are essential to the decision to initiate such a programme.

I thank you in advance for your support,

Yours sincerely

Dr Roger Smith
Acting Director

Encl

QUESTIONNAIRE

1. (a) If there was to be an afforestation programme planting trees for timber production in your area, would you prefer to see soft woods (pine) or hard woods (eg, karri or bluegum) as the primary crop? Please tick the appropriate box.

[ ] Softwoods [ ] Hardwoods

(b) Please give a brief explanation for your choice

.....

.....

.....

2. Assuming that pine was to be the crop involved in the afforestation programme, how interested would you be in the following arrangements concerning your land? Please tick the appropriate box to indicate your degree of interest in each of the arrangements listed below.

	Extremely interested	Somewhat interested	Not at all interested
Selling some of your land to the Forests Department to afforest independently. A buy back option would be made available when the crop matures	[ ]	[ ]	[ ]
Putting in a pine crop yourself on some of your land **with no** assistance from the Forests Department	[ ]	[ ]	[ ]
Putting in a pine crop yourself on some of your land **with some** assistance from the Forests Department	[ ]	[ ]	[ ]
Leasing some of your land to the Forests Department in return for a payment from the Forests Department which you consider acceptable	[ ]	[ ]	[ ]

3. (a) In this research project the Forests Department is interested in your attitudes to leasing land from you so the following questions assume a lease arrangement. There are a number of ways this could be done and following is a set of 16 alternative offers which we would like you to consider. Please rank them from your **most preferred** to your **least preferred** alternative by placing the cards the interviewer will give you into that order. Remember, your response in no way obligates you and your identity will remain strictly confidential to the independent research team carrying out the study.

Interviewer Use Only

Alternative A	[ ]
Alternative B	[ ]
Alternative C	[ ]
Alternative D	[ ]
Alternative E	[ ]
Alternative F	[ ]
Alternative G	[ ]
Alternative H	[ ]
Alternative I	[ ]
Alternative J	[ ]
Alternative K	[ ]
Alternative L	[ ]
Alternative M	[ ]
Alternative N	[ ]
Alternative O	[ ]
Alternative P	[ ]

(b) How important are these factors in your consideration of an afforestation programme? Please tick the appropriate box.

		Extremely Important	Somewhat Important	Not at all Important
(i)	Annual rental received	[ ]	[ ]	[ ]
(ii)	Timing of rental payments	[ ]	[ ]	[ ]
(iii)	Share of profit from crop	[ ]	[ ]	[ ]
(iv)	Responsibility for crop maintenance	[ ]	[ ]	[ ]
(v)	Allowance of grazing in pine plantation	[ ]	[ ]	[ ]

(c) For each of the factors given below, which alternative would you prefer?

(i)	Timing of Rental Payment	[ ] Annually [ ] Lump sum at beginning [ ] Every four years
(ii)	Responsibility for crop maintenance	[ ] Farmer's [ ] Forests Dept's [ ] Shared
(iii)	Grazing in Pine Plantation	[ ] Allowed [ ] Not allowed

4. (a) How interested are you in obtaining further information on -

		Extremely Interested	Somewhat Interested	Not at all Interested
(i)	A pine afforestation scheme?	[ ]	[ ]	[ ]
(ii)	A hard woods afforestation scheme?	[ ]	[ ]	[ ]

5. We would also like to know what your attitude is, in general, to a number of organisations in terms of how helpful you believe they are to you as a farmer. Please circle the appropriate number to give your opinion or tick the box if you have no opinion.

	Extremely Unhelpful	Somewhat Unhelpful	Neither Helpful Nor Unhelpful	Somewhat Helpful	Extremely Helpful	No Opinion
Forests Department	1	2	3	4	5	[ ]
Local Shire	1	2	3	4	5	[ ]
State Government	1	2	3	4	5	[ ]
State Department of Agriculture	1	2	3	4	5	[ ]
Public Works Dept	1	2	3	4	5	[ ]

6. Finally, some questions about your farm.

(a) How large is your farm? _____ hectares

(b) What percentage of your farm's land is still bush? _____ %

(c) What percentage ofyour cleared land can be used only for grazing? _____ %

(d) What percentage of your cleared land would you consider afforesting? _____%

(e) How successful do you feel your farm is?

[ ] Extremely successful

[ ] Quite successful

[ ] Not at all successful

(f) What are your farm's major sources of income and about what percentage of your farm's income do they provide

ACTIVITY	% of Farm's Income	Area devoted to activity (in hectares)
Grazing		
Cereal Crops (eg wheat, oats)		
Other crops (eg field peas, rape seed)		
Vegetables		
Fruit		

(g) What percentage of your total income does your farm provide? _____ %

Thank you for your co-operation.

SHAN-IIQ/cm

16/07/84

APPENDIX B

Responses to Question 2

Preference for Afforestation Scheme by Reason for Choice

Abbreviations Used in Appendix B:

SOIL	Pines have detrimental effect on soil.
AREA	Area believed to be a "hardwood area".
ECOLOGY	HW suit area ecologically.
AESTHETICS	HW suit area aesthetically.
FIRE	Pine presents an excessive fire risk.
TIMBER	HW represents better, more valuable timber.
O'SUPPLY	Pines believed to be in oversupply.
SHORTAGE	HW believed to be scarce in future.
MAINTENANCE	Pines believed to involve excessive maintenance.
DISEASE	Pines believed to be too susceptible to disease.
ECONOMICAL	Pines believed to be more economical than HW.
AGRIC USES	Agricultural uses preferred to timber production.
UNDERPAID	Timber production in general too underpaid.
NO PREFERENCE	No strong preference for either timber.
BALANCE	Balance planting - of HW and SW by soil type.
BOTH	A place for both HW and SW is perceived.

	HW	SW	NEITHER	BOTH	EITHER
1. Soil/Area	16	-	-	-	-
2. No future in pine	3	-	-	-	-
3. Fire/Soil/Area	13	-	-	-	-
4. Fire/O'Supply	1	-	-	-	-
5. Fire	11	-	-	-	-
6. O'Supply/Timber	4	-	-	-	-
7. Soil/Timber	4	-	-	-	-
8. Disease	2	-	-	-	-
9. Fire/Area	6	-	-	-	-
10. Area/Timber	15	-	-	-	-
11. Area/Shortage	15	-	-	-	-
12. Area/Aesthetics	38	-	-	-	-
13. Area/Ecology	14	-	-	-	-
14. Timber	24	-	-	-	-
15. Area/Maintenance	2	-	-	-	-
16. Agricultural Uses	1	-	11	-	-
17. Economical/Area	8	3	-	7	2
18. No preference	3	-	-	-	17
19. Balance	11	-	-	12	1
20. Fire/Maintenance/Economical	1	-	-	2	-
21. Economical	-	50	-	-	-
22. Area suited to pine	-	3	-	-	-
23. Pine better timber	-	4	-	-	-
24. Both	2	1	-	10	-
25. Easier to sell HW	2	-	-	-	-
26. Soil/O'Supply	2	-	-	-	-
27. Bad area for fire	-	-	1	-	-
28. Underpaid	-	-	2	-	-

Total number of respondents: 324.

APPENDIX C

OPTION	Annual Rental to Farmer	Timing of Rental Payment to Farmer	Farmer's share of Profit of Pine Crop on its Maturity	Responsibility for Maintenance of Pine Crop	Grazing in Pine Plantation
A	Equivalent value of land for grazing	Annually	No share	Farmer's	Not allowed
B	Equivalent value of land for grazing	Lump sum at beginning of project	25%	Shared	Not allowed
C	Equivalent value of land for grazing	Every 4 years	50%	Forests Dept's	Allowed
D	Equivalent value of land for grazing	Lump sum at beginning of project	25%	Forests Dept's	Allowed
E	10% more than equivalent value of land for grazing	Lump sum at beginning of project	No share	Forests Dept's	Allowed
F	10% more than equivalent value of land for grazing	Annually	25%	Forests Dept's	Allowed
G	10% more than equivalent value of land for grazing	Lump sum at beginning of project	50%	Shared	Not allowed
H	10% more than equivalent value of land for grazing	Every 4 years	25%	Farmer's	Not allowed
I	10% less than equivalent value of land for grazing	Every 4 years	No share	Shared	Allowed
J	10% less than equivalent value of land for grazing	Lump sum at beginning of project	25%	Farmer's	Allowed
K	10% less than equivalent value of land for grazing	Annually	50%	Forests Dept's	Not allowed
L	10% less than equivalent value of land for grazing	Lump sum at beginning of project	25%	Forests Dept's	Not allowed
M	10% more than equivalent value of land for grazing	Lump sum at beginning of project	No share	Forests Dept's	Not allowed
N	10% more than equivalent value of land for grazing	Every 4 years	25%	Forests Dept's	Not allowed
O	10% more than equivalent value of land for grazing	Lump sum at beginning of project	50%	Farmer's	Allowed
P	10% more than equivalent value of land for grazing	Annually	25%	Shared	Allowed

APPENDIX D

FINAL REPORT ON PINE ATTITUDE SURVEY

BY THE INTERVIEWERS

CONTENTS PAGE

APPENDICES

INTRODUCTION

The survey questionnaire and format were developed by the Centre for Applied Business Research (CABR) at the University of Western Australia in conjunction with the Forests Department (F.D.). Following a meeting with the staff of the CABR on 20th July 1984 for instruction in the philosophy of the questionnaire the interviewers, employed by the F.D. at Manjimup, started contacting farmers and landowners on 24th July.

A total sample of 390 landowners was selected from the electoral rolls of the Manjimup and Bridgetown-Greenbushes Shires for properties exceeding 20 ha in area, within 70km of Manjimup, within the Southern Region of the F.D., with owners living locally or in the Metropolitan Area, and having annual rainfall in excess of 700mm. A further 19 properties were selected in the Boyup Brook Shire for which the rainfall criteria was lowered to 650mm. The sample selection process employed was to go through the shire electoral rolls, ward by ward, marking every sixth name; where this name was associated with a property that obviously did not comply with the selection criteria then the third name below or above this was selected. Partnerships and joint ownerships were considered as one farming unit and surveyed only once. A total of 338 interviews were conducted. Some 22 landowners could not be contacted, typically because of having moved without leaving a forwarding address, or being temporarily overseas or interstate. A further 8 refused to co-operate and do the survey at all, reasons for this included 'too busy', 'an invasion of privacy', and a longstanding dispute with the F.D. over compensation. The remaining 41 had either just sold the property, died, or their properties proved smaller than than the available information indicated. Although the intention was to only survey properties exceeding 20 ha a few smaller properties have been included.

Generally the survey was received courteously by landowners with most of the questions given due consideration. However, there were reccurring difficulties both with the survey itself, and with the re-afforestation concept in general. These are outlined in this report.

Also included is a compilation of landowner comments that may assist in understanding the attitudes and responses recorded, together with suggestions by the interviewers on ways to expand and improve F.D. public relations and extensions services in response to farmer interest.

All data collation and statistical analysis is the responsibility of the CABR, and is the subject of a separate report.

COMMENTS ON SURVEY FORMAT

These refer to the questionnaire in Appendix 1.

Question 1

(a) Most people prefer hardwoods, however some of these are totally opposed to pines, and some merely prefer hardwoods but would consider pines if the economics were right.

Many people have no preference, or believe there is a place for both. Some people have strong views about afforestation programs on crown land but not on private land or vice versa. Extremely rarely total opposition to all afforestation programmes was encountered.

The question does not differentiate those views which would have been useful information.

(b) A question structured as in the Department of Forestry Queensland Technical Paper No. 29 "Public Attitudes to the Exotic Pine Reforestation Programme in South East Queensland" (see Appendix 3) as well as this open question might have made quantitative assessment of attitudes easier.

Question 2

A statement on the basis of valuation of land being purchased would have been helpful, and avoided unrealistic expectations. Many need more information before this question could be answered.

Farmers want to know what "some assistance" means, eg: advice only, supply of trees, planting, financial assistance, or marketing guarantees.

Co-operative ventures other than leasing could have been considered.

Question 3

Most people when faced with the sixteen options of question 3(a) felt it was far too complex, particularly considering the limited information available to them

The farmers generally feel it is pointless sorting the cards if they are not interested in leasing. It is too much to expect them to give a well considered answer to such an involved question. Many also feel that in answering this question they are expressing some interest in leasing when they have answered to the contrary in Question 2.

For those who are somewhat or extremely interested in leasing, actual figures are needed so a comparison of outcomes can be made. Eg: some would be interested at say $80/ha which they consider equivalent to the net profit from grazing, but are not at all interested at $40/ha annual rent. Even though it is a factor preferencing question the importance of each factor mainly depends on its financial implications.

Because of the complexity of options some express the fact that if given the cards to do again, they would probably not put them in the same order. Thus there may be many inaccuracies and inconsistencies in their answers.

Some farmers who aren't very interested, sort the cards purely as a mental exercise and these results may be quite misleading. (Some also sort the cards on the basis of a hardwoods only scheme).

There has been criticism over the options on the cards in that some might be unrealistic. For example it was anticipated that as the level of annual rental incr the share of profits would decrease but this is not apparent from the options proposed. Also a lump sum payment could be greater than the value of the land, and yet this is offered with a 50% share in profits as well.

Some farmers choose these cards as first preference saying they wouldn't be interested in leasing unless they receive these amounts ie: they are interested only at a very high price which could make the scheme uneconomic, others have lower expectations.

Some choose options giving lump sums as first preference because they see them as the most lucrative, but in reality prefer a scheme with annual payments.

Many say that the overriding considerations in their particular situation would be the effect on pension entitlements or tax liabilities.

The option of grazing means different things to different farmers. Agroforestry was canvassed in the information letter yet there is no direct question on this issue, and views on this are not properly recorded. Some are only interested in leasing in an agroforestry system, and no allowance is made for varying rates of lease payments. It may have been more useful to ask if farmers would prefer a plantation system or an agroforestry system. The grazing "not allowed" option seems unnecessary. What costs would be involved to the plantation owner, in permitting grazing rather than not allowing it?

The payment of the lease "every four years" option seems an odd arrangement. The cards could have been simplified without this option.

The "profits of pine crop at maturity" were not defined. For example, are administration, insurance, rehabilitation and pasturing costs to be deducted before determining profits?

Some are only interested in leasing bush or regrowth. They are quite prepared to accept a lower payment if the Department would clear their bush and plant pines.

The "Shared Responsibility" option only causes problems as it is so similar to "Farmers Responsibility". Most farmers see the latter as a shared arrangement anyway. Some see "Shared" as a more flexible agreement.

Question 4

This is often used to express a desire to be better informed on Government polices and general afforestation programs, rather than a further expression of interest in afforesting their own land.

Question 5

It would have been helpful to be able to differentiate between the policies of these organizations, and the people given the task of implementing them. For example P.W.D. policies were frequently seen as unhelpful and inflexible, whereas the P.W.D. personnel often rated much better. Answers to this question were not consistent in their approach.

Question 6

(b) Some include shade and shelter belts, other only state their bush blocks.

(c) The ambiguity of this confuses all. The percentage given included steep slopes, rocky outcrops, waterlogged or salty areas, paddocks with stumps and logs, and area of very poor soil, all of which is used for grazing only. However, this then does not differentiate between non-arable land that might be suitable for growing pines, and that which is

non-arable and totally unsuitable. Futhermore the type of land that one farmer considered suitable for cropping in one area, was not necessarily considered suitable in another area.

(d) We have taken this to include hardwoods, and trees grown in shelter belts and agroforestry.

(e) What criteria should a farmer measure his successfulness by - happiness, viability, productivity, tax avoidance? For example, part time farmers may say "extremely successful" even if the farm is making a loss but the life style is what they want. Fulltime farmers usually invest more of their profits back into the farm so may not be successful in the short term, but extremely successful in the long term. Some say they are as successful as can be given the current economic difficulties.

(f) This causes some embarrassment and is also often very difficult to anser. Income varies so much from year to year, and also the various enterprises are rarely kept as distinct units. The term "grazing" is too general, for this area in particular, as we have to include dairying, pigs etc under this heading which vary greatly in terms of profitability, from grazing. Also no provision was made for unusual enterprises such as aquaculture or commercial wildflowers.

(g) Often a very difficult question, as off farm income is not always accounted separately from the farm income, and tax figures may not always show the situation realistically.

Farms in development stages may provide no nett income to their owners at present, but may be very viable in the future. These people had to give the same response as owners of farms which are non-viable, providing no nett income also, but with no immediate potential to improve.

Some farmers responded in terms of nett income while others used gross income figures.

TYPICAL VIEWS ON PINES

(A) REASONS FOR CONSIDERING PINES

- Faster growth rate and greater return compared with hardwoods.
- A belief in the future profitability of and market for pines.
- A diversification on the farm.
- The potential to make better use of certain areas of land (eg: steep slopes, regrowth, poorer soils, bush).
- Small areas of intensively managed pines reduce the pressure on very much larger areas of hardwood forest. (A ratio of 1: 25 was quoted by one)
- The facility to maintain ownership and productivity of land to pass on to a grandson as no sons interested in farming it.
- Potential for cash income by contracting to do maintenance.
- Improvement to employment prospects in the area in the maintenance and milling of pines.
- Pines on private land may ease the problem of oversupply of farm produce.
- The possibility of using a small area of pines as private superannuation

(B) REASONS FOR DISLIKING PINES (IN ROUGHLY ORDER OF FREQUENCY OF STATEMENT)

- Fire hazard of plantation, and problems of maintaining adequate firebreaks
- Claims of serious and permanent soil deterioration under radiata pines.
- Problems and costs of returning land to pasture.
- Tying up good food-producing land, and loss of flexibility in farming operations.
- Crop rotation too long, as many farmers over 50 years old.
- Doubts about the profitability of the pine industry now, and in the future saying New Zealand can produce it cheaper than us, and that there will be a world glut of pines within 30 years.
- A belief that technology will reduce the demand for pine (eg: the increasing use of steel framing for housing).
- A belief that hardwoods have a secure future, being in shorter supply, and will become more profit able than pine.
- Aesthetic reasons, a wish to keep the pines out the area, saying it detracts from the natural beauty of the hardwood forests and must have a detrimental effect on the tourist industry.
- Social reasons, a belief that planting pines on farmland will depopulate the area and cause a decline in the Shire's prosperity.
- Ecological reasons, pine forest is seen as a sterile monoculture with no animal life or understorey, and harbouring vermin.
- A simple preference to use hardwood timber.
- Problems private landowners are having at present in marketing pines.
- A concern that encouragement of pines on private land is for political rather than rational reasons, and that a change of government could leave people who had entered into such schemes in the lurch.
- A feeling that a pine plantation would devalue their land, by reducing the number of potential buyers.
- A belief that with genetic and silvicultural research and cloning techniques other species (eg: karri, marri) have the potential to be as productive or profitable as pines.

- Reduction in employment prospects in the area as pine milling uses less labour than hardwood.

- A concern that if there were numerous pine plantations on private land in the area that bans on the movement of machinery on hot days would become more common, thus adversely affecting the horticultural industry.

(C) GENERAL COMMENTS

Many people consider that most private pine plantations and F.D. plots and some F.D. plantations are not being well maintained and this eloquently denies the profitability of pines and exacerbates their concerns over the fire hazards of pines in general.

Most people surveyed who had private pine plantations were happy with them but there was a general feeling that the F.D. is hindering the private pine industry with their management of their own pine log supply - ie: some millable logs go to the particle board plant, and this prevents the people with private pines being able to sell any thinnings to the plant.

In the Boyup Brook Shire most farmers consider pines particularly unsuitable, as such a large proportion of the Shire is involved in cereal cropping. Harvesting and lightning fires in stubbles are relatively frequent occurrences, and pines are not expected to escape such fires over the 30 year rotation time. The costs of insuring pines in this area might be extremely high.

There were several favourable comments on the improved appearance of the pines in the reduced fuel buffer zone on Balingup Hill.

COMMENTS ON SELLING, LEASING, AND AFFORESTATION

As would be expected a proportion of the properties were on the market at the time of the survey, and most owners would be keen to sell to the F.D. if the price suited. Several properties had in fact been offered to the F.D. some being refused, other being negotiated. Some owners, however, had sufficiently intense opposition to pines, or to government purchase of private land to reject the idea. Those who were not trying to sell their property often voiced total opposition to government purchase of freehold land.

Landowners who would consider a leasing option generally either see it as a way of arranging for someone else to profitably manage the entire property, or as a better way to use certain areas such as steep country or poorer soils.

Many see it as a possible way to clear poor quality bush or regrowth on their own property and obtain some returns on the area.
Some of these are complicated by P.W.D. clearing bans and compensation payments, but they feel it would be a far more productive use of the land which at present is a liability to them. The problem of clearing bans especially in Zone A, is a major issue among farmers, which they consider could be perhaps alleviated by some co-operation between the P.W.D. and the F.D.
An actively growing pine plantation, or suitable hardwood plantation is seen as effective as a low productivity jarrah forest in salinity control, while fulfilling the requirement for land to plant to pines.

The opportunity to obtain some cash income by doing maintenance, or some grazing as well as the lease payment also influenced many.
Many were attracted to the scheme because the F.D. involvement would reduce or remove the risks inherent in such a long term venture.
The reasons for disliking the leasing options include:-

- Don't want outsiders involved on their land or to have independence in any way restricted.
- Crop rotation time too long with low annual returns. Many don't expect to still have an interest in their land in 30 years time.
- Areas that farmers are prepared to lease, are too small to be economically efficient units.
- Leasing options are not realistic and don't give any factual basis for a considered decision.
- It is not in the best interests of good pine growing to have farmers involved, who may not give the pines their required attention.
- Legal complications involved if farmer becomes ill or dies, or if land is sold. Also questions of insurance, rates, liabilities, re-establishment costs etc. Many would thus prefer to sell outright to the Forests Department, or else to plant pines independently and take all the risks.
- Properties are often so small that if they leased or sold any land it would jeopardize their viability in the short term.

When discussing afforestation in general by far the most common comments were 'keep the karri soils for karri or intensive horticulture' and 'if pines are necessary plant them in areas of poorer soils, particularly Vacant Crown Land or State Forest with very low timber productivity, or in the Zone A clearing bans areas or the Blackwood Valley'. Other common comments focus on alleged wastage within the hardwood forests, too many windblown and firefall trees being left to rot, the chipmill taking some logs that could be profitably milled by small operators and not taking material such as crowns, licence holder mills deliberately spoiling logs for salvage spot millers.

Another common comment was that there would be no need for afforestation schemes on private land if the F.D. were funded to manage existing hardwood forests for higher productivity - this would imply different varieties and silvicultural treatments, and genetic improvements. Some considered that other management systems for karri plantations can give earlier and greater returns than the present F.D. system, and gave an example of a private landowner who was doing this. Many believe that afforestation should only be with trees natural to the area; some stated opposition to the bluegum plantations on private land for this reason alone, others because good quality karri has been clearfelled to plant them.

Many landowners would be very interested in planting hardwoods on some or all of their cleared land, not necessarily with immediate or even any financial benefit but with some assistance with seedling supply, planting, or a subsidy for fencing costs. They consider that such assistance might give good long term community benefits both by taking pressure off State Forest areas and by reducing salinity problems but do not feel in a position to finance it all themselves. Also there are many who would like some assistance in upgrading their bush to improve productivity.

AGROFORESTRY

Some farmers would only be interested in pines on a agroforestry basis, and many others are sceptical about whether grazing of any value would in fact be available. It would be helpful to all if more information were made available.

In the light of comments on Balingup Hill where the pines have been thinned to 100 stems per hectare it is possible that pines planted at agroforestry spacings may have considerably more aesthetic appeal than conventional plantations.

ECONOMIC COMPARISONS

The covering information letter (Appendix 2) sent to the landowners surveyed implied an acceptance to the findings of the Treloar Report. However, there are many who challenge the results by saying:-

- The returns from grazing appear to be unrealistically low, and that the budgets were not presented to enable detailed criticism. Most farmers consider the real profit from grazing enterprises as $80-100/ha.
- There is no statement that administration costs of managing plantations were considered. Such costs on small lots are likely to be excessive.
- Apparently costs of clearing stumps and roots, and returning land to agricultural potential, including pasturing and fertilizing, were not debited to pine schemes. Most farmers believe that these costs are very high and would have to be covered by the F.D.

A comparison of the economics of growing pines as against other timber crops such as bluegums for chipping, yellow stringybark for poles, young karri for tile battens etc, or other exotics such as poplar, was often requested.

Most farmers believe that State Forest and Vacant Crown Land with low forest productivity and quality should be cleared and planted to pines rather than using valuable cleared farm land. They question the economic justification of the F.D. preference to use cleared land over poor forested land, even if there were longer rotation times with the latter.

One farmer commented that if the Government wanted to reduce unemployment, then it should clear poor quality State Forest or Crown Land to establish pines as this required a greater workforce than planting pines on cleared, pastured land.

QUESTIONS AND SUGGESTIONS ON PINE SCHEMES

Many queries arose during the course of the survey which needed answering before the landowner could reasonably complete the questionnaire. As the survey progressed, we became more informed and could answer many of the more frequent queries. However those which could not be adequately answered, and which farmers see as important issues, will need resolving before a satisfactory lease agreement can be achieved. These queries are included in the list below:-

- Will the F.D. clear bush, or light scrub, or regrowth on private property to plant pines - if so how would this affect lease payments?
- How does soil type or value of the land affect lease payments? - would it be related only to estimated productivity under pines?
- Will the F.D. cover insurance costs? other costs such as rates?
- What happens if the plantation burns down at 25 years , and there was an agreement to share the profits? Would the landowner have to wait for another crop rotation period, or would it be covered in the insurance?
- Will the F.D. restrict access to the pines by the landholders during fire risk periods as they do in some plantations?
- Can the landowner keep small areas in the plantation ares unplanted? eg: karri hill, patch of orchids.
- Will irregular boundaries be acceptable to the F.D. eg: windbreaks?
- Will the size of plantations and the distance from markets affect the lease payment?
- Can the landowner have a say in when the pines are marketed? ie: if the price is temporarily depressed and he has a share in profits can he delay harvesting to ensure higher returns?
- Can the harvest be staggered over several financial years?
- Is the F.D. guaranteeing a market on maturity?
- Under C.P. regulations would plantations be considered as clearing?
- Is the F.D. proposing to return the land leased for pines to its original condition after final harvest?
- Would there be financial incentives to those farmers who would leave the stumps in the ground to rot rather than insisting on a return to arable condition immediately?
- How will different modes of payment affect pension entitlements and tax liabilities?

Also there were some suggestions on other ways schemes could be set up:

- Lease payments to all farmers to be kept in a fund accruing interest, to give him the option of annual payment or of calling on it only in years of low income or heavy expenditure. An overdraft facility could even cover the lump sum payment situation.
- F.D. to clear bush, plant pines, and do maintenance; paying only a small rental depending on costs of clearing, plus the value of timber obtained from clearing. Farmer has cleared land at harvest.
- No profit share to farmer, but with maximum possible annual rental payments, to more closely approximate real profits from grazing enterprise.
- Farmer does all the work upaid except for share in profits while F.D. supplies seedlings, covers insurance, gives technical advice, pays rates, guarantees a market.

- F.D. clears areas of poor quality jarrah forest in Vacant Crown Land or State Forest (eg: Lake Muir - Denbarker, Nannup - Augusta), and leases land to farmers on conditions that farmer applies fertilizers and sows clover and/or grow crops in an effort to improve the fertility of the soil for pines. This land would then be available when required, after a minimum period, for the F.D. to plant pines, while having reduced the demand on better agricultural land both for pine growing and for cropping.

PUBLIC RELATIONS CONCERNS

Most farmers approve of F.D. operations in general. Prescribed burning which reduces fire hazard to landowners, and karri regeneration both attracted much favourable comment. Problems with F.D. trees falling over fences and with blackberries spreading from F.D. land, difficulty in obtaining farm timber, sand and gravel requirements, adjoining bush needing burning, wastage of usable hardwood resource in the forests and the spring burning program were the most common areas of adverse comments.

In view of the considerable interest shown in upgrading native bush areas on farms for higher timber productivity we feel that a brochure giving information on timber tree varieties and advice on silvicultural techniques, and seminars or courses perhaps run under the aegis of TAFE would be very worthwhile.

There is strong belief, as mentioned previously that pines detrimentally affect soil quality. We suggest a demonstration plot, conducted jointly with the Agriculture Department showing removal of stumps and roots and establishment of pasture after pines, with the costs of such a program detailed, would be a very beneficial public relations exercise.

It would also appear worthwhile to ensure that all F.D. pine plots and plantations are properly maintained and fertilized as appropriate, as there has been considerable comment regarding their condition. Where it is necessary to maintain pines in an unpruned and unfertilised state in order to provide baseline data we would suggest suitable signposting would greatly improve the public's view of the situation.

Many of the communities attitudes towards pines have been formed on rumours and conflicting information, and with reports of trouble selling pines etc. We feel a detailed and reliable information booklet and demonstrations of different aspects of pine growing would go a long way in changing these attitudes. At present there is an element of mistrust, that they are being used as pawns in the politicial game, because the government gave way to the conservationist's, who have a louder and more influential lobby group than the farmers.

Many farmers wish to know more about government policy on the purchase of freehold land, on land swaps and on F.D. management policies. The majority welcomed the survey interview as an opportunity to discuss these issues and the afforestation program, to find out what was happening, and to express their views on these subjects.

A wider circulation of Forest Focus could also satisfy some of the demand for more information on forestry matters.

Many of those interviewed requested that the results of the survey be made available to them. It would seem appropriate, and the minimum courtesy, for the F.D. to send a summary of the results to each person who took the time and trouble to complete the survey.

TIM COMBER
ERICA SHEDLEY

October, 1984

APPENDIX 1

SURVEY QUESTIONNARIE

The University of Western Australia

Centre for Applied Business Research

28 Broadway, Nedlands
Telephone: (09) 389 1455.
Telex: AA 92992.
Telegrams: Uniwest, Perth.

Address all correspondence to The Director
P.O. Box 351, Nedlands,
Western Australia 6009.

Our ref: 6.01.022

July 1984

Dear Sir

About this questionnaire

This questionnaire is being given to you because the Forests Department of Western Australia is considering an afforestation programme in this area. The Department needs your opinions about such a development because if you like the idea of the project and decide to participate in it, several options will be offered to you for your consideration. These alternative options have yet to be determined and will largely be a result of your ideas about how such a programme would best suit you.

Primarily, the Department is interested in a scheme which, with your approval, would involve the development of some of your land as pine plantations. To do this, we need your opinions on such things as payment to you for undertaking pine afforestation, your role in managing such a plantation and your ideas concerning agro forestry within the plantation. We are also interested in your ideas about the overall suitability of pine afforestation and the role you see the Forests Department might have in such a project.

Please help us to understand your opinions on these issues by taking a few minutes with the research representative to fill out this questionnaire. Your personal identity is not required for the purpose of this study and all of the information you provide will remain strictly confidential. However, we need your support in this research because your opinions are essential to the decision to initiate such a programme.

I thank you in advance for your support,

Yours sincerely

Roger C. Smith

Dr Roger Smith
Acting Director

Encl

QUESTIONNAIRE

1. (a) If there was to be an afforestation programme planting trees for timber production in your area, would you prefer to see soft woods (pine) or hard woods (eg, karri or bluegum) as the primary crop? Please tick the appropriate box.

[ ] Softwoods [ ] Hardwoods

(b) Please give a brief explanation for your choice

.....

.....

.....

2. Assuming that pine was to be the crop involved in the afforestation programme, how interested would you be in the following arrangements concerning your land? Please tick the appropriate box to indicate your degree of interest in each of the arrangements listed below.

	Extremely interested	Somewhat interested	Not at all interested
Selling some of your land to the Forests Department to afforest independently. A buy back option would be made available when the crop matures	[ ]	[ ]	[ ]
Putting in a pine crop yourself on some of your land **with no** assistance from the Forests Department	[ ]	[ ]	[ ]
Putting in a pine crop yourself on some of your land **with some** assistance from the Forests Department	[ ]	[ ]	[ ]
Leasing some of your land to the Forests Department in return for a payment from the Forests Department which you consider acceptable	[ ]	[ ]	[ ]

3. (a) In this research project the Forests Department is interested in your attitudes to leasing land from you so the following questions assume a lease arrangement. There are a number of ways this could be done and following is a set of 16 alternative offers which we would like you to consider. Please rank them from your **most preferred** to your **least preferred** alternative by placing the cards the interviewer will give you into that order. Remember, your response in no way obligates you and your identity will remain strictly confidential to the independent research team carrying out the study.

Interviewer Use Only

Alternative A	[ ]
Alternative B	[ ]
Alternative C	[ ]
Alternative D	[ ]
Alternative E	[ ]
Alternative F	[ ]
Alternative G	[ ]
Alternative H	[ ]
Alternative I	[ ]
Alternative J	[ ]
Alternative K	[ ]
Alternative L	[ ]
Alternative M	[ ]
Alternative N	[ ]
Alternative O	[ ]
Alternative P	[ ]

(b) How important are these factors in your consideration of an afforestation programme? Please tick the appropriate box.

		Extremely Important	Somewhat Important	Not at all Important
(i)	Annual rental received	[ ]	[ ]	[ ]
(ii)	Timing of rental payments	[ ]	[ ]	[ ]
(iii)	Share of profit from crop	[ ]	[ ]	[ ]
(iv)	Responsibility for crop maintenance	[ ]	[ ]	[ ]
(v)	Allowance of grazing in pine plantation	[ ]	[ ]	[ ]

(c) For each of the factors given below, which alternative would you prefer?

(i)	Timing of Rental Payment	[ ] Annually [ ] Lump sum at beginning [ ] Every four years
(ii)	Responsibility for crop maintenance	[ ] Farmer's [ ] Forests Dept's [ ] Shared
(iii)	Grazing in Pine Plantation	[ ] Allowed [ ] Not allowed

4. (a) How interested are you in obtaining further information on -

		Extremely Interested	Somewhat Interested	Not at all Interested
(i)	A pine afforestation scheme?	[ ]	[ ]	[ ]
(ii)	A hard woods afforestation scheme?	[ ]	[ ]	[ ]

5. We would also like to know what your attitude is, in general, to a number of organisations in terms of how helpful you believe they are to you as a farmer. Please circle the appropriate number to give your opinion or tick the box if you have no opinion.

	Extremely Unhelpful	Somewhat Unhelpful	Neither Helpful Nor Unhelpful	Somewhat Helpful	Extremely Helpful	No Opinion
Forests Department	1	2	3	4	5	[ ]
Local Shire	1	2	3	4	5	[ ]
State Government	1	2	3	4	5	[ ]
State Department of Agriculture	1	2	3	4	5	[ ]
Public Works Dept	1	2	3	4	5	[ ]

6. Finally, some questions about your farm.

(a) How large is your farm? _____ hectares

(b) What percentage of your farm's land is still bush? _____ %

(c) What percentage ofyour cleared land can be used only for grazing? _____ %

(d) What percentage of your cleared land would you consider afforesting? _____%

(e) How successful do you feel your farm is?

[ ] Extremely successful

[ ] Quite successful

[ ] Not at all successful

(f) What are your farm's major sources of income and about what percentage of your farm's income do they provide

ACTIVITY	% of Farm's Income	Area devoted to activity (in hectares)
Grazing		
Cereal Crops (eg wheat, oats)		
Other crops (eg field peas, rape seed)		
Vegetables		
Fruit		

(g) What percentage of your total income does your farm provide? _____ %

Thank you for your co-operation.

SHAN-IIQ/cm

16/07/84

APPENDIX 2

INFORMATION LETTER

FORESTS DEPARTMENT
50 HAYMAN ROAD, COMO, WESTERN AUSTRALIA
P.O. BOX 104, COMO, 6152. TELEPHONE (09) 367 6333

Address all correspondence: Conservator of Forests
Your ref: *Our ref:* *Enquiries:* Forests Department,
Brain Street,
MANJIMUP WA 6258

23rd July, 1984

Dear Land Holder,

PINE ATTITUDE SURVEY

You have been selected from the Shire Electoral Role to participate in the Forests Department survey on the attitude of Land Holders to a pine plantation scheme in this area. An interviewer with a questionnaire will be attempting to contact you some time over the next ten weeks.

By way of preparation I have enclosed two information sheets on farming and forestry from the Forests Department plus the explanatory face sheet to the questionnaire signed by Dr Roger Smith from the "Centre for Applied Business Research", the organization which designed the survey.

I trust I can count on your co-operation in completing this questionnaire as it will be the collective opinion of those interviewed which will influence the way the pine afforestation programme will go in this area.

Yours sincerely,

P.J. McNAMARA
A/CONSERVATOR OF FORESTS

PMJ:CP

...estern Australia

Centre for
Applied Business Research

28 Broadway, Nedlands
Telephone: (09) 389 1455.
Telex: AA 92992.
Telegrams: Uniwest, Perth.

Address all correspondence to The Director
P.O. Box 351, Nedlands,
Western Australia 6009.

Our ref: 6.01.022

July 1984

Dear Sir

About this questionnaire

This questionnaire is being given to you because the Forests Department of Western Australia is considering an afforestation programme in this area. The Department needs your opinions about such a development because if you like the idea of the project and decide to participate in it, several options will be offered to you for your consideration. These alternative options have yet to be determined and will largely be a result of your ideas about how such a programme would best suit you.

Primarily, the Department is interested in a scheme which, with your approval, would involve the development of some of your land as pine plantations. To do this, we need your opinions on such things as payment to you for undertaking pine afforestation, your role in managing such a plantation and your ideas concerning agro forestry within the plantation. We are also interested in your ideas about the overall suitability of pine afforestation and the role you see the Forests Department might have in such a project.

Please help us to understand your opinions on these issues by taking a few minutes with the research representative to fill out this questionnaire. Your personal identity is not required for the purpose of this study and all of the information you provide will remain strictly confidential. However, we need your support in this research because your opinions are essential to the decision to initiate such a programme.

I thank you in advance for your support,

Yours sincerely

Roger C. Smith

Dr Roger Smith
Acting Director

Encl

A COMPARISON OF FARMING AND PINE FORESTRY IN THE MANJIMUP AREA

A study of the economics of farming and pine forestry in the Manjimup area was carried out in 1983 by staff of the Centre for Applied Business Research (University of Western Australia). The study used local tree growth and forestry cost data from the Forests Department and farm output and cost data from properties selected by the Agriculture Department as representative of the area.

The study showed that, under current economic circumstances, growing pines is more profitable overall than grazing cattle and sheep. Intensive horticulture, however, is more profitable than growing pines.

On the basis of this study, farmers who run grazing on suitable properties would receive higher returns, in the long term, if they converted all or part of their properties to pine forest.

The important proviso is that the project is "in the long term". From a farmer's point of view, planting pines may be impractical because it is 15 years before there are relatively small returns from the first thinning of the pines. The major financial return does not come until 30 years after planting, when the pine forest is clear felled.

To overcome this difficulty, the report by CABR proposed the development of an annuity scheme which would involve the Forests Department making an annual payment to the farmer (for the lease of the land). In effect it would pay the farmer a share of the final yield in advance, with indexation to cover inflation. The Forests Department would legally own the pines, but the farmer would own the land.

The Forests Department is currently evaluating the possibilities of the scheme and is gauging farmer interest. It has also been suggested that farmers who entered the scheme could earn additional income by undertaking maintenance work in the pines.

A COMPARISON OF FARMING AND PINE FORESTRY IN THE MANJIMUP AREA cont.

Because a scheme such as this would be very broadly based it is possible that the Forests Department could consider plots down to wood lot size ie: approximately 5 ha.

AGROFORESTRY

The pilot study by the Centre for Applied Business Research (University of W.A.) has shown that growing pines in the Manjimup area is more profitable than grazing sheep or cattle. Consequently the Government is examining all methods by which the establishment of pines on farmland might be promoted. In addition to the leasehold system proposed, there is a way in which pines can be grown on farms without removing the capacity to graze livestock. The system is called agroforestry, and the pines are grown at wide spacing to allow concurrent use of the land for hay cropping or grazing.

Agroforestry is a flexible system which can favour either the agricultural or the forestry enterprise, depending on the requirements of the individual farmer. It has been shown to be a practical and workable technique in field trials at Busselton and near Mundaring.

It is possible to produce good quality timber while still maintaining the grazing value of an area at between 50 and 85 percent, throughout the life of the tree crop. However, it is necessary to manage the pines carefully, in order to produce high quality timber. In particular, it is necessary to prune off the lower branches before they become large enough to adversely affect timber quality. For best pasture production the branch trimmings need to be crushed or mashed by mechanical slasher.

The main advantage of agroforestry is that the farmer can still obtain some grazing output from the farm while building up a valuable asset in the pine crop. There are other, less tangible, advantages such as the protection of new lambs or newly shorn sheep from extreme weather conditions. The work required to prune the pine trees can be easily carried out in less busy periods of the year. It is also possible that the farmer could carry out any necessary roading and logging when the trees are ready to harvest, and thus further improve the farm's income.

Please contact the W.A. Forests Department for further information and advice.

APPENDIX 3

PUBLIC ATTITUDES TO THE EXOTIC PINE REFORESTATION PROGRAMME IN SOUTH EAST QUEENSLAND

by

B.C. ASHCROFT

ISSN 0155 - 9664

SECTION B:

The following statements represent a wide range of attitudes towards pine plantations. Do you agree or disagree with each of these statements?

(Please indicate by ticking for each and every statement).

		Agree	Disagree
Q 15.	*It would be better to import timber from overseas rather than establish pine tree plantations in Queensland.*		
Q 16.	*Because only areas of poor native forest with little value are destroyed, the environmental effect of establishing pine tree plantations are limited.*		
Q 17.	*Because of the greater use of steel, aluminium and plastics, there is no need to establish pine tree plantations for a future supply of timber.*		
Q 18.	*Pine tree plantations are unattractive; they are a scar on the landscape.*		
Q 19.	*Because pine tree plantations cause some damage to the environment, their establishment should be restricted to areas where least damage will result.*		
Q 20.	*There is no difference between clearing native forest for farming or grazing and clearing the same forest for pine tree plantations.*		
Q 21.	*Because of the uniformity of pine plantations, few species of wildlife are able to adapt to life in plantations.*		
Q 22.	*Providing care is taken to minimize damage to the environment, the establishment of pine tree plantations is justified.*		
Q 23.	*The damage to the environment associated with the establishment of pine tree plantations is so great that no further development should be permitted.*		
Q 24.	*The statement by conservation groups that pine tree plantations are "green deserts" is true.*		
Q 25.	*Pine tree plantations are totally worthwhile, they cause no environmental damage and convert unproductive land into productive land.*		
Q 26.	*Although some species of wildlife cannot adapt to pine tree plantations, many species flourish in the plantation environment.*		
Q 27.	*Pine tree plantations are needed to ensure future generations an adequate supply of timber.*		
Q 28.	*The value of pine tree plantations more than compensates for the environmental damage they cause.*		

Q 29. ***How would you rate your attitude to pine tree plantations?***

1	2	3	4	5	6	7	8	9

Extremely Unfavourable — No Opinion — Extremely Favourable

Have you any comments on the need for pine forests?

THANK YOU FOR YOUR CO-OPERATION

17893—S. R. HAMPSON, Government Printer, Queensland