

Appendix 1

Live sheep exports from Australia

Table A1.1
*Exports of live sheep for slaughter
 1979-91*

Year	Number exported
	'000
1979	5245
1980	5622
1981	5799
1982	6302
1983	7303
1984	6838
1985	6782
1986	7072
1987	6975
1988	7028
1989	5360
1990	3531
1991	4040

Source: Derived from Australian Bureau of Agricultural and Resource Economics (various issues 1980-92b), *Commodity Statistical Bulletin*, Australian Government Publishing Service, Canberra.

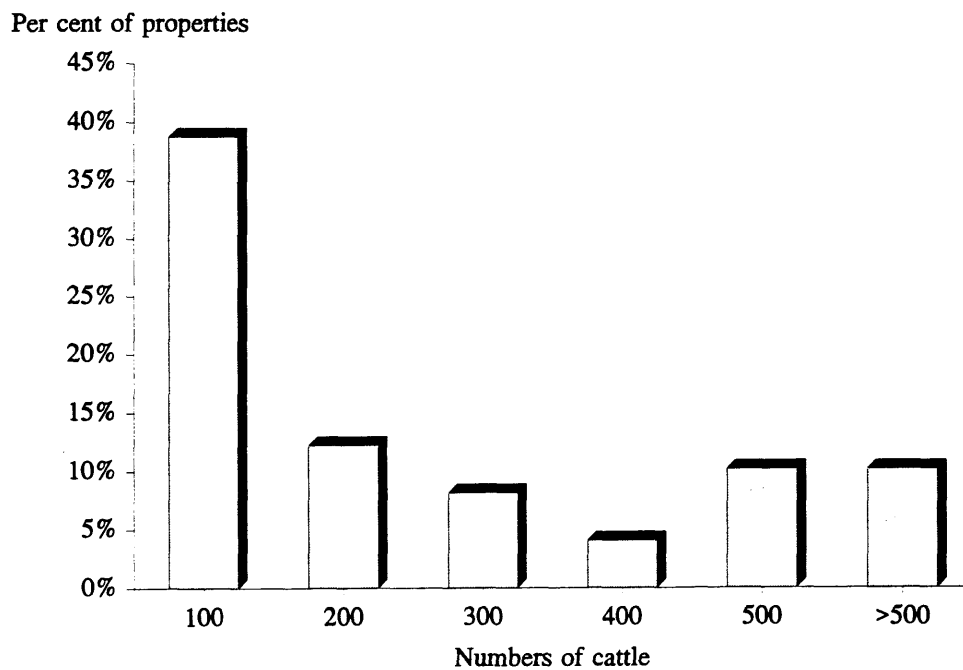
Appendix 2

Study area - Statistics and survey results

Table A2.1
Area of properties surveyed in each interview series

	Initial series	'Test' series
Average area	1 429	1 017
Total area	61 456	49 845
Number surveyed	43	49

Figure A2.1
Distribution of cattle numbers for 'test' series (1992)
 $n=49^a$



^a Percentages are calculated on all 49 properties in the sample, but the 8 properties with no cattle are not included in the graph.

Table A2.2
Total livestock numbers on 'test' series properties
n=45

Livestock type	1989	1990	1991	1992
Merino sheep				
superfine	36 825 ^a	38 902	46 900	44 487
	12 ^b	12	14	14
	27% ^c	27%	31%	31%
fine	74 085	76 238	69 242	69 636
	27	28	26	26
	60%	62%	58%	58%
medium	24 099	25 438	21 593	16 313
	13	14	12	9
	29%	31%	27%	20%
Non-merino sheep	20 212	20 694	18 686	16 117
	20	21	20	18
	44%	47%	44%	40%
Total sheep	155 221	161 272	156 421	146 553
	45	45	44	44
	100%	100%	98%	98%
Total cattle	11 567	11 017	10 939	10 932
	38	37	37	37
	84%	82%	82%	82%

^a Stock number

^b Number of properties with this stock type

^c Per cent of properties with this stock type

Table A2.3
Numbers of dry merino ewes in 'test' series flocks

Merino ewe type	1989	1990	1991	1992
Superfine	956 ^a	856	1 023	2 722
	6% ^b	5%	5%	14%
	4 ^c	4	5	7
Fine	1 135	892	1 185	2 273
	5%	4%	6%	11%
	5	4	5	7
Medium	500	500	500	600
	11%	11%	13%	15%
	1	1	2	1
Total dry ewes	2 591	2 248	2 708	5 595

^a Stock number

^b Per cent of breeding ewes

^c Number of properties

Table A2.4
Reasons for matings of merino ewes in 'test' group
n=45

	1989	1990	1991	1992
Merino breeding	37 283	39 687	38 832	38 151
	67% ^a	71%	71%	71%
XB replacements	2 310	1 770	2 669	1 552
	7%	4%	11%	7%
1X fat lambs	2 412	4 964	3 631	1 746
	13%	18%	16%	9%
Total matings	42 005	46 421	45 132	41 449
	73%	78%	82%	78%

^a Per cent of properties.

Table A2.5
Change in gender composition of sheep flock in study area

Sheep type	1982	1983	1984	1985	1986	1987	1988	1989	1990
Breeding ewes	1 368 049	1 377 856	1 467 595	1 465 709	1 435 179	1 399 826	1 415 937	1 410 815	1 438 787
Other sheep	115 375	115 129	109 122	119 088	144 416	124 992	126 549	123 249	165 665
Wethers	503 686	549 085	688 322	814 370	989 897	1 008 511	1 104 198	1 163 307	1 183 106
Lambs <1 year	620 962	827 223	718 849	797 837	828 004	733 702	837 263	840 210	909 766
Total sheep	2 608 072	2 869 293	2 983 888	3 197 004	3 397 496	3 267 031	3 483 947	3 537 581	3 697 324

Source: Australian Bureau of Statistics (various issues), *Livestock and Livestock Products, New South Wales*, Cat. No. 7221.1, AGPS, Canberra.

Table A2.6
Ewes mated and lambs marked in study area

	1982	1983	1984	1985	1986	1987	1988	1989	1990
Ewes mated	1 050 560	1 243 907	1 235 208	1 291 125	1 258 904	1 229 583	1 225 032	1 223 700	1 279 241
Lambs marked	932 119	1 073 427	1 174 288	1 255 384	1 242 319	1 111 721	1 214 435	1 225 035	1 272 706

Source: Australian Bureau of Statistics (various issues), *Livestock and Livestock Products, New South Wales*, Cat. No. 7221.1, AGPS, Canberra.

Table A2.7
Merino wether numbers in 'test' group
n=45

Year	Superfine			Fine			Medium			Total		
	Bred	Bought	Total	Bred	Bought	Total	Bred	Bought	Total	Bred	Bought	Total
1989	9 758	199	9 957	12 445	26 526	38 971	3 683	11 440	15 123	25 886	38 165	64 051
	22% ^a	4%	27%	27%	36%	58%	7%	22%	29%	56%	49%	91%
1990	11 204	277	11 481	12 925	24 936	37 861	3 853	10 817	14 670	27 982	36 030	64 012
	24%	4%	27%	29%	38%	60%	7%	24%	31%	60%	51%	93%
1991	11 535	1 269	12 804	14 334	19 070	33 404	4 399	7 130	11 529	30 268	27 469	57 737
	24%	7%	29%	31%	31%	53%	7%	18%	24%	62%	42%	87%
1992	11 870	1 228	13 098	13 939	18 850	32 789	3 971	4 790	8 761	29 780	24 868	54 648
	24%	7%	29%	36%	33%	56%	4%	13%	18%	64%	42%	89%

^a Per cent of properties

Appendix 3

Models of woolproducers' decisions

A3.1 Introduction to models

In chapter 6 a hierarchical decision process was outlined that was the theoretical basis for developing the models outlined in this appendix. This process is assumed to have two stages: Stage 1, a pre-attentive or unconscious stage in which options are eliminated using a type of elimination by aspects process; and Stage 2, a conscious stage in which an option is chosen using a form of maximisation subject to constraints. Chapter 7 contains an explanation of the procedures followed in the design, conduct and analysis of the interviews from which the models were developed and tested. This appendix contains a detailed description and discussion of each model developed for the study. A summary of the findings and conclusions can be found in chapters 9 and 10.

A3.2 Decisions to begin merino breeding

Of the 49 interviewed for the 'test' series, 23 were not breeding merinos in 1980, or when they took over management of the property where this was later than 1980. Of these, thirteen (or 56 per cent) eventually began merino breeding by 1992. As indicated in 8.6 most of changes to merino breeding occurred between 1987 and 1992 and were at the expense of three main enterprises, 2x prime lambs, bought wethers and cattle.

A3.2.1 *Trigger reasons for decisions to begin merino breeding*

A summary of the replies of those who made the decision to begin merino breeding is given in Table A3.1. It shows the number of times each reason was mentioned as the major reason and as a secondary reason. The frequency of the reasons reflects

the change over the period from 2x prime lambs, bought wethers and to a lesser extent cattle, into merino breeding discussed in chapter 8.

By far the major change was from prime lambs into merino breeding. For this change the most important trigger was continuing low lamb prices, a trend that has continued despite many producers leaving the industry. Prices for finished lambs do not, however, tell the whole story. During dry seasons like those experienced at the beginning of the 1980s and 1990s, producers had trouble finishing lambs, and often, were forced to sell many of their drop as store lambs. The interaction of seasonal conditions and store lamb prices are therefore important secondary factors influencing the supply of prime lambs. It is important to note that in many prime lamb producers' minds, it was the continuing poor returns from prime lambs that forced the change, rather than the high prices for merino wool. Often, the latter was the reason merino breeding was chosen over other options rather than the initial trigger for change, although sometimes it was both.

A further three people began breeding merinos when wool prices boomed, because they were forced to pay high prices for replacement (generally fine wool) wethers. Although they might have received a reasonable return from the wethers despite their cost, the wethers were considered 'too expensive'. They were concerned at the money they would need to outlay to buy the wethers and the risk of getting into trouble if prices fell. In this case high prices for merino wool and wethers encouraged some people to go into merino breeding rather than buying wethers although, as will be shown later, others were encouraged to pay the high prices for the wethers and begin a bought wether enterprise.

Two cattle producers were encouraged to begin merino breeding because of the profitability of the enterprise in the late 1980s combined with the presumed 'safety' of the Reserve Price Scheme. The extent to which the removal of a constraint can lead to change is illustrated by the situations where a change in available labour and/or interest in breeding merino sheep occurred, normally when young member(s) of the family returned or became old enough to take part in decisions about the property.

Table A3.1
*Reasons which initially triggered decisions that resulted in
 graziers beginning to breed merinos
 'test' series 1980-92*

Trigger reasons	Major reason	Secondary reason
	times	times
• Have a series of years of low lamb prices and/or crossbred wool prices resulted in low property returns?	3	2
• Have a series of dry springs or summers meant poor returns from fat lambs due to costs of finishing lambs and/or because of low store lamb prices?	1	2
• Have you been unable to buy suitable replacement wethers at a cost which does not mean a large cash outlay and the risk of a loss if prices fall?	3	0
• At current prices for merino wool and cull sheep is the return from merino breeding noticeably greater than from your existing sheep enterprises?	2	1
• At current prices for merino wool and cull sheep is the return from your property likely to be noticeably improved by starting a merino enterprise rather than run all cattle?	2	0
• Has there been an increase in available labour and/or interest in breeding merino sheep?	1	2
• Has the risk of having to eradicate footrot carried by bought ewes or wethers prompted you to consider breeding rather than buying?	0	1
• Have you been unable to buy suitable replacement 1x ewes at a cost which is likely to result in an acceptable return?	0	0
• Have you bought or leased more land since last winter?	0	0
• Other reason	1	0

Three reasons in the list were not important triggers for producers in the 'test' series but are mentioned because they were relevant to producers in the initial series.

A3.2.2 *Situations that may have prompted a decision to begin merino breeding*

The sixteen producers from the 'test' series who were not breeding merinos between July 1989 and June 1990 were shown the list of reasons that had initially prompted other producers to make a decision to begin merino breeding. When asked, for each year between July 1989 and June 1990, if these situations had arisen, twelve indicated one or more of the situations had arisen, one mentioned another reason that was not listed, while three said no situations had arisen to prompt them to consider merino breeding. As a result, four producers made the decision to begin merino breeding, purchased merino ewes, and mated them to merino rams.

The frequency with which each reason was mentioned, in each year and for the total period, is given in Table A3.2. Not all the reasons were relevant to every producer in every year, for example, questions dealing with replacement 1x ewes and merino wethers were only relevant to producers who had the enterprise in the year in question.

The concerns of prime lamb producers in recent years over continuing low prices and problems of finishing lambs because of dry seasons feature prominently. A typical comment was:

'We had trouble finishing prime lambs. . . . were carrying 2x lambs into the following winter and had to grow crops to try and finish them every year. Lot of work for what we got out of them.'

Considering the high wool prices in the 1989-90 season it is perhaps surprising the profitability of merino breeding received so few mentions, but many producers appeared to filter and ignore information about price changes. After the collapse of wool prices, the high return from merino breeding was no longer mentioned. These answers give further credence to the idea that in an uncertain and ambiguous environment, like the grazing industry in Australia, graziers are more likely to make changes

Table A3.2
*Number of times trigger reasons for beginning merino
 breeding were mentioned as having arisen
 'test' series 1989-92*

Situation	Times situation arose			
	89-90	90-91	91-92	Total ^a
• Have a series of years of low lamb prices and/or crossbred wool prices resulted in low property returns?	3	3	5	11(29)
• Have a series of dry springs or summers meant poor returns from fat lambs due to costs of finishing lambs and/or because of low store lamb prices?	2	4	4	10(29)
• Have you been unable to buy suitable replacement wethers at a cost which does not mean a large cash outlay and the risk of a loss if prices fall?	0	1	0	1(31)
• At current prices for merino wool and cull sheep is the return from merino breeding noticeably greater than from your existing sheep enterprises?	4	0	0	4(40)
• Has there been an increase in available labour and/or interest in breeding merino sheep?	1	0	2	3(40)
• Have you been unable to buy suitable replacement 1x ewes at a cost which is likely to bring an acceptable return?	0	0	0	0(29)
• Has the risk of having to eradicate footrot carried by bought ewes or wethers prompted you to consider breeding rather than buying?	0	0	0	0(38)
• Have you brought or leased more land since last winter?	1	0	1	2(40)
• Other reasons?	1	0	0	1(2)

^a Numbers in brackets indicate the times this was a relevant question to ask, e.g., the first two reasons were only relevant to producers in the years in which they had a fat lamb enterprise.

because of something going wrong with the existing system than because another system may be better - otherwise known as 'better the devil you know, than the devil you don't know' syndrome.

The decision to begin merino breeding can involve at least two identifiable decisions: a decision to begin merino breeding; and a decision about which micron type of merinos to breed. These decisions can be considered to occur sequentially and therefore are initially triggered by the situations discussed above. A failure to pass one aspect or constraint in either of these decisions may lead to the abandonment of an attempt to begin merino breeding. For instance a person may go to several sales to buy a particular type of merino ewe, but be outbid on the day because the price is above what they have to make the purchase. This may lead to a delay in carrying out the decision and subsequently abandonment of the attempt to begin breeding.

A3.2.3 Models of decisions to begin merino breeding

Each of the trigger reasons to begin merino breeding could in theory have been linked with a separate model since the reasons often arose because of specific situations (e.g., a change from bought wethers; a change from prime lamb production; or a change from beef production). In practice it was found that models for each of the trigger reasons had several constraints or aspects in common. Each trigger reasons with its relevant aspects is given in Figure A3.1a, Figure A3.1b and Figure A3.1c, while the remaining aspects of the decision to begin merino breeding are given in Figure A3.2. Each branch has two numbers that show the cases from the 'test' series that passed that branch of the model. The first number shows those who passed that branch for decisions made between July 1989 and June 1992. The second number (in brackets) shows the branches passed by the nine producers who began merino breeding between 1980 and July 1989.

Following on from the initial situation that 'triggered' a producer to think about a change, came a consideration of the options. This has been simplified to involve a consideration of one option, merino breeding. The most common criterion was that merino breeding would be at least as profitable as the alternative sheep enterprises at current prices. It is the ordering aspect of the decision. Frequently this is what

Figure A3.1a

Reasons for decisions to begin merino breeding

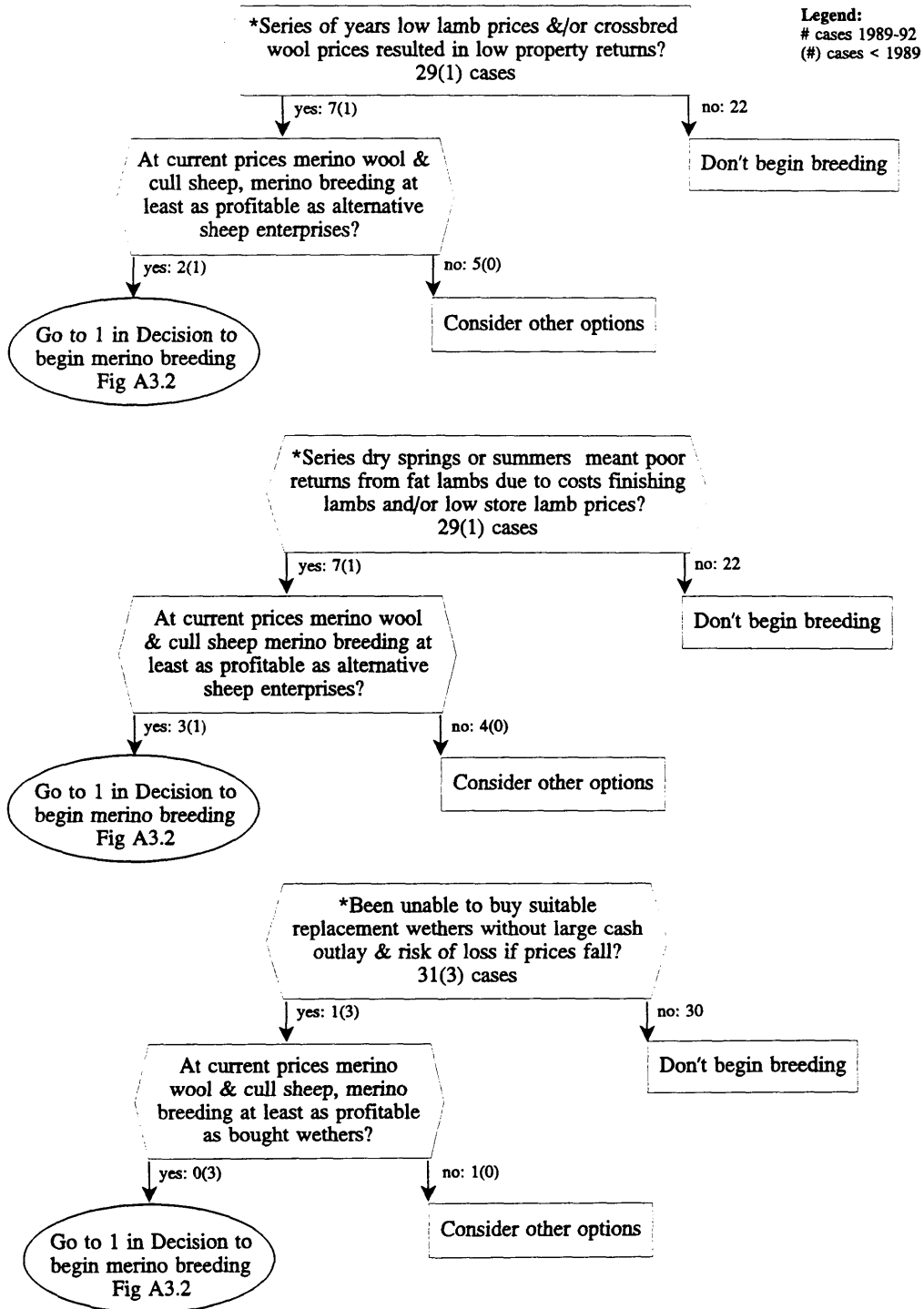


Figure A3.1b

Reasons for decisions to begin merino breeding (continued)

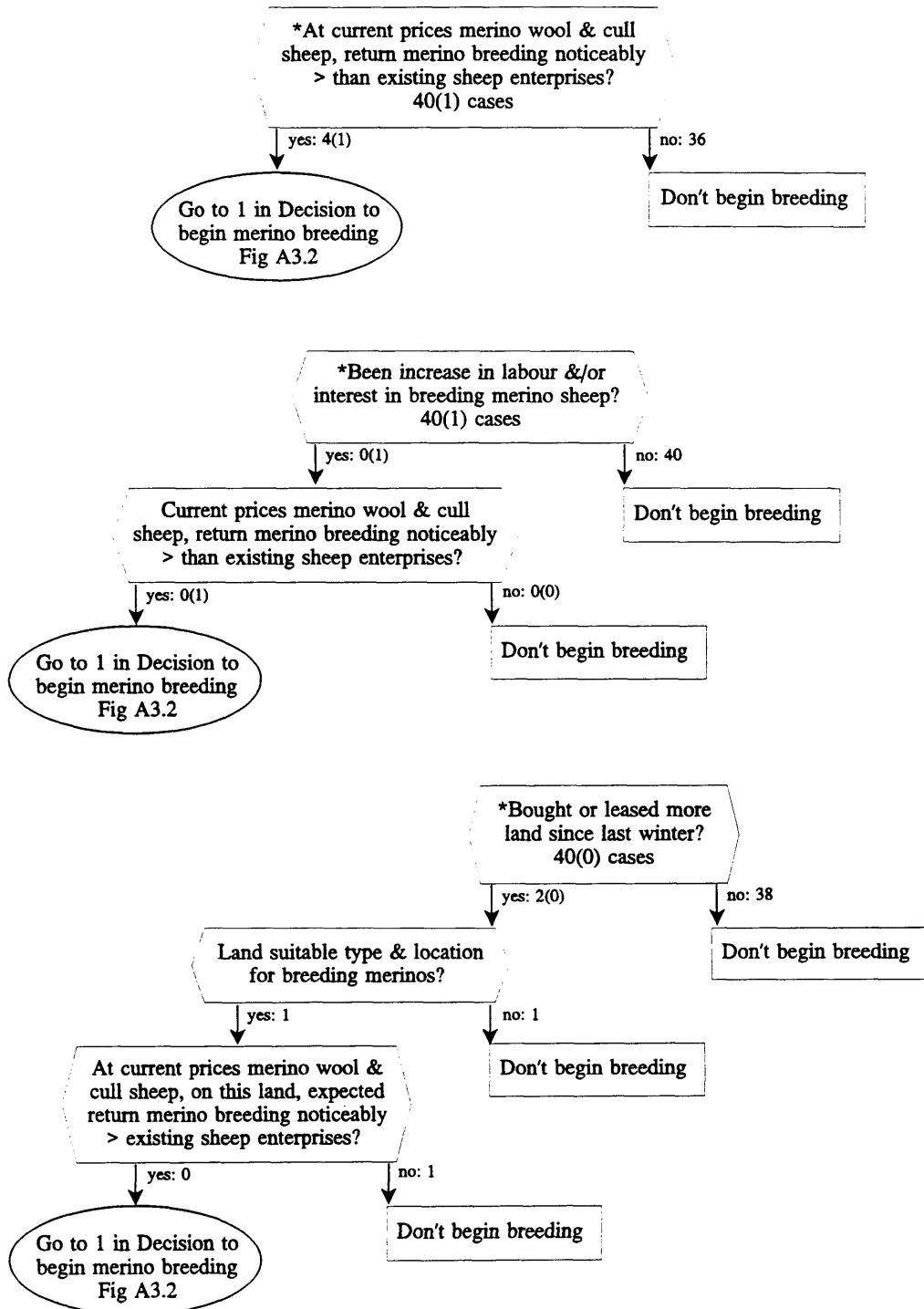


Figure A3.1c

Reasons for decisions to begin merino breeding (continued)

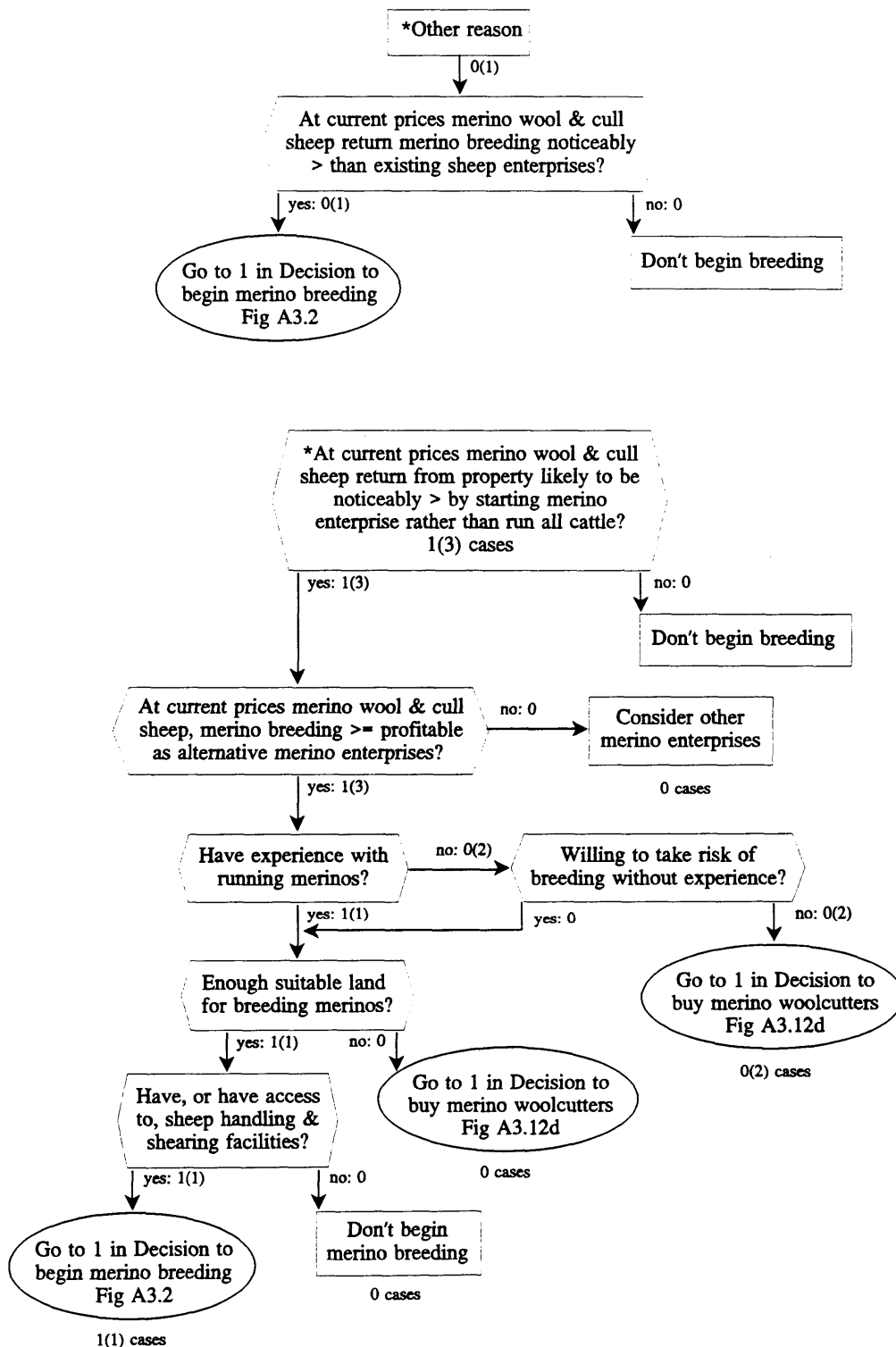
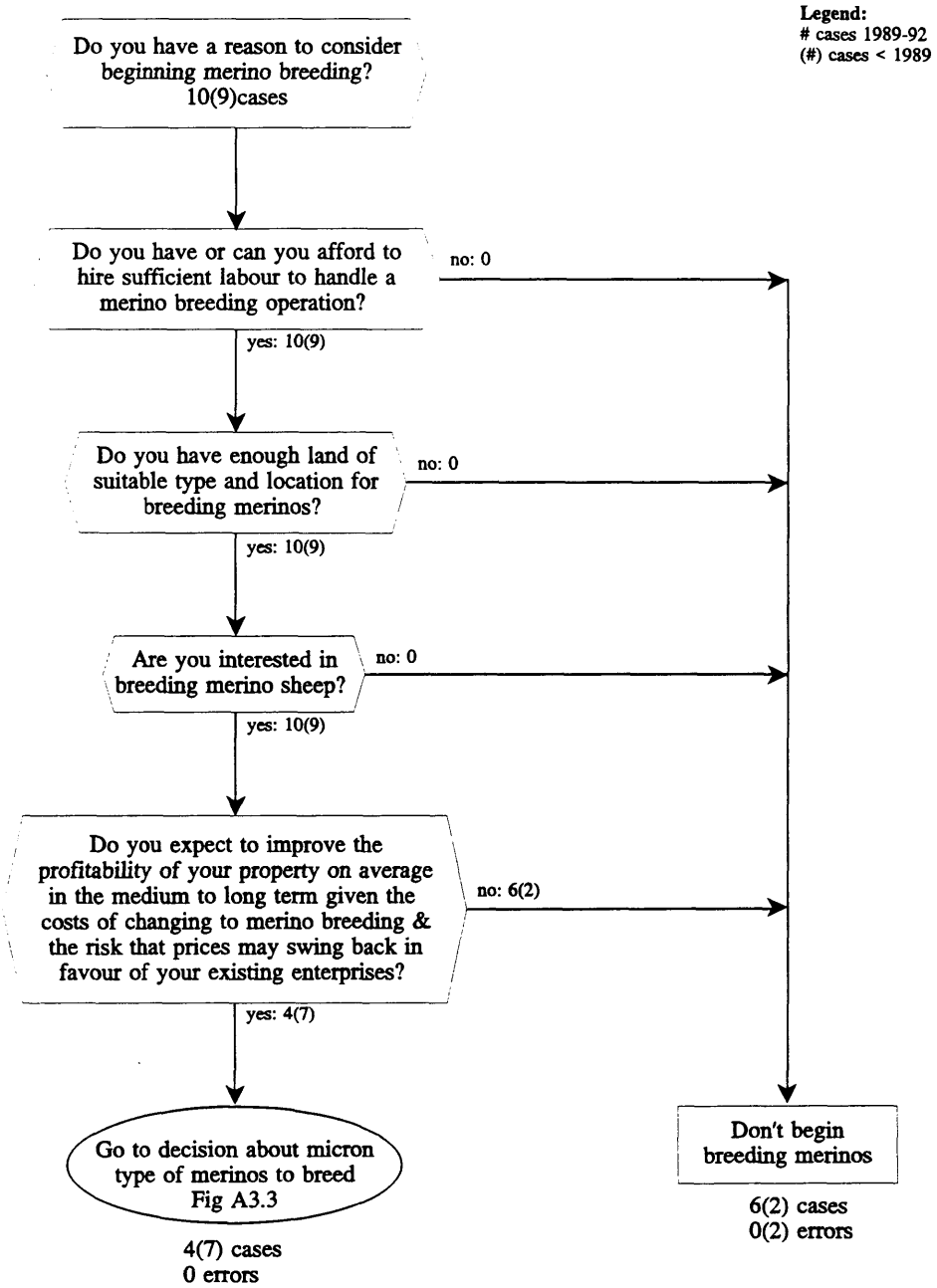


Figure A3.2

Decision to begin merino breeding



appeared to occur, since one option tended to stand out from the others. If merino breeding was eliminated as an option, the model assumed producers evaluated other options (e.g., merino wethers or cattle). In reality many alternative enterprises were eliminated unconsciously, by a series of aspects (e.g., wheat and other grain crops were not considered in most areas since the climate and soils were not appropriate). Cattle were eliminated as replacement enterprises for prime lambs or wethers commonly because of the problems associated with running them in drought years. Not all options were relevant to each producer, nor were all aspects relevant to each option. If all the options had been included, the model would have been extremely complex to represent and use for questions. It was decided to apply the simpler form.

Purchase or lease of extra land was a factor that sometimes induced a producer to change enterprises. It may have been more complex than the statement in the model implies because purchase of land may have been motivated by desire to get into an enterprise for which the existing land was not suited. The model presented in Figure A3.1b assumes the purchase of the land and proceeds from there. Two related aspects were important before land was used for merino breeding: whether the land could run breeding ewes; and whether the location was a suitable distance from the homestead and/or free from vermin such as foxes or packs of dogs.

The model of the change from cattle into merino breeding was not formally tested. It was developed from interviews conducted in the 'test' series rather than the 'initial' series since no-one in the 'initial' series changed from cattle into merino breeding. It is included because it provides insight about a change that required the consideration of additional aspects from those required for a change from wethers or prime lambs. Of particular relevance was experience with merinos. The model shows four cases entering the model initially, but only two passing through to begin merino breeding. This occurred because both of the people who eventually changed from cattle in to merino breeding delayed the change initially because they did not have experience with running merinos. They were unwilling to make the change without first obtaining some experience. Instead they purchased merino wethers that were run for a period until they felt confident enough to begin breeding. Another

aspect that was relevant to this situation was availability of a shearing shed and sheep yards. In both these cases facilities were available (at least nearby) so they did not delay the decision in any substantial way.

In effect, the models developed from the 'initial' series of interviews were incomplete because three of the thirteen people who began merino breeding were initially prompted by factors not included in the models. Although the other factors in the models were relevant to one of these cases, for producers changing from cattle to sheep, extra aspects were considered.

After passing the initial criteria, the models imply producers considered other criteria (Figure A3.2) leading to an in principal decision to begin merino breeding. The land and labour criteria were unimportant because they were passed by all eight cases from the 'test' group. Most of the properties had suitable land for breeding merinos, however, some producers do not. Labour can be a constraint occasionally, because breeding requires more labour than cattle and dry merinos. Some older graziers had given up breeding and continued with wethers because of this factor while others had taken up breeding after there had been an increase in family labour. It is also likely that these two aspects may have operated at both a pre-attentive and conscious level, although at different degrees of restriction. For example, merino breeding may have been eliminated pre-attentively by producers who had only rough undeveloped country. They would not necessarily be covered by the structure of this model. Other producers with land that was not so marginal would be less likely to eliminate merino breeding pre-attentively, but might have eliminated it after conscious reflection.

While producers were prompted to consider merino breeding by a change in prices (or other factors) which made merino breeding more profitable than their existing enterprise combination, and had passed the other aspects mentioned, many were still reluctant to take the plunge. Commonly this was expressed as a deliberate strategy developed to handle their incapacity to figure out the direction in which markets were heading. This reluctance was expressed in several ways. They expressed the view that they did not believe in 'chasing rainbows', or 'chasing your tail', and that 'by

the time you get changed, things change back' and that they had 'never seen anyone that did come out ahead'. Despite their holding a view of prices as acting like a 'pendulum', and the risk of being 'up the creek' if change was made, some graziers made changes in certain situations. Therefore, these statements were not suitable as decision criteria. They did not divide the population accurately into those who did change and those who did not change.

So that a decision criterion or criteria could be developed, graziers construct systems in these situations were elaborated using laddering techniques derived from Personal Construct Theory. It became apparent this type of change involved altering their medium to long term strategic orientation. An assessment was being made of the likely costs and the benefits of the change over this period. However, it was not sufficient for the expected returns to outweigh the costs. A change normally involved an outlay of money that may have put the business at risk if things did not turn out as expected. Since graziers were aware from experience that prices for their products tended to go in cycles, and that they could not predict these cycles, they had developed an 'aversion' to making major changes in their enterprise mix in response to changes in prices.

An attempt was made to use separate criteria for the extra expected return and risk aspects of the decision. However, it became apparent what was involved was a tradeoff between the extra expected return and the perceived risk or concern about the consequences of failure. The criterion finally chosen was:

Do you expect to improve the profitability of your property on average in the medium to long term given the costs of changing to merino breeding and the risk that prices may swing back in favour of your existing enterprise.

When producers who had passed all other criteria were asked why they had decided not to go ahead with merino breeding their comments were generally of the 'chasing rainbows' type. However, when they were asked for their reaction to the criterion above, they invariably answered to the effect that this was why they had not changed.

It is also an important criterion, as judged by the way it splits the cases, although, the model shows it led to two errors in prediction. Both these cases arose with producers

who started a breeding operation after wether prices increased substantially. The problem was the criterion stated that merino breeding would lead to an improvement in profitability. Improvement in profitability was not their concern. They were satisfied if the change to merino breeding maintained rather than improved profitability, since their reason for change was to decrease the risk of having to pay high prices for replacement wethers. The model of the decision to begin merino breeding would therefore be improved by using a separate model, with an adjusted criterion, for those who switched from wethers because of high purchase prices.

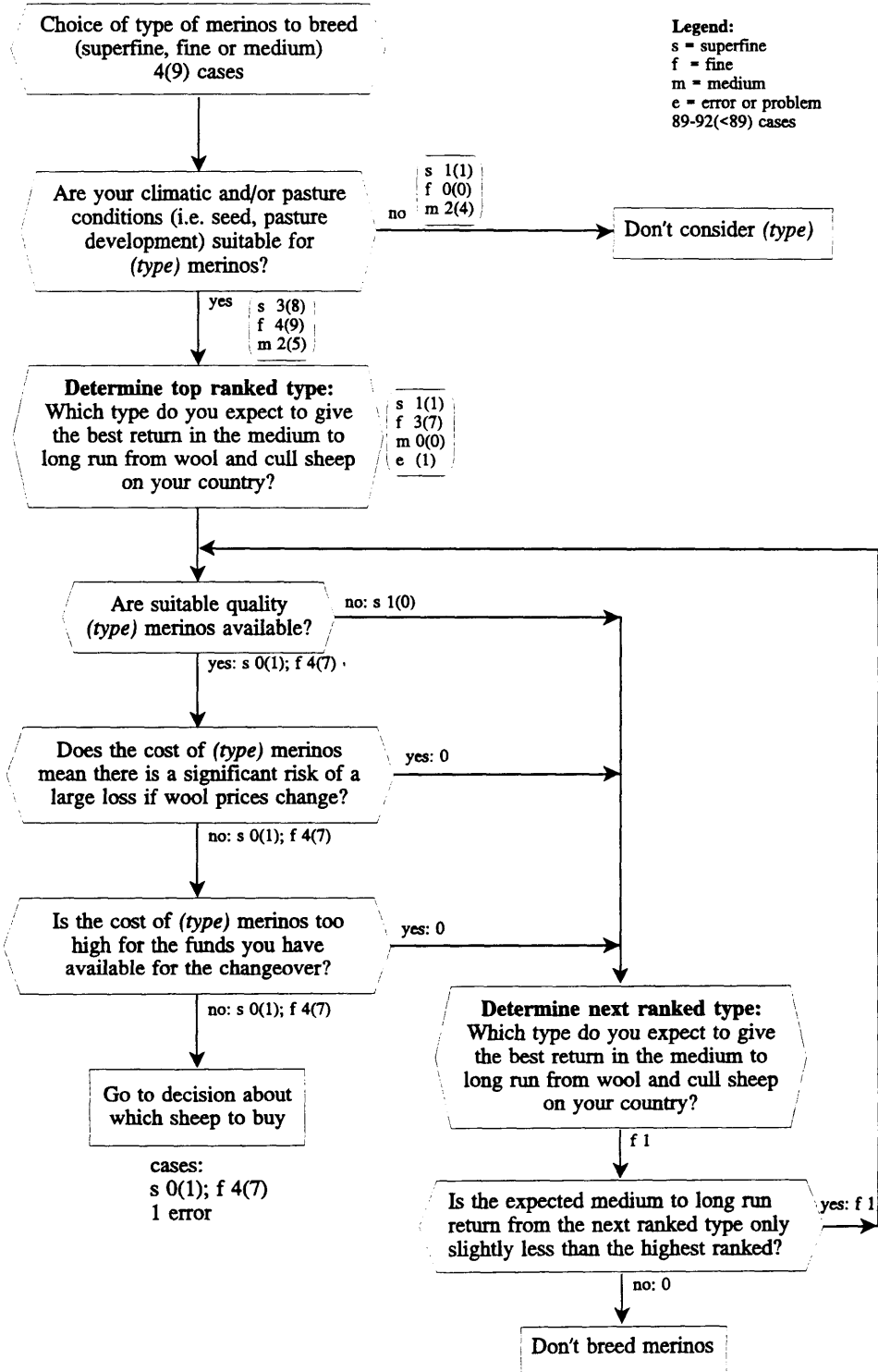
Other criteria, such as experience with breeding, and availability of suitable equipment, could also be included in the model, and were tested in earlier versions. Except for someone changing from a beef operation, they were not relevant to the producers interviewed since experience and equipment from other sheep enterprises appeared sufficient.

A3.2.4 *Decisions about micron type of merino to breed*

A decision to begin merino breeding also required a judgement about the micron type of merinos to breed and the opportunity to buy the chosen type of merino in the marketplace. This decision is represented in Figure A3.3. As a simplification, the decision was limited to a choice between three types of merinos: superfine, fine and medium. While the micron of fleeces from sheep in merino flocks on the Northern Tableland would follow a normal distribution, and generally range across more than one of the micron types mentioned above, wool producers tended to identify their flocks by reference to one of these categories. Anyhow, the average micron of a flock can also vary quite considerably from season to season because of nutritional factors. A strong/comeback type was also included in preliminary models, but it was never considered seriously as an option by wool producers in the area. In effect it was eliminated pre-attentively on the grounds of unsuitability to the climatic conditions of the area, and as considerably less profitable than the other types.

Producers who reached the decision about the type of merino to buy, sometimes simplified the choice by eliminating particular types of merinos using a criterion that judged the suitability of the type to the climatic and pasture conditions of the

Figure A3.3
Decision about micron type of merino to breed



property. Superfine merinos were not considered by some producers because of grass seed problems, generally in the western parts of the area, while some soils and pastures were considered too developed or rich for producing superfine wool. Excessive grass seed reduces the price advantage enjoyed by clean superfine wools over stronger wools. Medium wools on the other hand were generally rejected in the higher rainfall areas because they were considered more susceptible to fleece rot and other wool quality problems.

The next criterion served as the ranking aspect for the model. Graziers tended to choose the type of merino they wished to breed by deciding which they expected to give the best medium to long run return on their property. As indicated in Figure A3.3, in 10 out of 13 cases they chose fine-wool merinos. This does not imply fine-wool merinos were the most profitable at the time the decision was being made, since often superfine merinos were more profitable. The long term view was generally based on historical knowledge: 'go on what area has historically produced', or '. . . fine wool on borderline of both medium and superfine wool . . . get the benefits of both'; or an expectation of future price based on the supply of the various wool types: 'not every area in Australia can grow clean fine wool'. Return from culls was also a consideration, in particular the size of wethers demanded by the boat wether market; superfine wethers being too small.

An error occurred with this criterion due to the division of merinos into fixed categories. One producer wanted to buy sheep that were on the borderline between superfine and fine rather than exclusively in either of the categories.

After a type of merino was chosen, the next criteria detected if the grazier bought this type or was forced to buy another type. Three criteria were included here, although two did not change the decision for those interviewed in the 'test' group. At the peak of wool prices superfine merinos were difficult to buy. Superfine merinos are inherently infertile and hence few good sheep are sold in normal times. However, when prices increased superfine producers were encouraged to hang on to their stock, creating a shortage of quality sheep. Those that were available were sold at historically high prices. In the 'test' series one producer wanted to buy superfine

sheep but was unable to find suitable quality ewes to buy. Since the sheep were not available and the medium to long run advantage in return over fine-wool sheep was small, he bought fine-wool sheep instead.

The remaining two criteria deal with the problem of buying sheep when prices were high. Most of those who bought sheep at high prices were concerned about the purchase cost. This concern appeared to take two main forms. A natural caution about buying sheep when they were expensive. They were aware from experience that prices tended to go in cycles and were wary about buying 'expensive' sheep. The second constraint was a capital-risk constraint. In most situations producers needed to borrow money to buy stock. Their attitude to borrowing money and the attitude of their creditors tended to place a cap on the money available. In two instances in the 'initial' series the purchase of sheep was delayed because the producer was outbid at auction (more than once). Prices for the sheep were bid above the funds they had available, or were willing or able to borrow. In both these cases they were unwilling to buy another type of sheep and therefore the purchase of merino ewes was delayed for a year or more. Only one criterion was used for these two aspects when this model was initially developed, but producers said they considered them as two separate factors.

For the period July 1989 to June 1992 (for the 'test' series of interviews), a situation arose that may have initiated a decision to begin merino breeding on 24 occasions. Only four of these finally resulted in a decision to begin merino breeding. All four purchased fine merinos.

A3.3 Decisions to stop merino breeding

Only one of those interviewed in the 'initial' series had stopped merino breeding so it was not possible to develop detailed models of this decision. Nevertheless, the issue was raised during the interviews. It was possible to elicit several factors that might have stimulated such a decision, along with criteria that would have been relevant. These enabled the development of preliminary models to use as a guideline in the 'test' series of interviews.

Four properties from the 'test' group ceased merino breeding between 1980 and 1992. These occurred in 1981, 1985 and two in 1990-91. Each case occurred for different reasons although the criteria considered were often similar. A list of the trigger reasons that may have initiated a decision to stop merino breeding is given in Figure A3.3.

The property that stopped breeding in 1981 had only been taken over by the present owners shortly beforehand. At the time it was running a self-replacing merino ewe and wether enterprise and a 2x prime lamb enterprise. This was a complex enterprise to run and the fencing was poor which created problems in keeping separate the two lots of ewes and rams. To simplify management it was decided to stop merino breeding. At the time prime lambs were slightly more profitable than merino breeding so profitability was not a constraint.

Both properties that stopped merino breeding in 1991 had only started a couple of years earlier because of the boom in wool prices. One property was in a high rainfall area and had been a cattle fattening and trading operation. The manager was attracted to merino breeding by high wool prices and the stabilised marketing system. When prices began to decline they switched back to cattle because they expected a total collapse in the wool market. The owner of the other property had been in 1x lambs and wethers and was attracted to merino breeding by good wool prices, but also by the high prices of replacement wethers. Lack of experience with breeding resulted in low lambing percentages and poorly grown young sheep. When wool prices collapsed, followed by wether-replacement prices, buying appeared more profitable than breeding and the 'experiment' with merino breeding was abandoned.

Of the 38 properties that were breeding merinos between 1989 and 1992 only 11 said that any situation had arisen that had made them consider (no matter how briefly), ceasing to breed merinos. This is despite the collapse in wool and sheep prices and the drought conditions in 1991 and 1992.

Preliminary models of decisions to stop merino breeding are given in Figure A3.4a and Figure A3.4b. They have not been formally tested and are based on very limited

Table A3.3
*Trigger reasons for decision to stop merino breeding
 'test' series 1980-92*

Situation	Trigger	Times situation arose ^a				Total
		80-89	89-90	90-91	91-92	
Does an increase in age, loss of man or similar factor mean there is less labour to handle merino breeding?	1	0	0	1	1	
Have management problems made you consider alternatives to merino breeding?	1	0	0	0	0	
Have recent climatic conditions highlighted the unsuitability of your country for breeding merinos?	0	0	1	1	2	
Is the expected return from mating your merino ewes this year to fat lamb rams significantly greater than the expected return from mating the ewes to merino rams	0	2	4	6	12	
At current prices for merino wool and cull sheep is the return from your (<i>type</i>) merino breeding noticeably less than the return from alternative sheep enterprises?	0	0	2	2	4	
At current prices for merino wool and cull sheep is the return from merino breeding noticeably less than the return from a cattle enterprise?	0	0	1	2	3	
Other reason	0	0	1	0	1	

^a During the period July 1989 to June 1992 out of 105 occasions when the question was relevant. Includes 2 times when there was more than one situation arising in one year.

data, being derived from information in both series of interviews. The numbers given with each model show the type of response given by interviewees from the 'test' series, although they were not always asked these questions directly, since some questions are derived from their responses.

The first model in Figure A3.4a deals with situations in which a decision to stop merino breeding is stimulated by labour and management factors. For instance, inadequate fencing or increasing age may force a grazier to consider changing away from merino breeding to enterprises that are not as dependant on these factors. In this instance maximising profitability of the property is not as important as generating sufficient income to meet needs. The error in this model arose because low wool prices had forced one grazier to lay off labour. There was still sufficient labour to handle a reduced breeding operation and the view was taken that in the end it was still advisable to continue with merino breeding because it decreased the risk of having to pay high prices for replacement wethers in the longer term.

Another factor dealt with in Figure A3.4a is the possibility of mating the core of the breeding flock to prime lamb rams rather than merino rams. In some years the expected return from mating merino ewes to prime lamb rams might be expected to be greater than from mating them to merino rams (Figure A3.4a). In any particular year this is a decision that could improve cash flow, in the short term. In the longer term it could not be continued as the replacements would not be generated to maintain merino breeding. Even in the short term it would only be considered in more extreme circumstances unless a decision was being taken to stop merino breeding for good. In the 'test' series one person gave up merino breeding via this route, but no-one undertook it as a temporary measure. Generally the gains to be made were considered insufficient to make up for the disruption it would cause to the breeding program. However, if wool prices were to remain low and 1x lamb prices to rise substantially, more people might be tempted to follow this route in the short and perhaps longer term. The model might need to be expanded to include other factors to handle this case.

Figure A3.4a
Decision to stop merino breeding

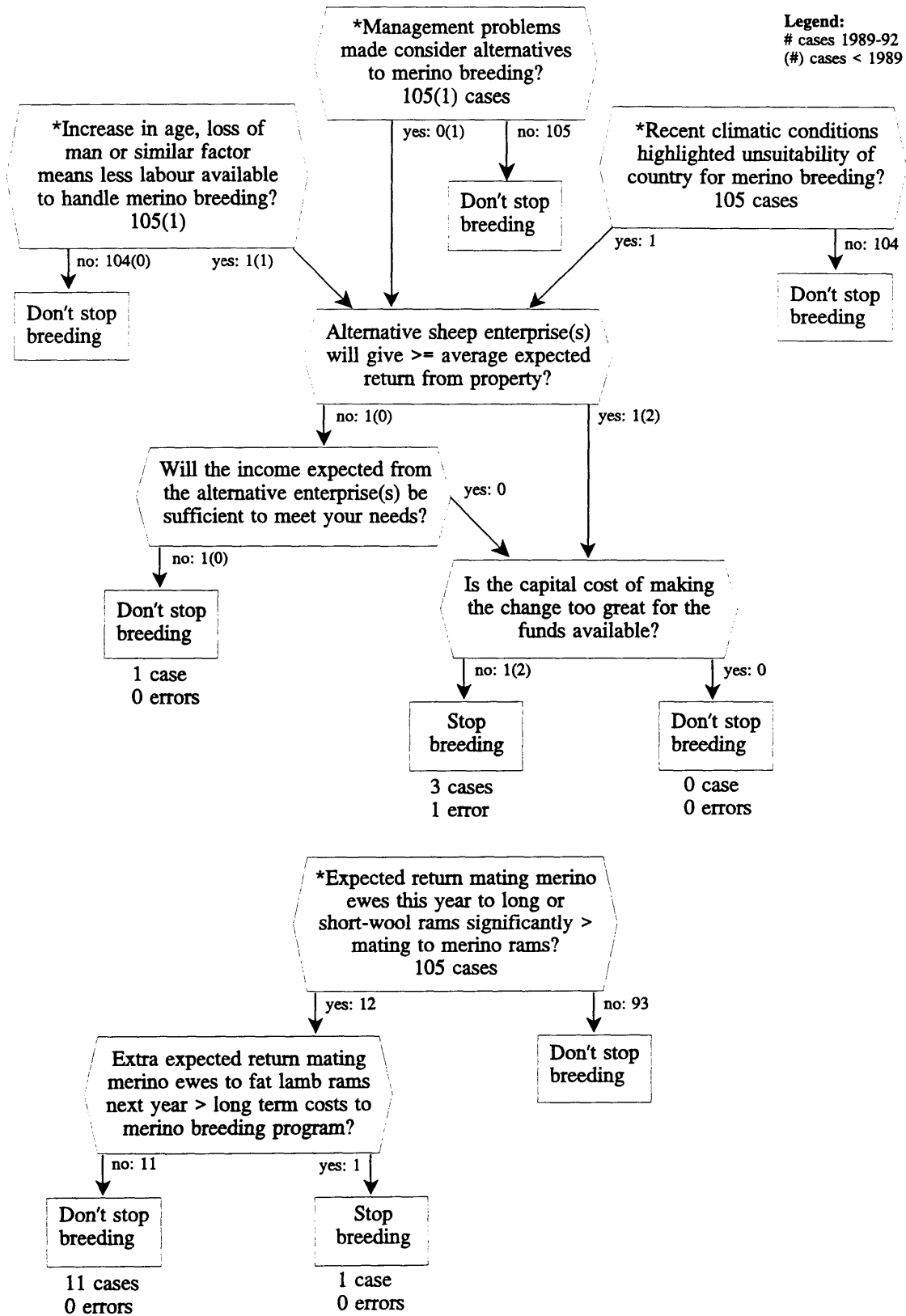
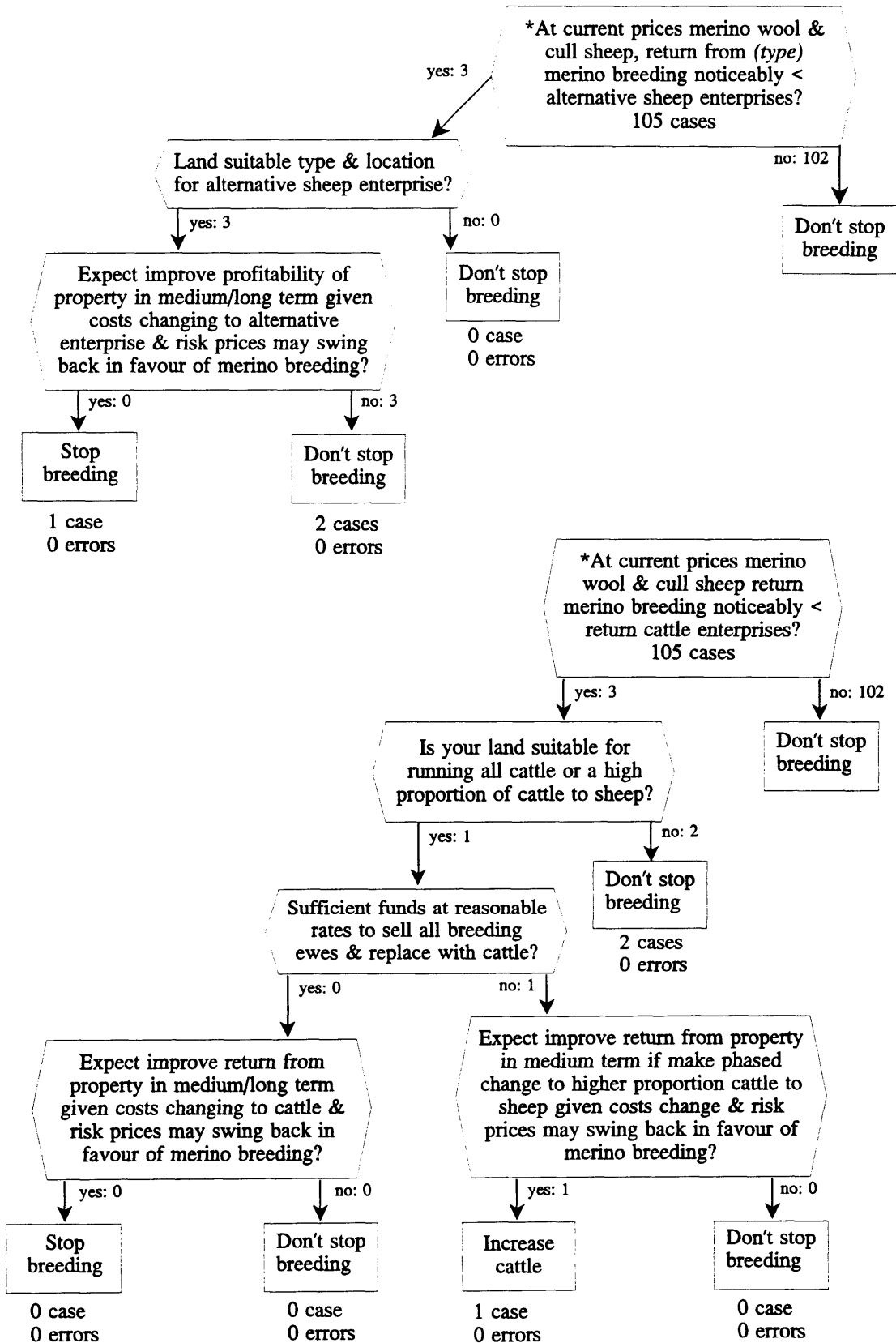


Figure A3.4b
Decision to stop merino breeding (continued)



Two other reasons that stimulated decisions to stop merino breeding were a recognition of greater returns from other sheep enterprises (other than 1x prime lambs), and from cattle enterprises (see Figure A3.4b). The first of these two models is very general because of the limited opportunity to make it more specific. Consequently, although it gives correct answers, it does not reflect fully the underlying factors that influenced the decisions. For instance, one individual considered buying store lambs and fattening them to replace merino breeding, at least in part. The opportunity was rejected by the profitability criterion, but this is not the whole picture. A dry season, which looked like continuing dry, was the reason it was not profitable. The main difficulty with expanding this section of the model was that very few graziers had changed (or considered changing) from merino breeding enterprises to other sheep enterprises in recent times. The few who did had idiosyncratic reasons that made it difficult to develop a descriptive, general model.

When graziers considered changing to a cattle only enterprise, two important considerations were: suitability of the country (mainly determined by rainfall); and the extra capital cost of replacing sheep with cattle. In all except the high rainfall areas of the New England, almost all graziers considered the climate to be too dry and unreliable to run an all cattle operation. Consequently cattle are generally complementary to sheep, although sometimes they may make up to around half the livestock units carried on the property. In addition, most graziers still remember vividly the beef boom and collapse of the 1970s, and are wary of costs associated with a change to cattle and the effect this might have on their financial viability.

A further error occurs with these models because they do not include one property that completely stopped merino breeding and returned to cattle. Here the change was triggered by what was perceived as the impending collapse of the wool market and the Reserve Price Scheme. Interestingly, this was the only case from the 95 interviews where this was predicted, and acted on, before it occurred. The latter part of the model of the change from merino breeding into cattle is relevant to this decision (Figure A3.4b). It would require a different beginning, apart from the trigger reason, because the prediction was based on an assessment of future market

direction that went beyond the assessments of producers and most public commentators.

Because very few people stopped (or considered stopping) merino breeding between 1980 and 1992 it was difficult to obtain an accurate, general picture of the factors involved in the decisions. Merino breeding is a core enterprises of the New England Tablelands and comments from graziers suggest it will remain so. Therefore, a long term trend against wool will need to be apparent before many producers will change out of breeding. Even then many will attempt to 'sit it out' in the belief that when it 'comes back' they will 'get the benefit'. If changes are made to the breeding enterprises they may be marginal and spread over several years so that the core of the enterprise is maintained.

A3.4 Decisions to change the micron of merino breeding flocks

While there was little incentive to change from merino breeding to other sheep enterprises during the period covered by this study, there was considerable incentive for those already breeding merinos to change to breeding finer merinos. As indicated by Figures 2.2 and 2.3, beginning in the 1983-84 season, the price for finer micron wools began to draw ahead of the prices for broader wools. This created a substantial differential between the prices of finer and broader wools that persisted until the 1991-92 season; creating a substantial advantage for finer merinos that overcame their inherently lower wool weights. Even more importantly the largest gains were made by the finest wools.

In the 'initial' series of interviews three reasons were found to have initiated decisions to change the micron of breeding flocks. The most important of these was of course a change in the differential in prices for the different microns of wool. The other two were: acquiring land perceived as suited to a different type of merino; and pasture quality and its interrelationship with premiums or penalties for quality of the clip. The same pattern emerged in the 'test' series of interviews with a change in return because of change in wool prices being the major trigger reason.

Before July 1989 three properties changed to a different micron type of merino (e.g., fine to superfine). Two went finer and one broader. Both those who went finer did so because of the differential in wool prices, although one of these was not a conscious decision, but a consequence of a breeding index used to select rams and ewes that place some emphasis on the value of wool. The property that went broader did so because of grass seed problems in superfine wool that negated the premiums paid for clean superfine wool.

A model of the factors involved in decisions to change the micron of the merino breeding flock is shown in Figure A3.5a. It contains three decisions:

- (a) to change to another micron type of merino (either finer or broader);
- (b) if yes to (a), to make the change by breeding or buying;
- (c) if no to (a), to breed for a flock with marginally finer or broader micron.

Between July 1989 and June 1992 the model was tested on 103 cases, of which 37 were superfine flocks, 57 were fine flocks and nine were medium flocks. The initial trigger question asked producers if at current prices finer or broader sheep than their existing merinos would bring a better return. At the beginning of the period it was generally considered that flocks with a finer micron were bringing the best return, while towards the end of the period the situation switched with there being some support for broader micron flocks (Table A3.4).

In 1989-90 most superfine producers did not consider they had any incentive to try to breed finer, while none considered there was an incentive to go broader. By 1991-92 one-half felt they would receive a better return if they had broader merinos. Approximately 70 per cent of fine-wool producers and all of the medium-wool producers believed they would have received a better return if they had finer merinos in 1989-90. Since the trend of prices had been towards finer wool for a considerable time before 1989-90, and much media attention had been paid to the high prices being received for fine wool, this result would be expected. Despite this some still did not consider finer wools would bring a better return on their property.

Table A3.4
*Times a finer or broader micron flock would have given a better return
 'test' series 1989-92*

Initial type	Year								
	89-90			90-91			91-92		
	finer	broader	no	finer	broader	no	finer	broader	no
superfine	2	0	11	2	3	7	0	6	6
fine	12	0	5	3	1	15	3	4	15
medium	3	0	0	0	0	3	0	0	3

Whether these were accurate readings of the situation, or due to other factors (for example, lack of information to compare different flocks, or a deliberate policy of ignoring trends) is not clear. Some people mentioned they did not know enough about wool weights of finer flocks to make an accurate assessment. Probably both explanations have merit. Either way some wool producers do not consider change even when quite considerable changes in prices occur. On the other hand many follow price trends quite closely as is shown by the fact that almost all fine and medium producers considered the advantage for fine-wool flocks had disappeared by 1992. Some even suggested broader flocks had an advantage.

Three main aspects were relevant to producers who considered a change in the micron type of merinos they were breeding. First, climatic and/or pasture conditions had to be suitable to the different sheep. Sometimes a finer/broader sheep may have been favoured by prices at the time, but the climatic or pasture conditions were considered unsuitable for running the different micron type. Second, a judgment was made whether another micron type would give a better return at current prices. In a few cases although sheep of a finer (or broader) micron were considered likely to provide a better return at current prices, this did not extend to a finer (or broader) micron type.

While these two factors eliminated some alternative micron types from further consideration, and in some of these meant a major change was not considered, by far

Figure A3.5a
Change micron of merino breeding flock

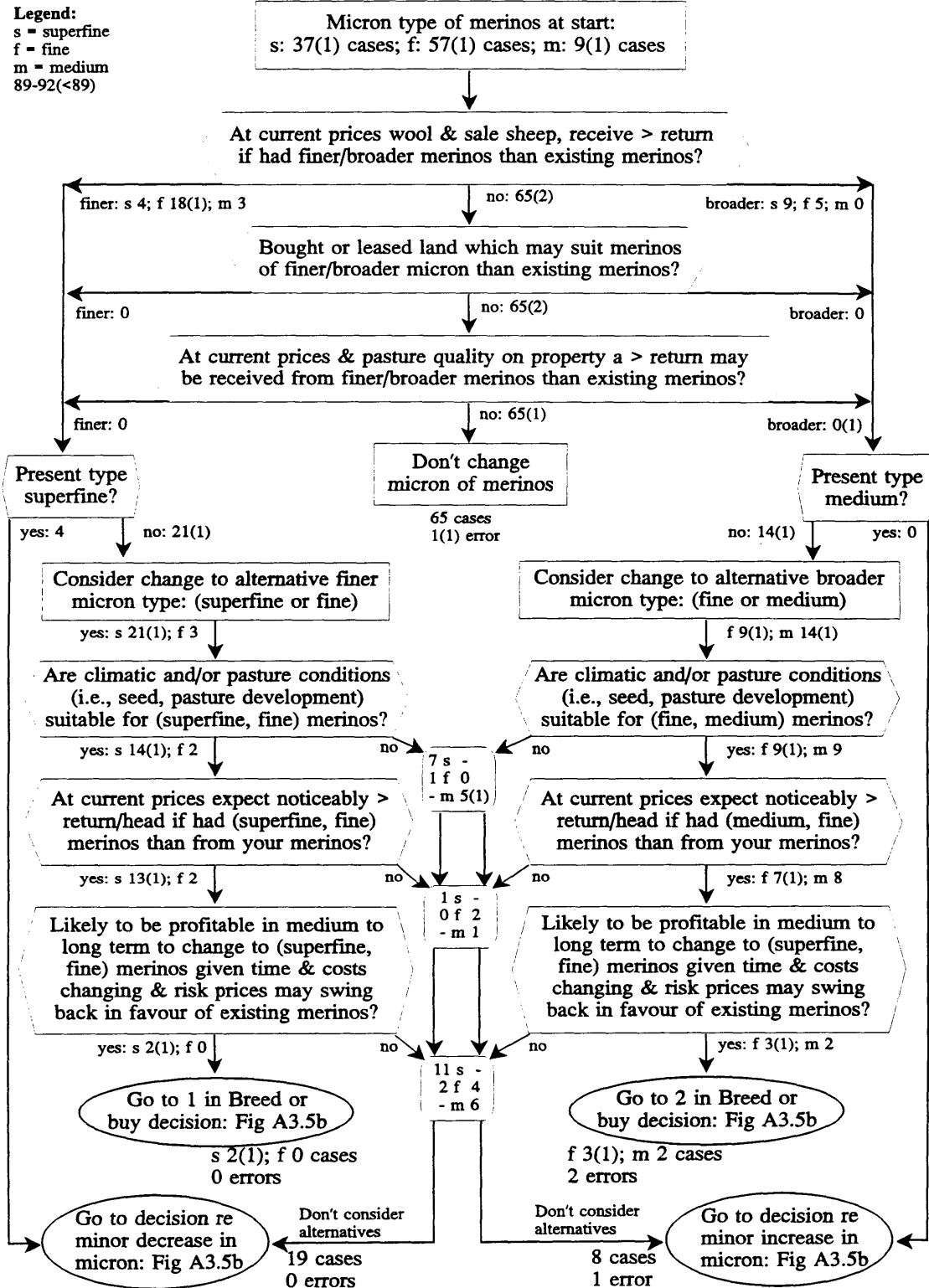
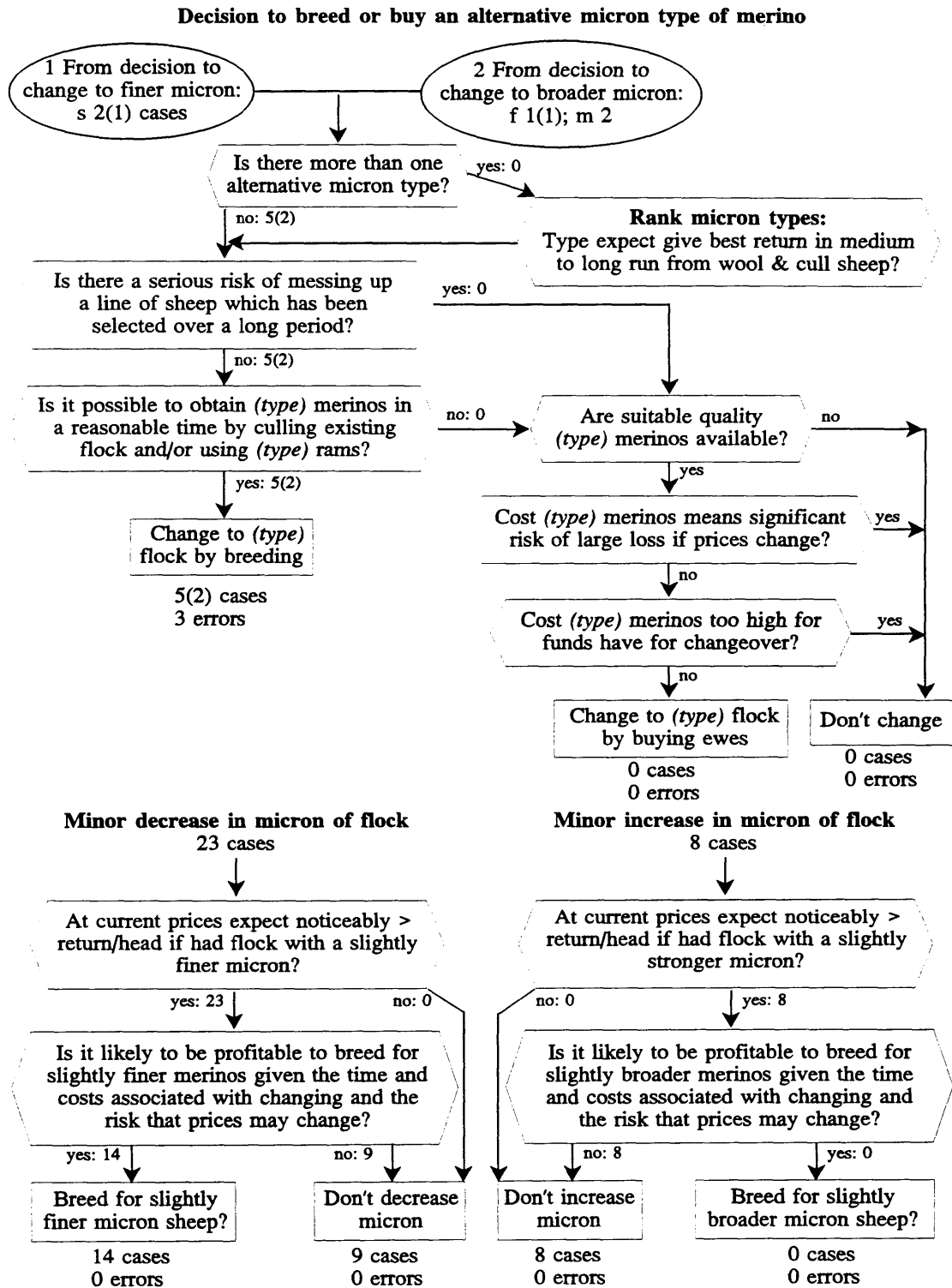


Figure A3.5b
Change micron of merino breeding flock (continued)



the major factor mitigating against a change to another micron type was the third aspect. This was the criterion that asked if they were likely to be better off in the medium to long term given the time and costs of making a change and the risk of prices swinging back to favour their existing micron type. This criterion is based on comments such as:

'I don't think it actually pays to change ... if you stick with what you've got it all takes its turn.'

'Historically it is not usually profitable to follow fashion - never seem to catch it.'

'Get into a quality article that suits your country ... by time you change the market will turn against you so might as well stay where are in the first place.'

Again, this type of comment reflects a strategy commonly adopted by many graziers to help them cope with the problems of making meaningful predictions about what is likely to occur in the wool market. The criterion as formulated seems to capture the essential elements of this strategy, while allowing for change to occur when it is deemed that the strategy has been overtaken by long term structural changes in the market.

For the period 1989-92 the model made seven predictions of change to another micron type by breeding or buying (two finer and five broader, see Figure A3.5a). Two of these were errors, both for the same person. This occurred because one superfine producer felt that although in the long term he might have been better off financially with fine-wool merinos, he wished to remain in superfine production. It involved a special challenge to produce (and some prestige) and this outweighed the marginal advantage in return enjoyed by fine wool. In addition the model had a further error in that it implies one property that had decided to breed for finer sheep would also consider breeding for broader sheep. This occurs because the model allows people to consider both the broader and finer options without clearly choosing between the two.

Seven cases (two pre-1989 and five for 1989-92) were passed on to the final stage of the model to change to another micron type, which was, whether to make the change by buying different ewes or by breeding for the different type (see Figure A3.5b).

Most appeared more inclined to make a change to another micron type by breeding rather than buying because it was less expensive and therefore less risky. Two aspects were found to affect this in the 'initial' series of interviews. First, a line of sheep bred for a particular type of wool, over an extended period, might be unsuitable for changing to another micron type. Second, if a major change in the micron was involved the time required to make the change might not allow any advantage to be taken of the current price differential favouring the proposed change. If either of these situations occurred, buying would be considered provided suitable ewes could be found at a price that met the budgetary and risk criteria.

The model predicted all seven cases would change to another micron type by breeding. In fact only four cases (out of the 37 properties breeding merinos at some time during the study period) followed through with a breeding program to change to another micron type of merino flock. Of these three went finer to superfine while one went broader to fine. In three cases, two of them from the same property, the decision to change was made, but was not followed through because the different rams were not bought. This was mainly due to the difficulty and cost associated with obtaining rams of the type required. An in principle decision had been taken but not carried out.

While almost all producers rejected making a major change to another wool type, more were willing to make minor changes to the average micron of their flocks. Typically this meant making changes of less than half a micron. This is a small amount given that seasonal conditions can result in greater changes and differences of over a micron occur between young and old sheep.

If a major change was rejected, the model allowed consideration of a minor increase or decrease in micron. Only decisions made between 1989-92 were elicited because producers found it difficult to remember this type of decision accurately for earlier periods. A minor change in the micron of a flock can be achieved by changing the culling regime for the breeding ewes and by using different rams. These are decisions carried out annually, normally in the late summer-autumn period so the questions were asked for each year in the period.

A minor decrease in micron was considered 23 times (17 properties). Of these 14 cases (eight properties) decided to breed for slightly finer sheep, while nine cases rejected change. A minor increase was considered eight times (seven properties) and rejected each time.

During the period 1989-92 only nine of the 37 properties breeding merinos carried out a decision to change the micron of their flock. In the early part of the period there was considerable incentive to change to finer sheep, but this did not appear to affect the long-term view of many decision makers.

A3.5 Other strategies to change the average micron of merino flocks

The average micron of a merino flock can also be changed by altering the age structure of the flock and changing their nutrition. Young sheep have finer fleeces than old sheep. Increasing the number of breeding ewes in the flock increases the proportion of young sheep. This is balanced by decreasing the numbers of wethers, particularly old wethers. The two factors combine to decrease the average micron of the clip. This has to be traded off against lower wool weights of ewes and young sheep compared to old wethers. Some graziers undertook this type of structural change, but it was also driven by the high prices being paid for cull/seconds young sheep that increased the profitability of merino breeding compared with a self-replacing ewe and wether flock.

In the latter period of the 1980s, when significant premiums existed for each decrease in micron, some fine-wool producers had the short-term option of keeping their seconds young sheep rather than selling them. Older dry sheep were sold to make room for them. A distinction is made here between culls and seconds. Culls are sheep that would rarely be considered worth keeping. Some properties had plenty of replacement sheep, however, and kept only the best of these for themselves. Therefore they had lines of sheep that, while not up to their normal high standard, were nevertheless still good sheep and were often highly sought after at the annual sales.

A model was developed for this option (see Figure A3.6), but only one property took this route in the 'test' series. The option was mainly considered by larger properties who had many good quality seconds. Some people were not aware of it, however, the most important factors against it were: graziers were unwilling to keep culls or seconds on their properties; and the premium for the finer wool was not considered great enough to make up for the lower wool weights of the younger sheep.

The option arose because of a peculiarity of the wool market in the late 1980s that had no recent parallel. This may be the reason for its lack of favour. Many were not willing to reconsider their policy of not keeping culls. In addition others appeared to have the view that wethers were the woolcutters and had not reconsidered this rule-of-thumb to take account of changing circumstances.

A3.6 Decisions to run own wethers

Once a merino breeding enterprise was established, several other options also became available, one of which was to keep the male progeny to be run as woolcutters. Most merino breeding operations do this to varying degrees, but it is not an essential part of the operation and therefore it is an option that can be considered separately. Three choices were examined in this study:

Keep wethers as woolcutters after beginning a merino breeding enterprise;

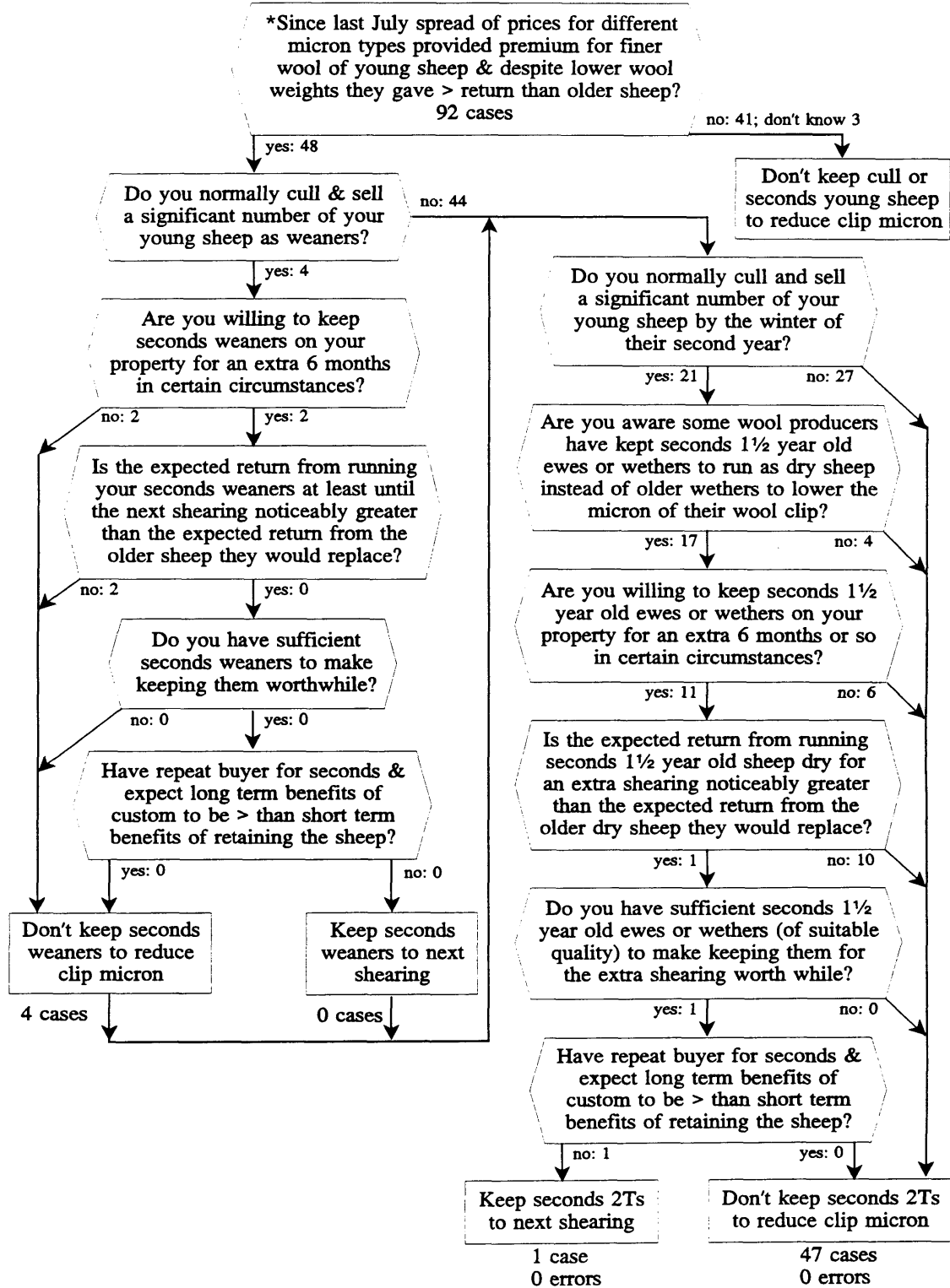
Keep wethers as woolcutters at some later period when they were not being run at the time;

Stop keeping wethers as woolcutters.

A3.6.1 Decisions to keep wethers as woolcutters after beginning a merino breeding enterprise

Some wethers were sold as weaners but generally they were sold in the autumn of their second year. Merino wethers normally entered the woolcutter flock after they reached 1½ years old, although they would generally not be put in very rough

Figure A3.6
 Decision to keep young seconds to reduce micron of wool clip



country at this age. As a simplification it was decided, therefore, to examine this decision as though it was being made at this time and not earlier or later. Producers who did not have wethers over one year old were not asked if they had made the decision. In this way the accuracy of the decision could be tested by asking if the wethers had been kept and used as woolcutters.

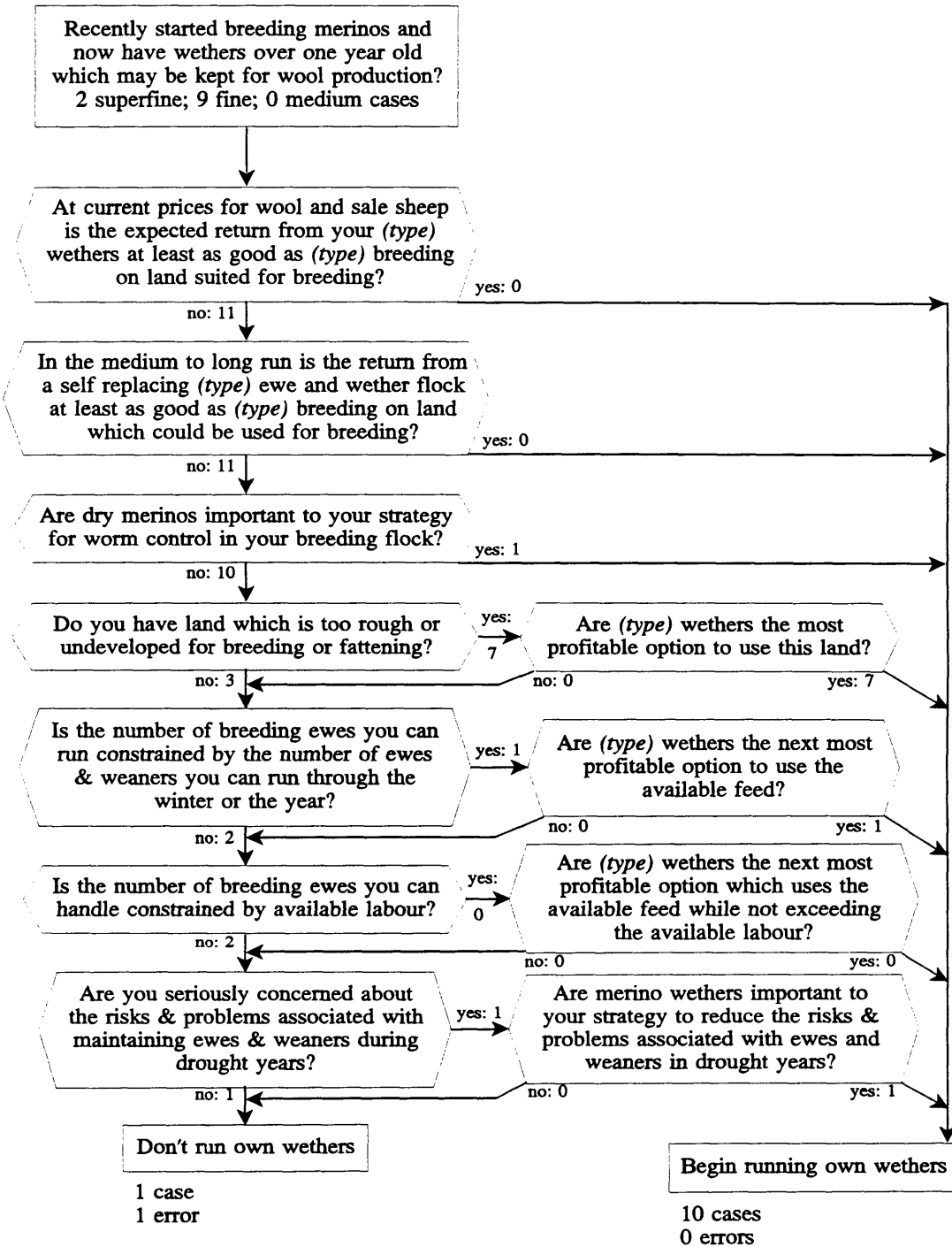
Eleven producers (two with superfine flocks and nine with fine flocks) who had begun merino breeding and had wethers older than one year old were eligible to use in the model of this decision (Figure A3.7). The first two criteria in the model asked producers to compare the relative profitability of breeding and wethers on breeding country. In situations where cull/cfa sheep were bringing poor prices some graziers might have considered wethers to have been at least as profitable as breeding, and given their other advantages might have run them for this reason.

The remaining criteria in the model arose because of physical and environmental constraints that limited the graziers' options. Some graziers had trouble controlling worms in their breeding flock, particularly in their weaners. One option that helped overcome this was to use wethers to 'clean up' the pastures.

By far the main reason wethers were run was because properties had rough or undeveloped land whose nutritional status made it unsuitable for breeding and fattening stock, particularly young stock. Since wethers have no lactation requirement and limited growth requirements, most graziers considered them the most profitable option for that type of country.

Other criteria in the model deal with constraints imposed by: problems of running ewes and weaners through the winter; labour required for breeding; and the risks of a breeding operation during drought years. One method of decreasing the risks and problems created by breeding operations in dry or drought years was to run some wethers that could either be run harder, or sold to lighten the stocking rate. Another approach was to run at a lower stocking rate to begin with.

Figure A3.7
Decision to run own wethers after merino breeding begun



In reality more than one criterion in the model sometimes influenced a decision to carry wethers, and occasionally a criterion lower down the list was the primary determinant of the proportion of wethers carried. This did not create a problem for the model in predicting if wethers were run, but may give a slightly biased impression of which were the most important factors. For the examples tested in this model, this occurred only once. Labour, rather than the land constraint, was the main factor influencing the decision to run wethers.

The model predicted ten producers would run their own wethers and one would not. In fact the latter property also ran wethers, but for another reason. They were trying to run as many sheep as possible following the collapse of the wool price.

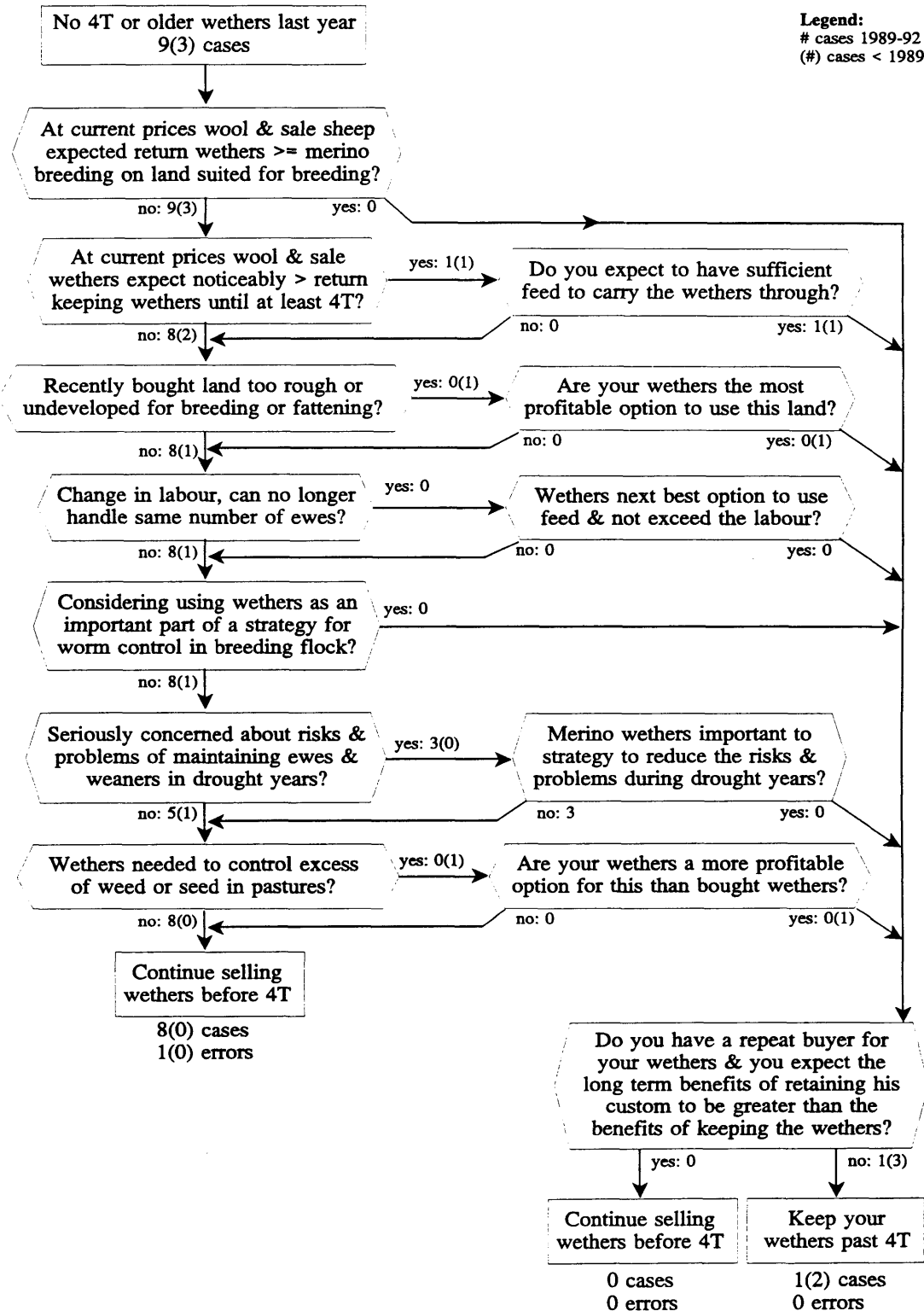
A3.6.2 *Decisions to keep wethers as woolcutters at some later period*

Some merino breeders chose to sell their wethers before they reach the 4-tooth stage (4T), generally as weaners or as 2-tooths (2T). This was an uncommon occurrence, and occurred for a variety of reasons. It was difficult to develop a model of this series of decisions, but the attempt is shown in Figure A3.8.

Most of the criteria are similar to those used for the decisions to keep merino wethers after merino breeding had begun. The additional criterion dealt with the situation where the wool producers found, for whatever reason, that some stock were required that could be run hard on pasture to control weeds or a grass-seed problem. Wethers were generally considered the best for this situation, and the only decision was whether they should be bred or bought. These criteria could also be appropriate for the previous model (Figure A3.7), but the situation did not occur for the producers interviewed.

Only one error is shown for the model. This occurred because one producer bought another property that needed to be stocked. It was suitable for breeding but the wethers were kept because of the cost of purchasing ewes and a policy of not buying stock (for quality and disease control reasons). Other graziers are likely to use this approach in similar situations. Where graziers have their own stock available, even if

Figure A3.8
Decision to begin to keep own wethers past 4T



they would normally be considered culls, and even if the property might not be fully stocked as a result, many would use them in preference to buying stock.

In two other situations the model gave the correct prediction but gave an incomplete description of the reasons for the result. In one case a yes to the second and third criteria in the model gave the correct result but the reasoning was more complex than this, involving several factors and a choice between two classes of stock. The other case relates to the drought criteria. Three cases are shown as answering no to the use of wethers as a strategy to reduce the risk of drought. This is the correct answer but the reason is that the producer had originally stopped running wethers because of problems with pizzle rot and was not willing to keep them again.

A3.6.3 Decisions to stop keeping wethers as woolcutters

As mentioned for the previous model, most people who bred merinos also ran wethers and commonly decided to sell them before they reached 4T. If wethers were replaced, they were normally replaced by another sheep enterprise (unless of course breeding stopped altogether). The major options were: to replace them with breeding ewes; buy wethers; increase the merino ewes but mate them to 1x lambs; or to run 2x lambs. A model was developed to cover these options (Figure A3.9a and Figure A3.9b) but is not well developed because this was not a common decision.

An initial question asked if the producer had stopped breeding merinos since woolcutters could no longer be replaced by bred wethers. It did not imply that the wethers would be sold immediately. This depended on the reason merino breeding was stopped. For instance, the producer might have stopped breeding for age or management reasons but kept running wethers. To cover this situation and for simplicity, people who continued with wethers after they had stopped merino breeding were assumed to be operating a bought wether enterprise although for several years some of their flock were derived from their breeding operation. Only one person ceased running wethers when merino breeding stopped and, here, the wethers were bought wethers because the breeding operation had only been going for two years.

Figure A3.9a
Decision to stop running own wethers

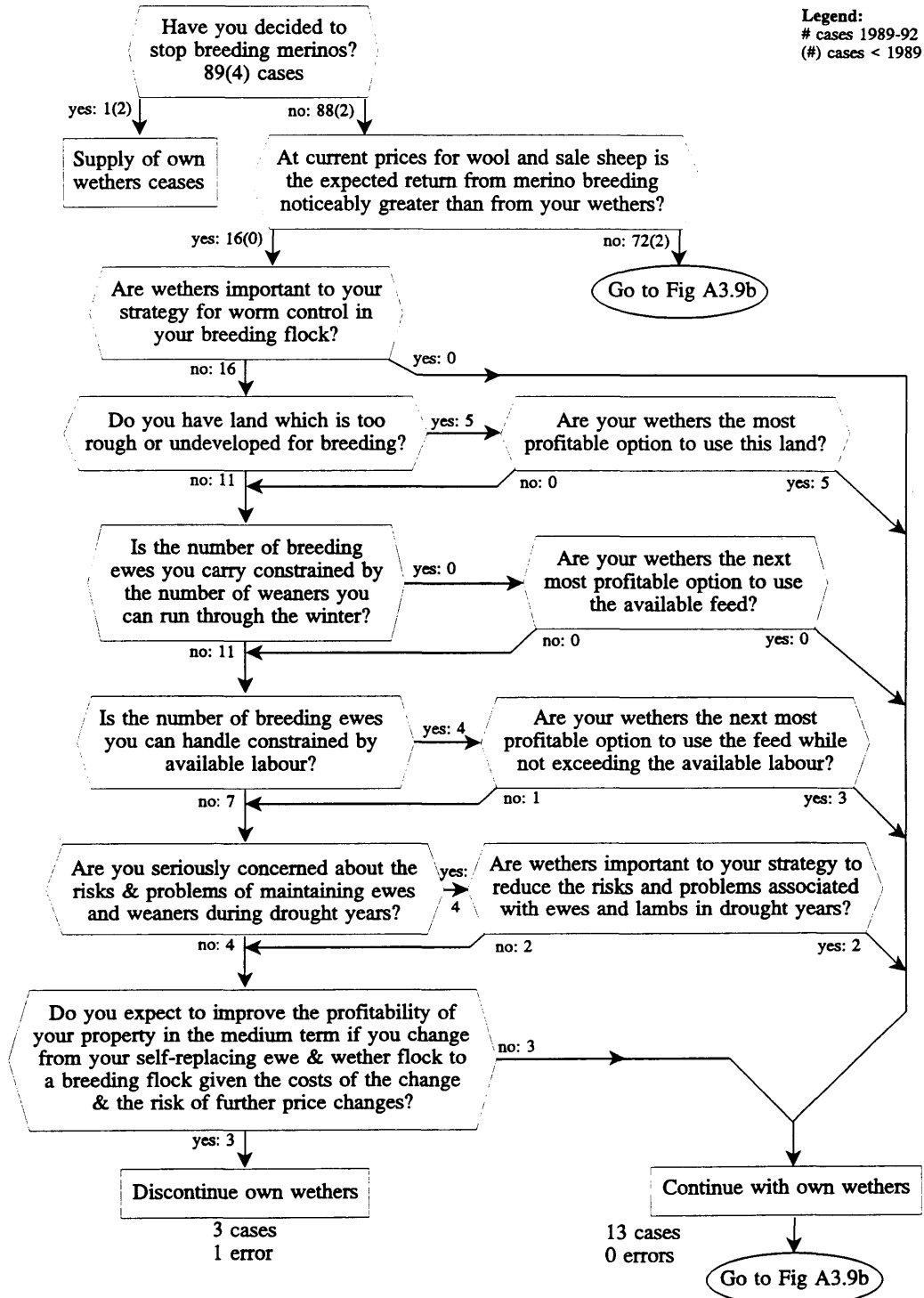
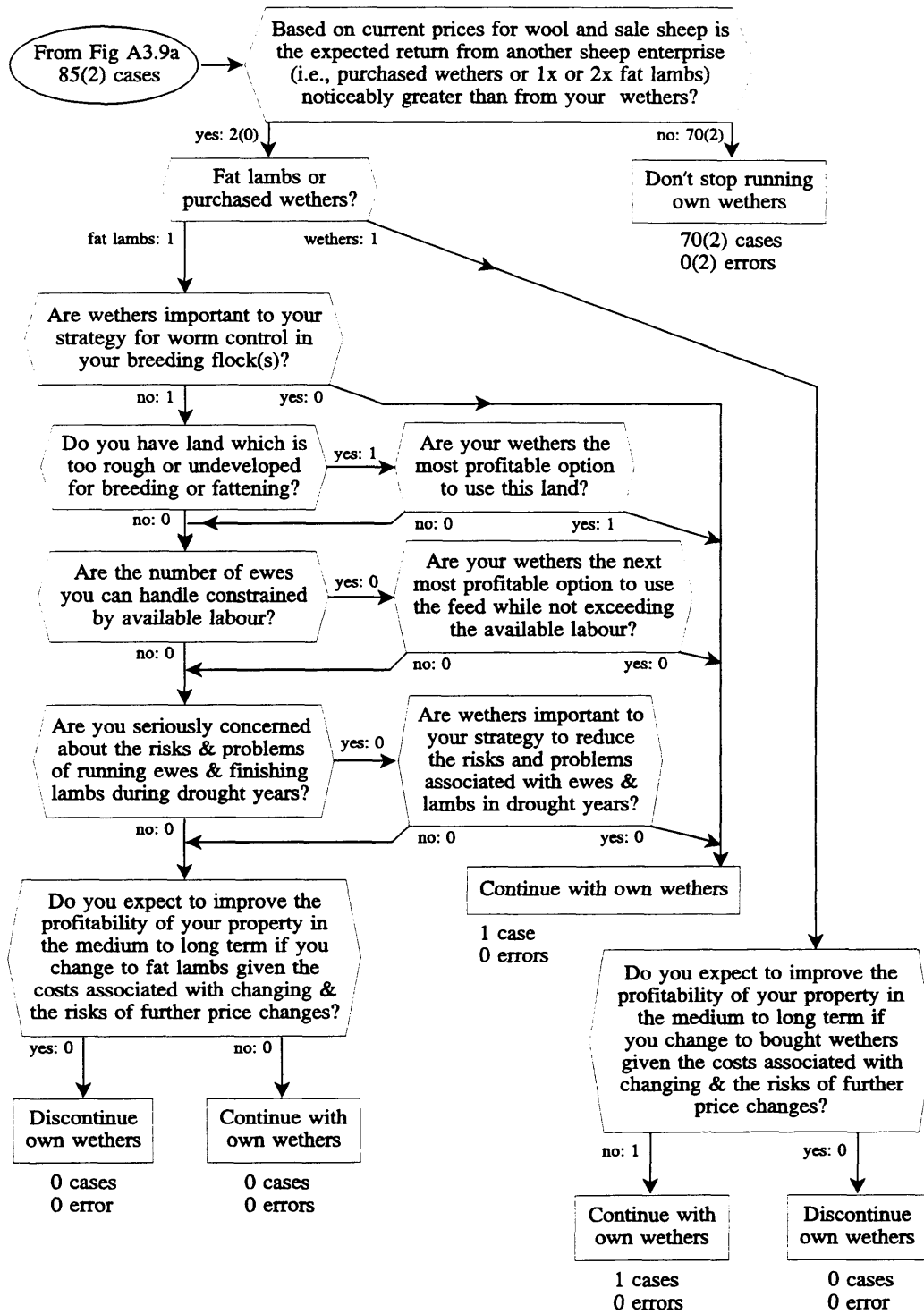


Figure A3.9b
Decision to stop running own wethers (continued)



The next stage of the model used ranking criteria to compare the relative profitability of wethers and the alternative sheep enterprises. The response to the criterion asking for a comparison of breeding and wethers suggested most producers saw little difference in their profitability. In discussions of this issue many said they had not seriously attempted to compare the two enterprises. Common types of responses were:

'I'm in wool production and wethers cut you the most wool.'

'I haven't thought about breeding being more profitable than wethers.'

The reaction to this criterion might appear at first glance to be at odds with the response of those who kept their wethers after beginning merino breeding. Here wethers were seen as less profitable than breeding. A closer examination shows this was not necessarily the case. First, the contexts of the two decisions were different. One was a situation where merino breeding had already been chosen as the most profitable enterprise otherwise they would have bought wethers. The other was a situation where a self-replacing flock had been in existence (generally for some considerable time) and therefore was the status-quo. Second, they were essentially two different groups of people, with different backgrounds and possibly with different resources. Those who began merino breeding in the 1980s generally did so because they changed from prime lamb or cattle production (which require good breeding country), or they changed from bought wethers (because of the high cost of replacement wethers). In these cases breeding might be expected to be more profitable than wethers.

In sixteen cases breeding was considered more profitable than wethers. Other criteria were then used to decide if wethers would still be run. The model predicted three would end their wether enterprise and 13 would continue. The land, labour, and risk of drought constraints were important determinants of producers' decisions to keep wethers. Again a criterion that required a judgement of whether it was worthwhile 'chasing' markets was also important.

An error occurred in the model because one person had made a decision to increase the breeding enterprise to replace the wethers, but was still running wethers because

there was sufficient feed to keep some of them. The enterprise ceased in the next year. In one sense this is not an error as it correctly predicts the decision. However, it would be preferable for the model to contain further criteria that follow through with the decision to completion.

The next part of the model (Figure A3.9b) contains a very general criterion that attempted to cover the few cases where a wether enterprise might have been stopped because other sheep enterprises were more profitable. This was not very relevant in the 1980s and early 1990s because of the market situation, but could become more important in the future. No cases were found of people stopping a wether enterprise because of prime lambs or purchased wethers. It might seem incongruous to replace bred wethers with purchased wethers and it is probably unlikely. However, if another micron type of wether was considerably more profitable than those being bred, the option existed to sell bred wethers and replace them with bought wethers of another type. This did not occur with the 'test' group, but one producer in the 'initial' group had been following this approach during the early 1980s.

Two other errors occurred because producers stopped running their wethers for reasons not included in the model. One producer sold all wethers during the early 1980s to lighten the stocking rate because of a drought. Selling wethers during a drought is a common strategy although it is unusual for them all to be sold. This often occurs when the property has a small proportion of wethers to ewes.

The other producer got out of wethers because of serious losses caused by pizzle rot that could not be controlled economically. While pizzle rot can be a problem in wethers, especially in the initial stages of pasture development when clover content is high, most graziers can control the problem through management and this was an unusual case. Again there were instances where a correct prediction was achieved by the model but the criteria only partially explained the reasons for the decision.

A3.7 Decisions to mate ewes from merino breeding flocks to prime lamb rams

A decision to mate ewes from a merino breeding flock to prime lamb rams is a complex one. First, there are several uses for the progeny. Second, it can range in purpose from a small, speculative exercise to a large, long-term enterprise; even to the extent of replacing merino breeding. These multiple purposes, and the marginal economic nature of many decisions, made it difficult for some producers to remember more than a few years. Testing of the models was therefore only conducted for the period 1989-92.

To simplify matters, and because this was a logical separation normally made by producers, the decision to mate merino ewes to prime lamb rams was split into two separate decision models based on the primary purpose for mating the lambs. The first of these purposes was for lambs grown for sale, either as prime lambs and/or as replacement 1x ewes for 2x lamb producers. The second was for lambs that were to be grown as replacement 1x ewes for the producers own 2x lamb enterprise. While this appeared a valid division, in one situation the two possible uses were seen as an added benefit of the option. Anyhow, the wether portion of those mated to produce 1x ewe replacements still had to be sold as prime lambs.

A3.7.1 Decisions to produce 1x lambs for sale from merino breeding flock

Wool producers had the option of mating any proportion from none through to all of their merino ewes to prime lamb rams to produce 1x lambs. Producers who mated their ewes for this reason tended to use their cfa ewes, although some also mated young cull ewes. A further complication was that the market could be defined further by the choice of prime lamb sire. Border Leicester x Merino lambs were sold as prime lambs, but the ewe portion could also be sold in store condition for 2x lamb dams. On the other hand lambs from a Merino x short wool ram (e.g., Dorset) could only be sold as prime lambs. Usually the latter received a slight premium in this market compared to Border Leicester crosses. As a simplification, this wrinkle was ignored in these models and does not appear to have created any great problems.

Anyhow, choice of ram was a complex decision that would have unnecessarily compounded the difficulties.

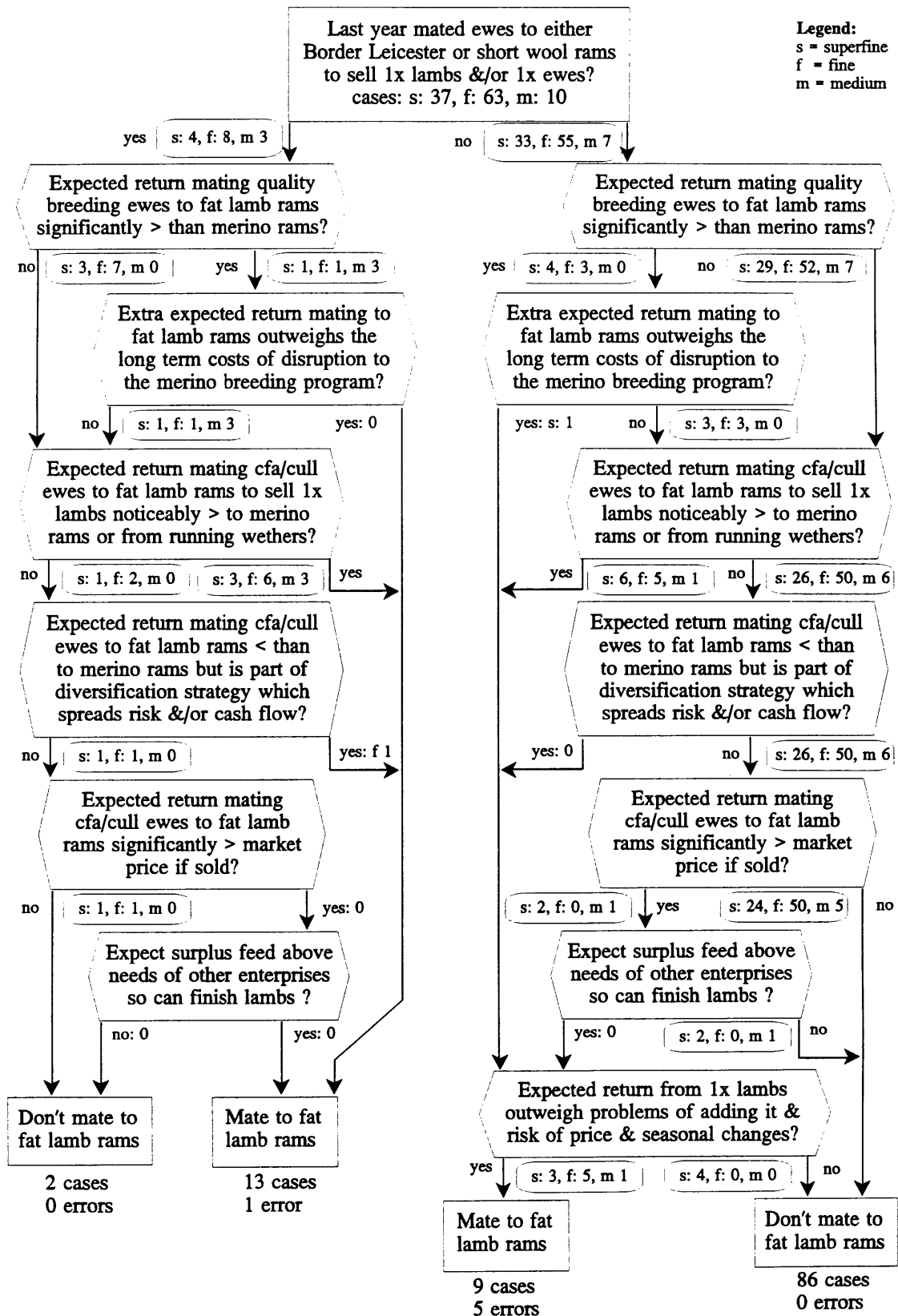
Producers with a merino breeding flock were separated into two groups by the model (Figure A3.10), depending upon whether they had mated ewes to prime lamb rams in the previous year. This was done because testing in the 'initial' series of interviews had shown the need for an extra criterion when producers had not been previously mating their ewes to prime lamb rams. In a couple of cases producers had gone in and out of prime lambs, which meant the extra criterion was probably unnecessary for them, but neither did it create any great problems with the model.

One hundred and ten cases were used to test the model, of which 37 were superfine, 63 fine and 10 medium flocks. Given the opportunity for speculative matings, some criteria had to account for this behaviour. Speculative or short-term decisions to mate to prime lambs occurred for two main reasons.

First, in some years producers felt prime lamb prices would be likely to increase next year and make 1x production more profitable than merino breeding. Producers differentiated in this consideration between quality breeding ewes and cfa or cull ewes. It was rare for them to mate quality ewes to prime lamb rams because merino breeding was considered more profitable than 1x lamb production and because this would have caused disruption to the breeding program. If merino breeding were to continue, it was only a short-term option.

More commonly producers considered it was profitable to mate cull or cfa ewes to prime lamb rams. In many flocks ewes culled because of wool quality, age or other reasons were not considered suitable to mate to merino rams. They were sometimes considered for mating to prime lamb rams. Although the criterion compared the profitability of this to breeding them to merino rams, and this idea appeared to work fairly successfully, it did not always seem as simple a calculation as the criterion makes it sound. Some producers appeared to have a policy of not considering mating culls to merino rams. Although they could have sold them, sometimes quite profitably, they were concerned to maintain their reputation for selling a quality product.

Figure A3.10
Decision to mate ewes from merino breeding flock to prime lamb rams to sell 1x lambs



An 'opportunity cost' of losing this reputation was factored in that cancelled any gains from what was essentially a marginal decision to mate a few of these ewes to merino rams.

Second, in the last few years following the collapse of the wool market and the live-sheep trade, the market for cull/cfa sheep was particularly poor. A few producers took the risk that enough feed would be available and thought they would make more out of the ewes by mating them to prime lamb rams than by selling them. Essentially they increased their stocking rate while relying on the seasons holding good.

The other aspect that was relevant to a decision by wool producers to mate their cull/cfa ewes to prime lamb rams was that it spread the risk. In some years producers recognised they would make less money from their prime lambs than merino weaners or other options. They continued with them either because they provided cash flow at another time of the year, or because they had a strategy of spreading their risk by maintaining a couple of enterprises. This approach was often expressed as 'not having all your eggs in one basket'. It appears to have been less important in the last couple of years than appeared from experience with the 'initial' series of interviewees. Prime lambs prices were poor in recent years and combined with dry springs and summers may have forced producers to reconsider this strategy, particularly when wool prices were good and the Reserve Price Scheme was operational.

For producers who had been growing 1x prime lambs in the previous year, the model had one error from the 15 cases that entered the model. The error occurred because the producer thought that mating cull/cfa ewes to prime lamb rams would be more profitable than mating them to merinos or replacing them with wethers. He did not do so because in the drought conditions he wished to get rid of stock and this was a better option. In retrospect it is surprising this error did not occur for more producers.

The criteria discussed above also form the basis of the model for producers who had not grown 1x lambs in the previous year. An additional criterion was added to account for the strategy of not altering enterprises to 'chase the rainbow'. The criterion is slightly altered from its format in other models since many cases explored in this model were marginal rather than major changes and therefore were unlikely to have been very costly or risky. In addition a 1x lamb enterprise added extra management problems because the two breeding flocks and two sets of rams had to be kept separate. As well, the good quality pasture needed to finish lambs that may have conflicted with the requirements of merino ewes and weaners. A further important consideration was the chance of prime lamb rams wandering in the wrong paddock and creating havoc with many years of a breeding program. While this criterion was understood and appeared to work in the interviews, it is perhaps too all encompassing and could have been divided into a couple of criteria that would have differentiated these aspects more clearly.

There are five errors in this section of the model. Two arose because of the seasonal conditions problem mentioned for the other part of the model. A criterion to deal with this aspect could be developed without too much difficulty. The other three errors arose from one person who felt that although the extra returns outweighed the problems and risks of another enterprise it was just not worth the trouble.

Discussions held during the testing of this model suggested that while the profitability criterion gave the correct prediction they did not fully explain the underlying reason for many negative responses. Many producers who had not been raising 1x lambs eliminated the 1x lamb option unconsciously because, they did not believe they had suitable country for finishing prime lambs or, had insufficient country to run both operations at once. Another aspect, which was particularly relevant for stud properties, was the risk of introducing disease with prime lamb rams or bought 1x ewes. If any of these aspects were important, 1x prime lambs were never seriously considered as an option, and criteria should have been included at the beginning of this section of the model to assess these aspects. The profitability criterion gives the false impression that some producers actively considered 1x lambs, when in reality they almost totally ignored them.

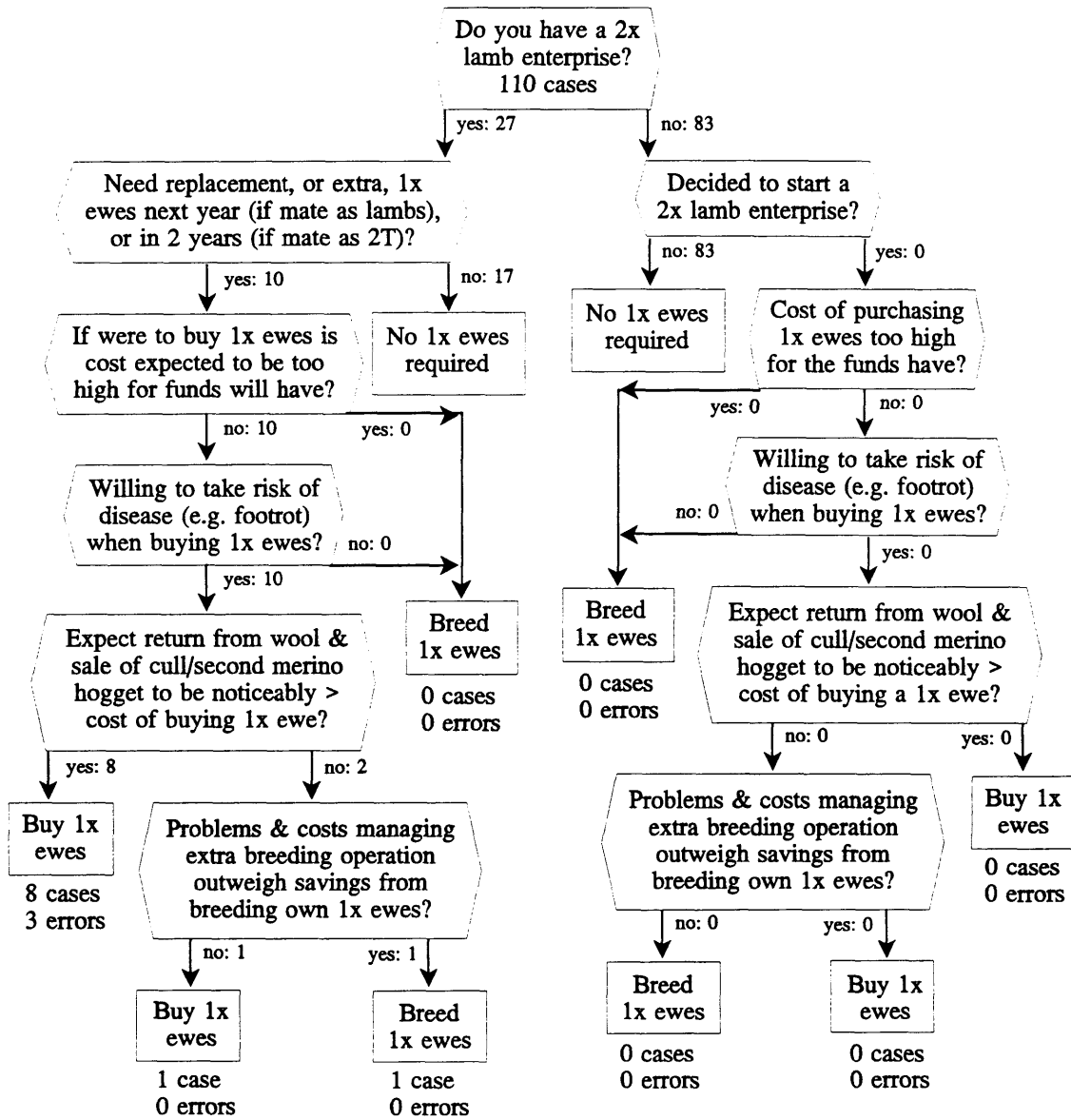
A3.7.2 Decisions to raise 1x ewe replacements for 2x lamb enterprise using merino breeding flock

The model of the decision to raise 1x ewe replacements for a 2x lamb enterprise by mating ewes from a merino flock (Figure A3.11a) proved particularly complex to develop. Very few people bred their 1x ewe replacements and at the time of the study many were going out of 2x lambs and not replacing 1x ewes. Several interrelated factors affected decisions to raise 1x lamb replacements and several options were available. For instance, 1x ewe replacements could be bought or bred. First-cross ewes could be mated as lambs or two-tooths. They could be bought as lambs and kept to two-tooth before mated. Replacements could be bought almost instantaneously, while breeding took time, particularly if they were mated as two-tooths. If replacement ewes were bred then the male portion still had to be sold at a discount compared to 2x lambs. In addition the producer had the option of breeding some, buying some, or 'squeezing' an extra year from the present 1x ewes.

In reality a whole series of decisions was involved for what might seem, at first, to be a simple decision. This made it difficult to develop criteria that accurately divided the respondents into their various groupings. For these reasons, when tested, the model was only at a preliminary stage. The idea behind including it in the study was to gather more information that could be used to develop a better model. The improved model was not retested because insufficient time was available.

One part of the model explored decisions by producers who had a merino breeding flock and a 2x lamb enterprise (27 cases). Even so, in particular years producers did not necessarily breed 1x ewes as replacements. Many were going out of 2x lambs and not replacing their 1x ewes. The initial stages of the model contained questions that established if there was a merino breeding flock and if 1x ewes were required for a 2x enterprise. In effect the questions obtained the results of decisions that were not modelled. Only ten cases passed through to the next stage, whether to buy or breed replacements.

Figure A3.11a
 Decision to raise own 1x ewes by mating ewes from merino-breeding flock



Two aspects that influenced decisions about whether to buy or breed 1x ewes were the cost of buying replacement ewes and the risk of introducing disease. In some years replacements were expensive. A rough rule of thumb used by some producers to judge whether 1x ewes were too expensive was to compare their purchase cost with what they expected to receive for a 2x lamb. A high replacement cost, or the risk of a high replacement cost, caused some producers to consider breeding, particularly if a large number needed to be replaced at once. This may have involved a considerable outlay that could have seriously affected cash flow in that year.

Experience with disease, or concern about the risks of introducing disease, influenced some people to breed rather than buy their ewes. Even breeding 1x ewes was risky as it meant buying prime lamb rams that could also introduce disease, although it was less risky than buying 1x ewes.

Once passed these two constraints (which were unimportant for the cases tested), the next criterion asked producers to compare the return from mating merino ewes to merino rams with the cost of buying a 1x ewe. If the answer was no to this question the producers were then asked to account for the problems and costs of managing an extra breeding operation compared with the expected savings from breeding 1x ewes.

Another part of the model covered the situation where producers with a merino breeding flock may have decided to begin a 2x lamb enterprise. No cases passed through this part of the model because between 1989-92 no-one from the 'test' series decided to start a 2x lamb enterprise.

Three errors were detected in the model out of 10 cases that passed through. A high error rate was expected because the model was relatively simple given the range of options that were available.

A particular problem, which resulted in an error, arose because the model did not include different aspects for those whose practice it was to breed, and those whose practice it was to buy. As had been suggested in the discussion of previous models, wool producers ignore many signals (consciously or unconsciously) about changes in

prices and relative returns. Thus they did not change a practice unless something occurred that triggered them to reconsider. Discussions conducted during testing of the model, and with others with 2x enterprises who might have made similar decisions if they had been replacing their 1x ewes, suggested the model needed to be changed to incorporate this consideration. A few other aspects were also elicited and clarified in these discussions.

A revised and expanded model of the decision to breed 1x ewe replacements from ewes in the merino flock is shown in Figures A3.11b, A3.11c and A3.11d. It contains four models. The distinction is retained between those who already have a 2x ewe enterprise and those who have decided to start a 2x ewe enterprise. Separate models are presented for producers who had previously bought their 1x ewes, for those who had previously bred their 1x ewes, and for those who had bred some of their 1x ewes and bought others to make up the difference as required. Since the model was developed after the interviews were completed and the wording and layout have not been pretested, they are not yet at the stage where they could be formally tested.

A3.8 Buy merino woolcutters

Nine of the 49 interviewed for the 'test' series were buying merino woolcutters in 1980, or when they took over management of the property if this was later than 1980. Of the 40 who were not, 14 (or 35 per cent) began a bought merino woolcutter enterprise (not including short-term speculative purchases) by 1992. All these occurred before July 1989.

Figure A3.11b
 Revised model of decision to raise own 1x ewes
 by mating merino ewes from breeding flock

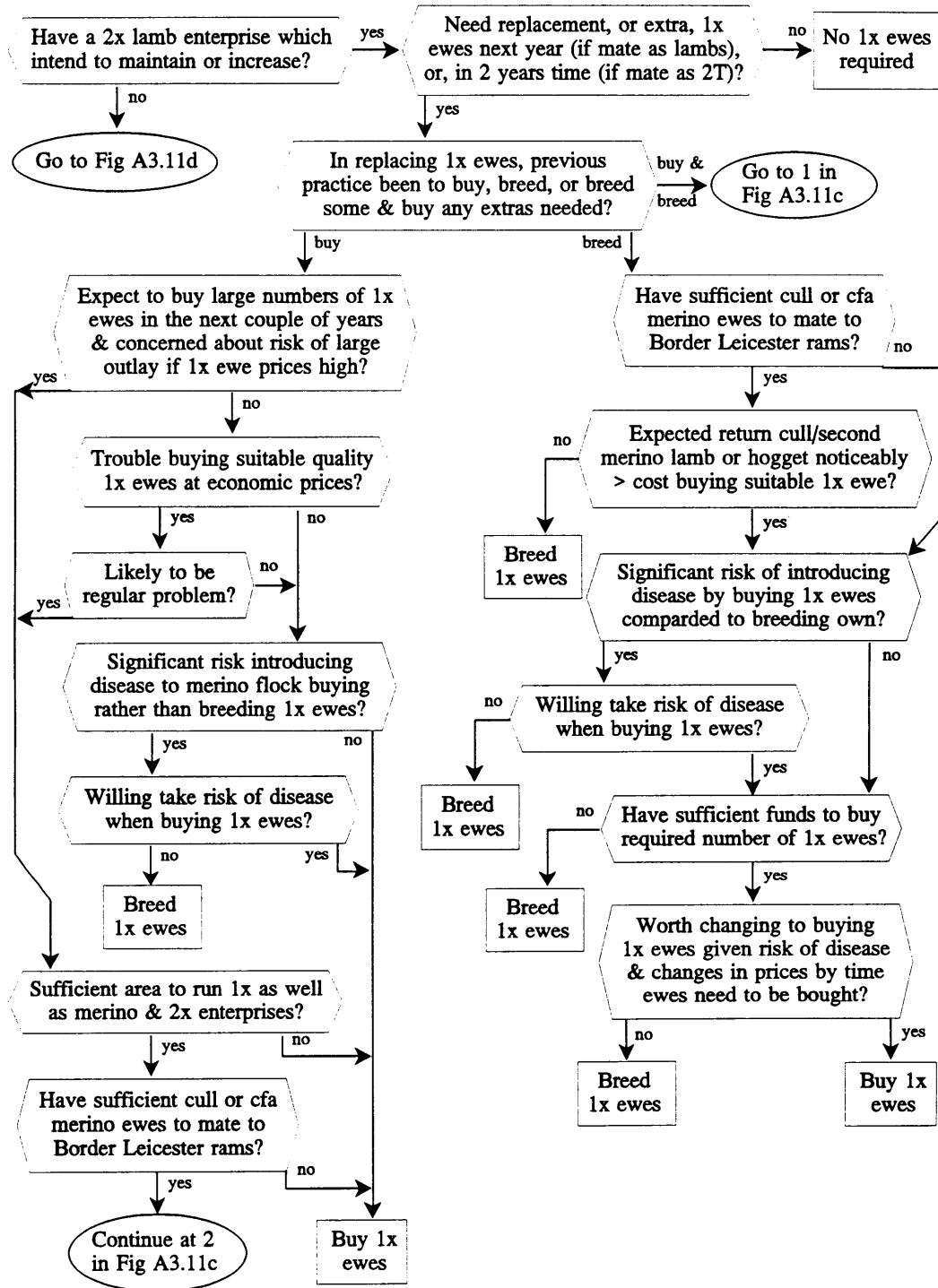


Figure A3.11c
 Revised model of decision to raise own 1x ewes by mating merino ewes from breeding flock (continued)

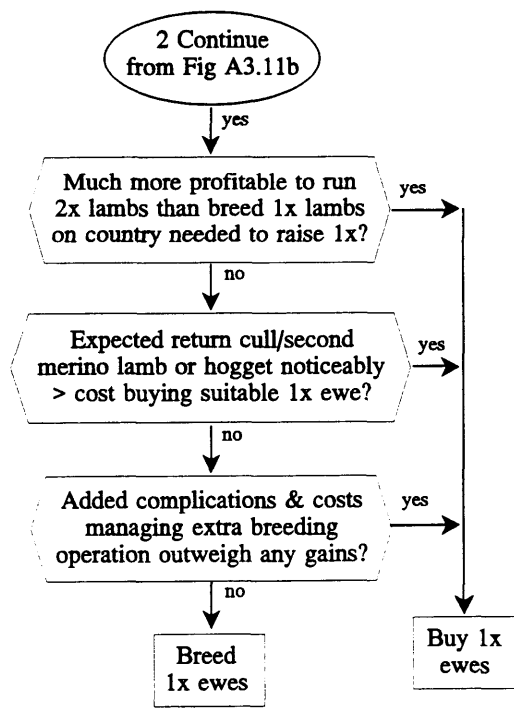
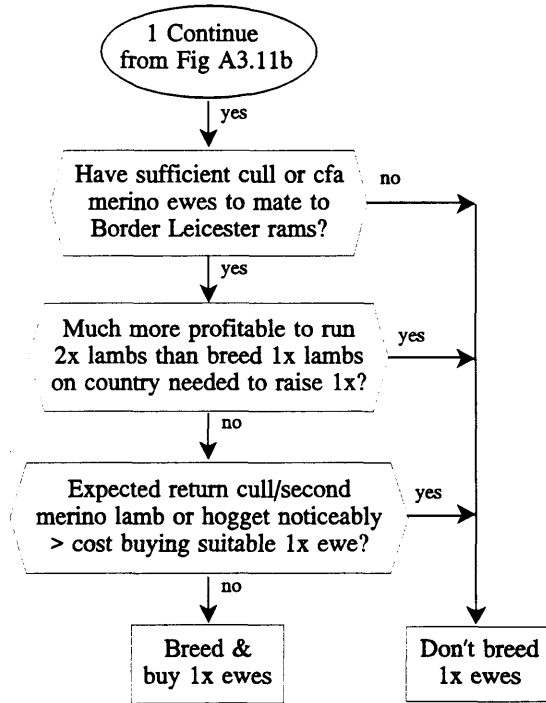
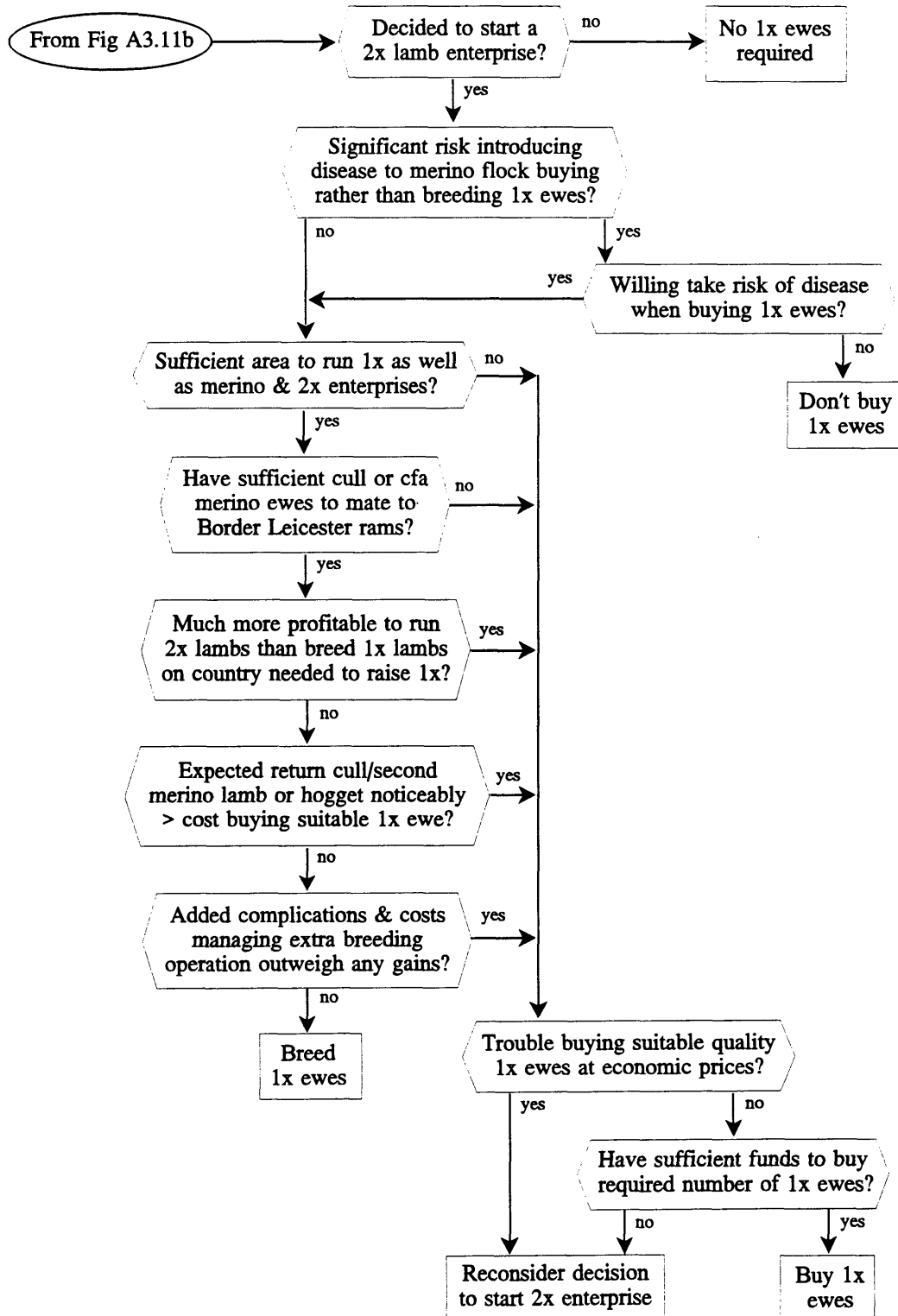


Figure A3.11d
 Revised model of decision to raise own 1x ewes by mating merino ewes from breeding flock (continued)



A3.8.1 Decisions to begin to buy merino woolcutters

Trigger reasons for decisions to begin to buy merino woolcutters are shown in Table A3.5 as well as the number of times each of these arose in the 'test' series of interviews between 1989-92. The decision models containing the other aspects involved in these decisions are displayed in Figures A3.12a to A3.12d.

Purchase of extra land triggered the most decisions to begin to buy merino woolcutters, followed closely by poor returns for prime lamb production from crossbred ewes. One wool producer changed from merino breeding to buying woolcutters because he was getting old and bought wethers were easier to manage than breeding ewes.

The model of the decision to buy woolcutters because of the purchase of land provides a good illustration of the interplay of a range of aspects (Figure A3.12a). Constraints imposed by the context of the decision (e.g., whether breeding merinos), constraints imposed by physical factors (e.g., land type, labour), price factors (e.g., of wool and stock), and risk aspects (e.g., of footrot or drought) all were important to decisions about whether woolcutters were bought to help stock the land. When the land was unimproved and stock were not available through breeding, bought woolcutters were an obvious option. However, if the land was suitable for breeding, then a range of factors becomes important to the decision. Similarly, if there was already a merino breeding operation then breeding extra sheep and keeping cull and seconds sheep was an option. The risks and costs associated with buying rather than breeding the extra sheep needed were other aspects relevant to this option.

Buying woolcutters because of the purchase of land did not necessarily herald a permanent change to woolcutters. Particularly if the producer already had a merino breeding enterprise, its purpose was generally to stock the land until they could be replaced by bred sheep.

Where the owner of a property was getting older, or where less labour was available, producers considered changing to merino woolcutters because they required less

Table A3.5
*Trigger reasons for decisions to buy merino woolcutters
 'test' series 1980-92*

Situation	Trigger	Times situation arose			
		80-90	89-90	90-91	91-92
Have you bought or leased more land since last winter?	5	1	2	1	4
Does an increase in age, loss of a man, or similar factor lead you to consider a change to an enterprise which needs less labour than merino breeding or fat lambs?	1	0	0	1	1
Are your sheep numbers too low after breaking of a drought, poor lambings, or an increase in labour?	0	0	0	2	2
Have a series of years of low lamb prices and/or crossbred wool prices resulted in low property returns?	4	1	1	5	7
Have a series of dry springs or summers meant poor returns from fat lambs due to a high ratio of store lambs sold at low prices?	0	0	0	1	1
At current prices for merino wool & cull sheep is the return from bought merino woolcutters noticeably greater than from your existing sheep enterprises?	0	0	0	0	0
Is there a line of woolcutters available which at current prices could be held for a few months, shorn and resold at a profit?	0	0	1	9	10
Other reason	4	1	1	1	3

Figure A3.12a
Decision to begin to buy merino woolcutters

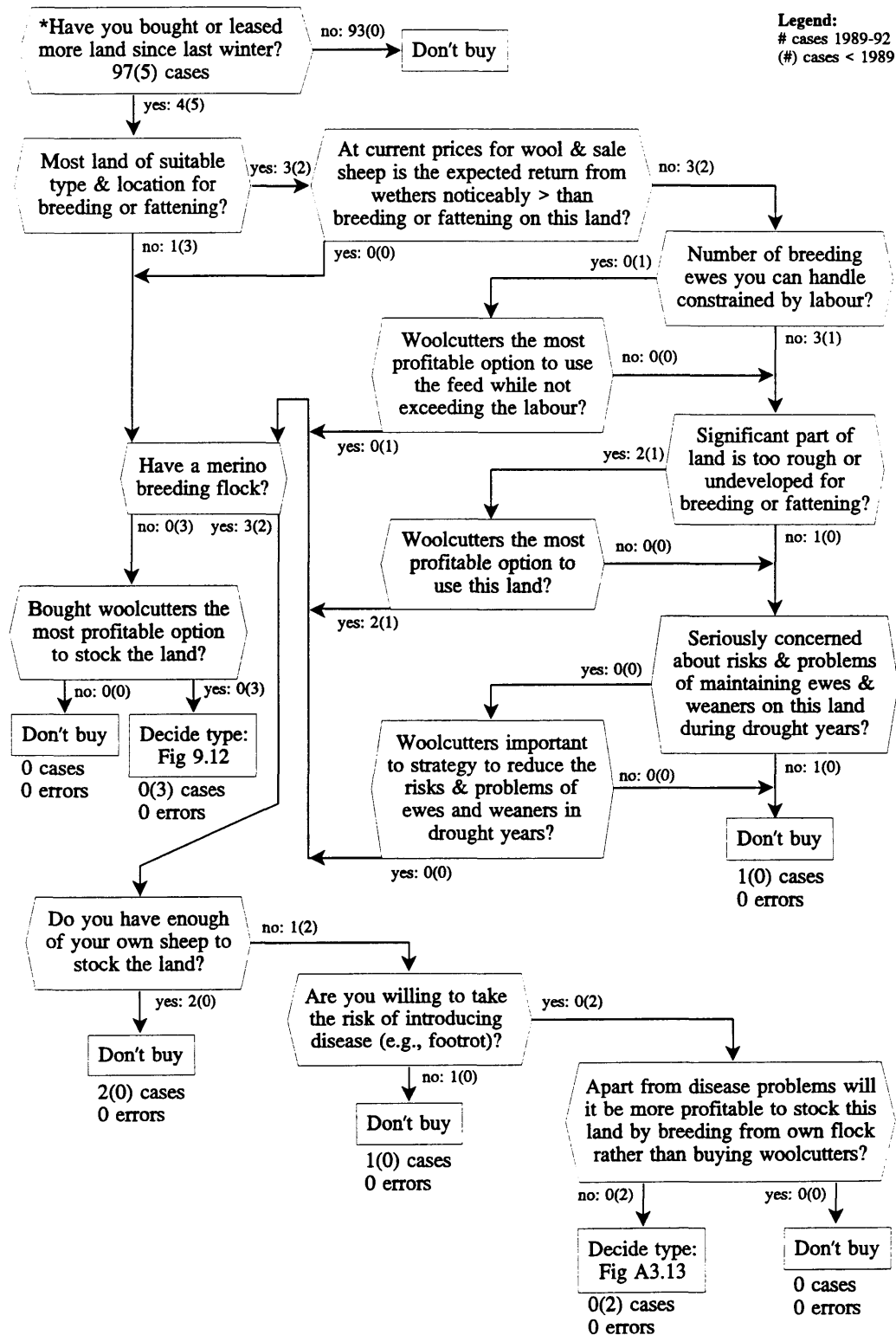


Figure A3.12b
 Decision to begin to buy merino woolcutters (continued)

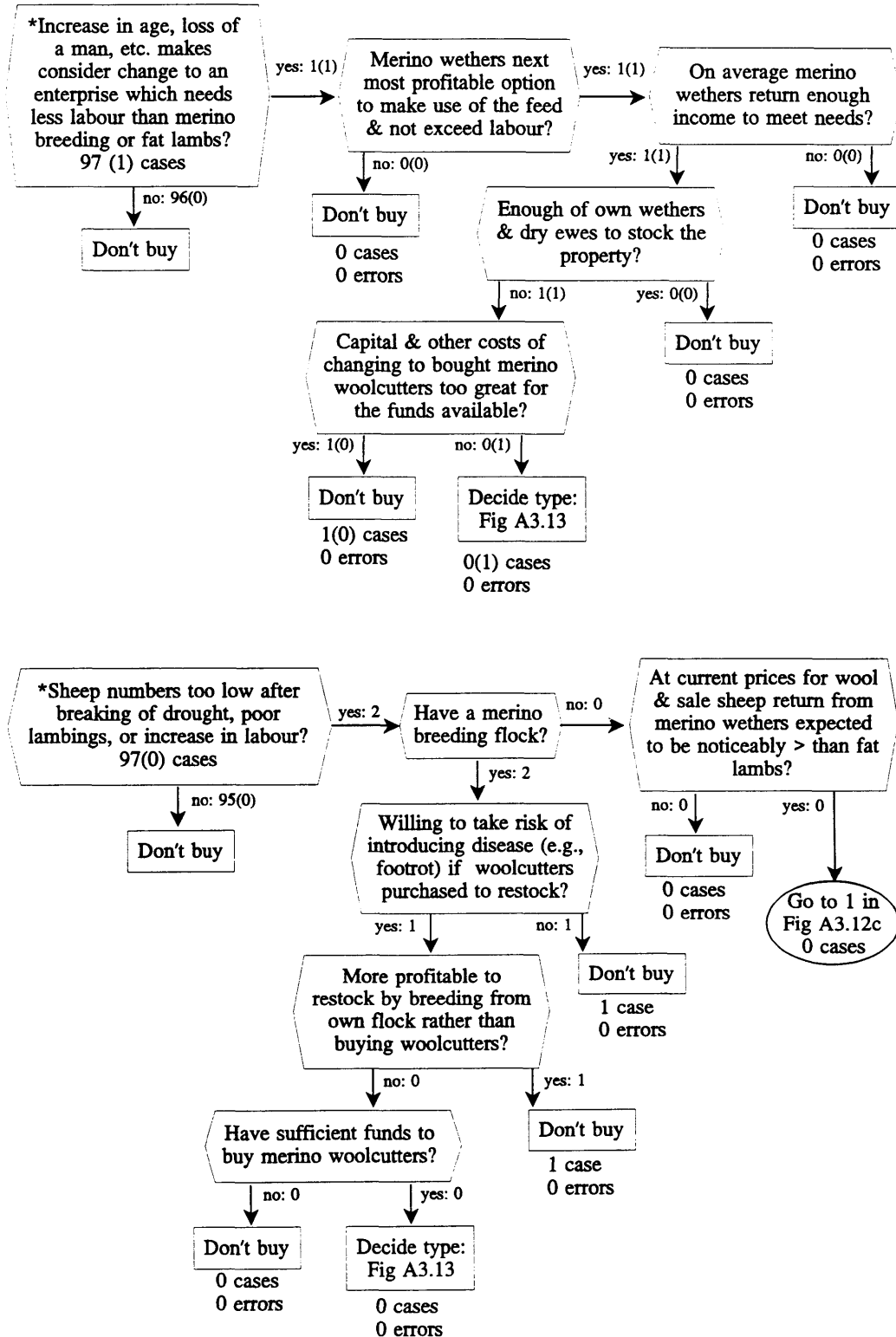


Figure A3.12c
Decision to begin to buy merino woolcutters (continued)

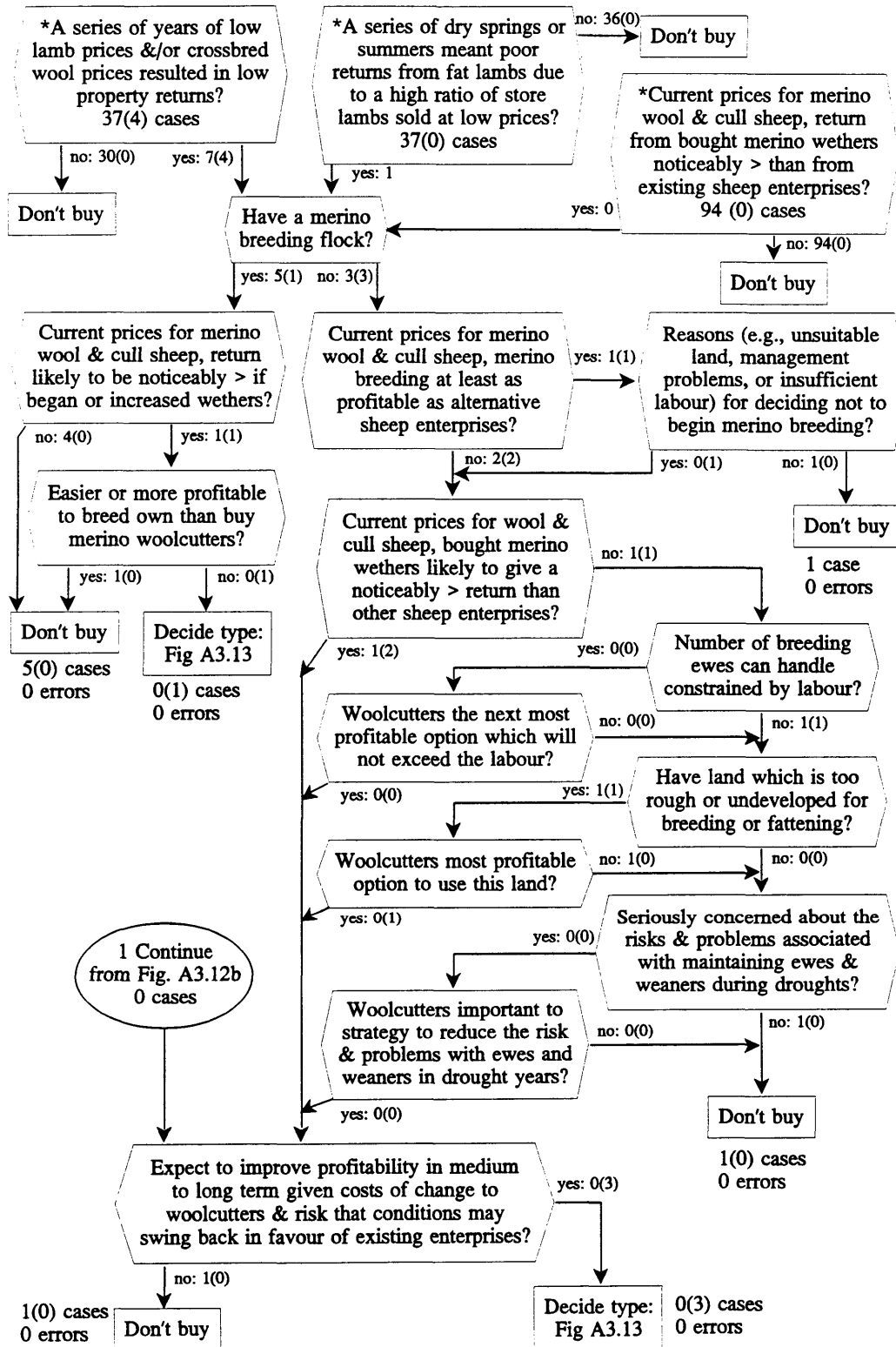
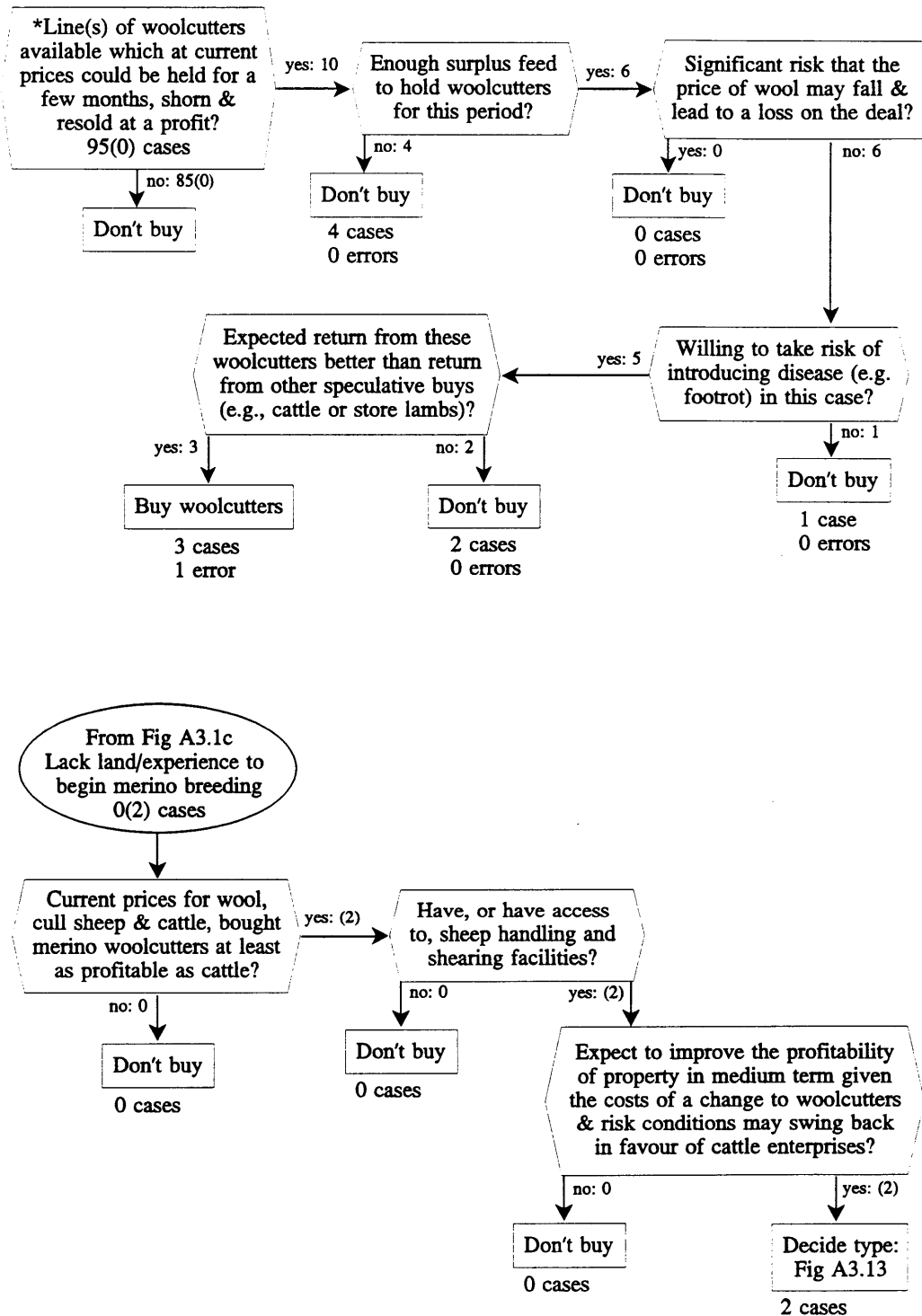


Figure A3.12d
Decision to begin to buy merino woolcutters (continued)



labour and management than breeding operations. Aspects considered included: relative profitability of wethers; the net returns from wethers; and costs of a change to wethers. This was a situation where a lower return would be considered provided the income was sufficient to meet the needs at the time. Changing from merino breeding was simple because ewes could be run as woolcutters and only extra and replacement sheep were required. On the other hand a producer who considered changing from prime lambs to woolcutters had higher changeover costs.

Poor lambings, the breaking of a drought, and the return of a son, were factors that made some producers consider they were understocked and to look for ways to increase stock numbers. Buying woolcutters was a quick method of increasing stock numbers but, for those interviewed from the 'test' series, it was not an important reason to begin such an enterprise.

The influence of changes in relative prices as trigger reasons to begin to buy merino woolcutters is featured in Figure A3.12c. As discussed in A3.2.2 for merino breeding, concern about low returns from lambs (caused by price and seasonal conditions) proved to be more important as a trigger to begin a merino enterprise than high wool prices. Nevertheless, wool prices were important in deciding which enterprises were adopted because of this dissatisfaction. A single model was used for the various price triggers because similar aspects were important for these decisions.

If the producer had a merino breeding flock, the two aspects to be assessed were: the relative profitability of wethers; and whether to breed or buy woolcutters. If the producer was not breeding merinos, then merino breeding was an option that also had to be deliberated (see also models of decisions to begin merino breeding). Even if merino breeding was more profitable, producers might have contemplated buying woolcutters because merino breeding was unsuitable for other reasons. Woolcutters were also compared with other sheep enterprises for profitability, and failing this, were bought occasionally because of their other advantages (e.g., low management requirements, low nutritional requirements).

Sometimes producers also bought woolcutters as short-term speculative purchases. These were mostly sheep, which at prevailing wool prices, had their purchase price or better in wool on their backs. In these cases if feed was available to hold them, the wool market did not look like falling, the producer was willing to take the risk of introducing disease and there were not better speculative buys, they were bought. Such sheep were shorn within a few months and resold shortly after.

Reasons derived from the 'initial' series of interviews provided only 10 of the 14 reasons that triggered decisions to begin buying woolcutters (excluding speculative purchases). Two other producers began buying merino woolcutters as an offshoot of a desire to get into merino breeding from cattle. This was discussed in A3.2.3 as part of the decision to begin merino breeding. Although a model is presented in Figure A3.12d, it has not been properly tested since it was developed from information obtained from the two producers interviewed.

Wethers were considered less profitable than breeding but, at the time, were more profitable than cattle. Their advantage over merino breeding was they were less susceptible to bad management decisions resulting from lack of experience with running sheep. In addition they provided initial experience with merino sheep that reduced the risk of making mistakes when breeding was begun. The risk arose because of a lack of information; a lack of technical knowledge and experience.

Starting with bought wethers first is an example of a strategy of taking the second-best option to manage the risk of starting a new enterprise. It has parallels in the adoption of packages of new technology. Here farmers will sometimes adopt a familiar or less risky part of the package first to lessen the risk of the change. Additional parts are adopted later as knowledge of the system increases.

Another trigger reason not covered by the models was a desire to have another enterprise to spread the risk. The producers involved had a 2x lamb operation and wished to add 'another string to my bow'. Merino breeding was not considered because insufficient labour was available to handle the breeding operation. A further reason that initially triggered a decision to buy wethers was the offer of wethers that

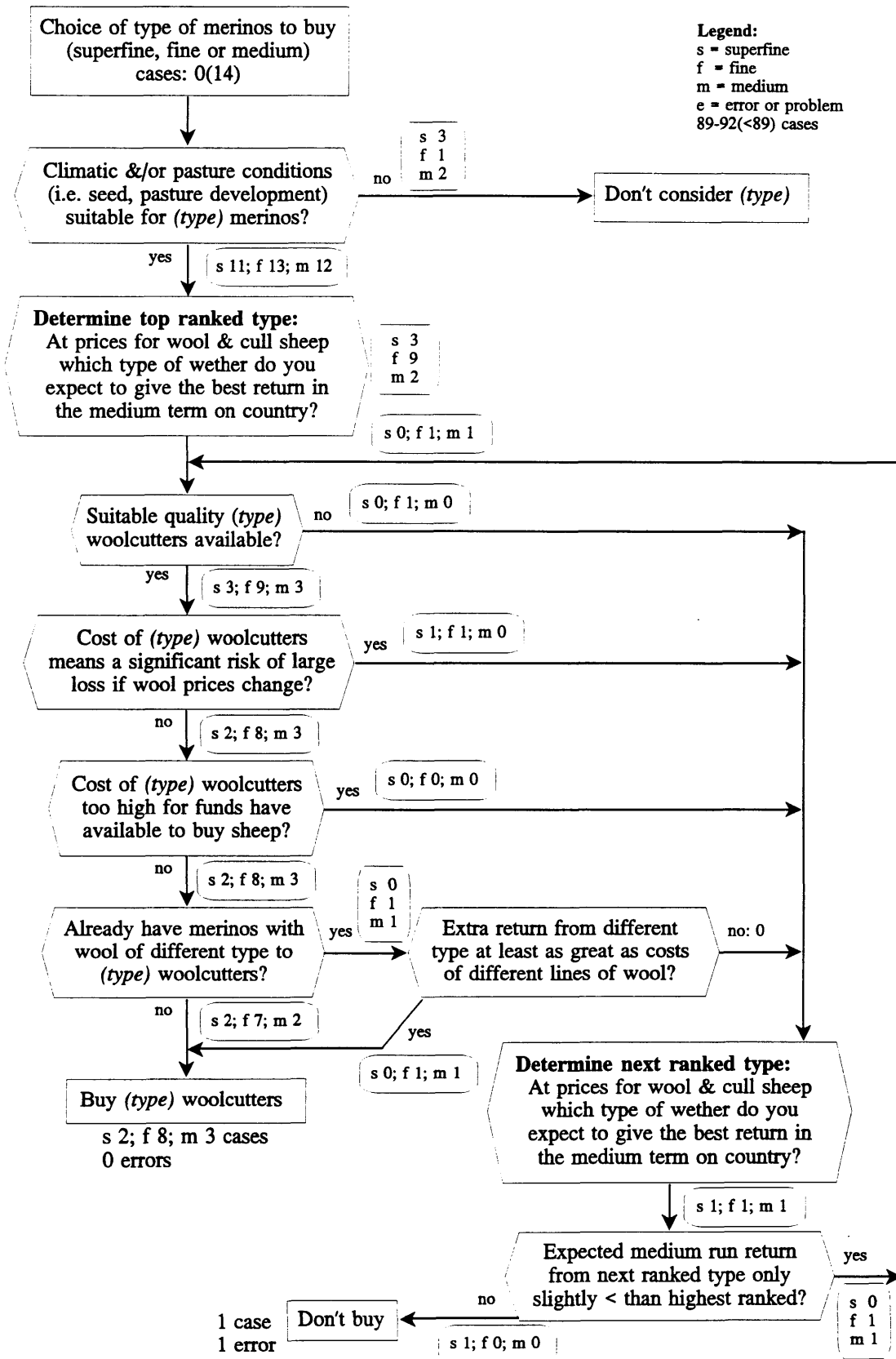
were the same as those being used to produce 1x lambs. Since the property contained some land that was unimproved, they were considered ideal to make use of this. This example illustrates the function trigger reasons play in initiating decisions (see Figure A3.12c also for cases of producers who had rough land that was nominally being used for 2x lambs). Just because producers had some unimproved or rough land that might have been ideally suited to woolcutters does not mean they ran woolcutters on it. It required a trigger such as poor returns from another enterprise, or the offer of some wethers, to provoke a reconsideration of the enterprise mix, and then, if the other aspects were favourable, a change was made.

A3.8.2 Type of woolcutters to buy

All fourteen producers who decided to buy woolcutters were passed on to the model of the decision about which micron type of woolcutter to buy (Figure A3.13). Similar aspects were included in this model to those used in the other models involving the choice of a micron type of merino to buy. Three choices were given: superfine, fine and medium. Each micron type had to be judged suitable to the climatic and pasture conditions of the property before it was considered further. A ranking criterion was used that compared the wethers on their return in the medium term. The highest ranked type then had to pass through criteria dealing with availability of sheep, risk of loss because prices were too high, and funds available for the purchase of sheep.

An additional aspect was added that applied to producers who already had merinos of a different type from the ones being considered. This aspect was included because producers who had different types of merinos had to sell the wool as separate lines. If this meant many small lines had to be sold instead of a few large lines, selling costs would be higher. Small lines of wool were considerably more expensive per bale to sell. When lines were too small, they were combined with someone else's wool, which may not have been to a producer's advantage or liking. Producers who already had merinos of a different type were asked to consider if the extra return from the new type of merino would outweigh the costs associated with having to sell wool in smaller lines than if all wool was the same type.

Figure A3.13
Micron type of woolcutters to buy



If all these criteria were passed, the model predicted the producers would buy a certain type of merino. When a criterion rejected the first ranked type, producers were asked to rank and consider the next ranked type. This occurred three times. If the expected return from the next type was judged to be only slightly less than the highest ranked type it was passed back through the constraint criteria.

An error occurred in the model because one producer answered no to the availability criterion because he was forced 'to hunt around'. The model then forces consideration of other micron types, which were rejected, resulting in a prediction of no purchase. In reality, fine woolcutters were eventually obtained and purchased.

A3.9 Decisions to buy another micron type of woolcutter

In theory, a producer with a bought woolcutter enterprise had the option of buying a different micron type of woolcutter every time replacement (or extra) purchases were made. Often purchases were made annually and therefore changing to another type was easier than changing a merino breeding operation. In practice, most producers appeared to continue to buy a particular type of woolcutter unless something initiated a reconsideration of their position. The models of this decision presented in Figures A3.14a to A3.14c contain five reasons that could have prompted a change in the type of woolcutter purchased: purchase of different land; change in wool prices; need to obtain another source of wethers; high replacement cost of current type of woolcutter; and speculative purchases.

Apart from the model of speculative purchases, the models associated with each of the trigger reasons for change contained criteria covering basically the same aspects, with alterations to reflect the different contexts of the decisions. An initial criterion eliminated micron types that did not suit the climatic or pasture conditions of the property. A ranking criterion followed that compared the return from other micron types with the existing type. Constraints imposed by availability of sheep and their cost followed that determined if the new type could be purchased.

Figure A3.14a
Decision to buy another micron type of woolcutter

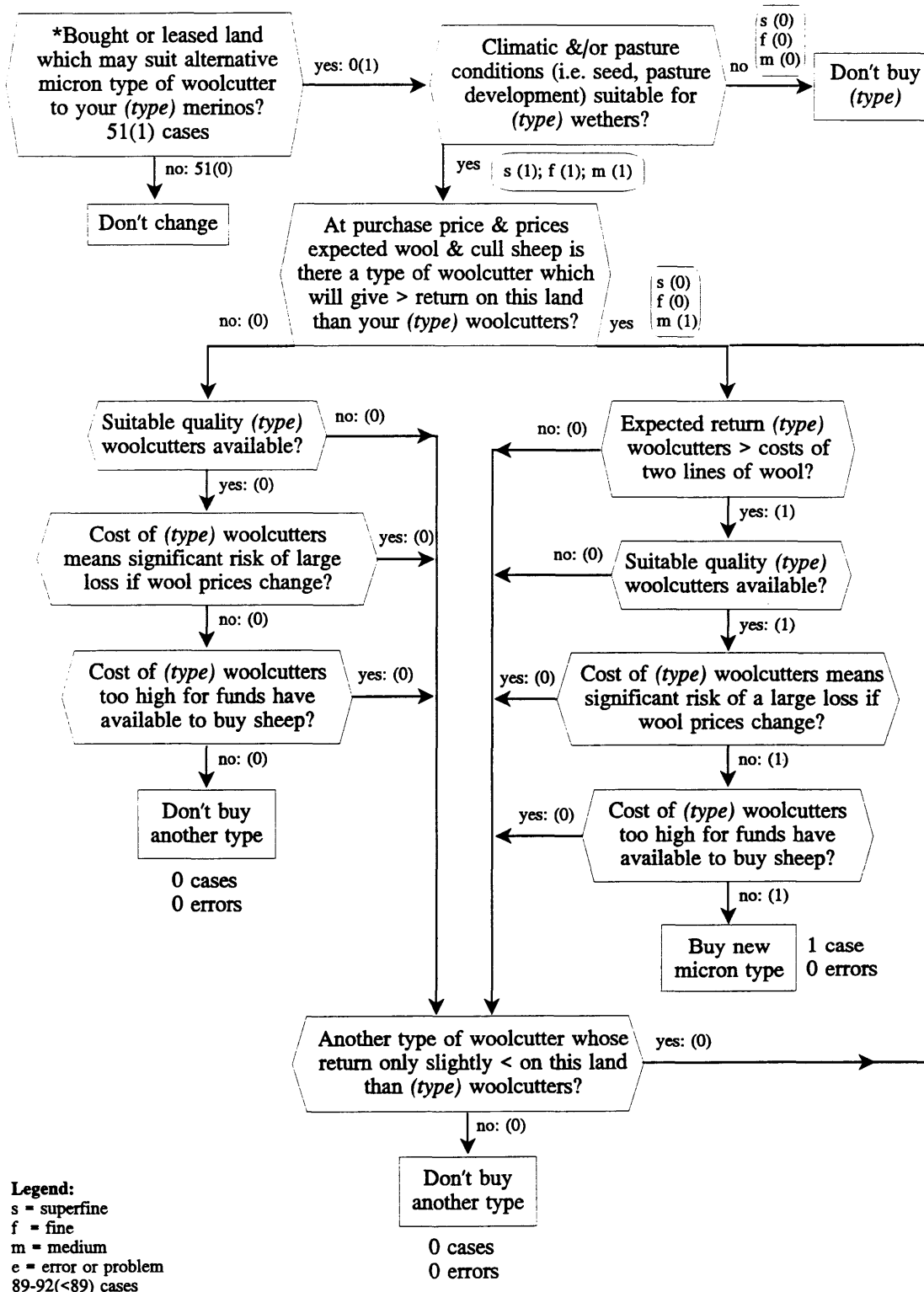


Figure A3.14b
 Decision to buy another micron type of woolcutter (continued)

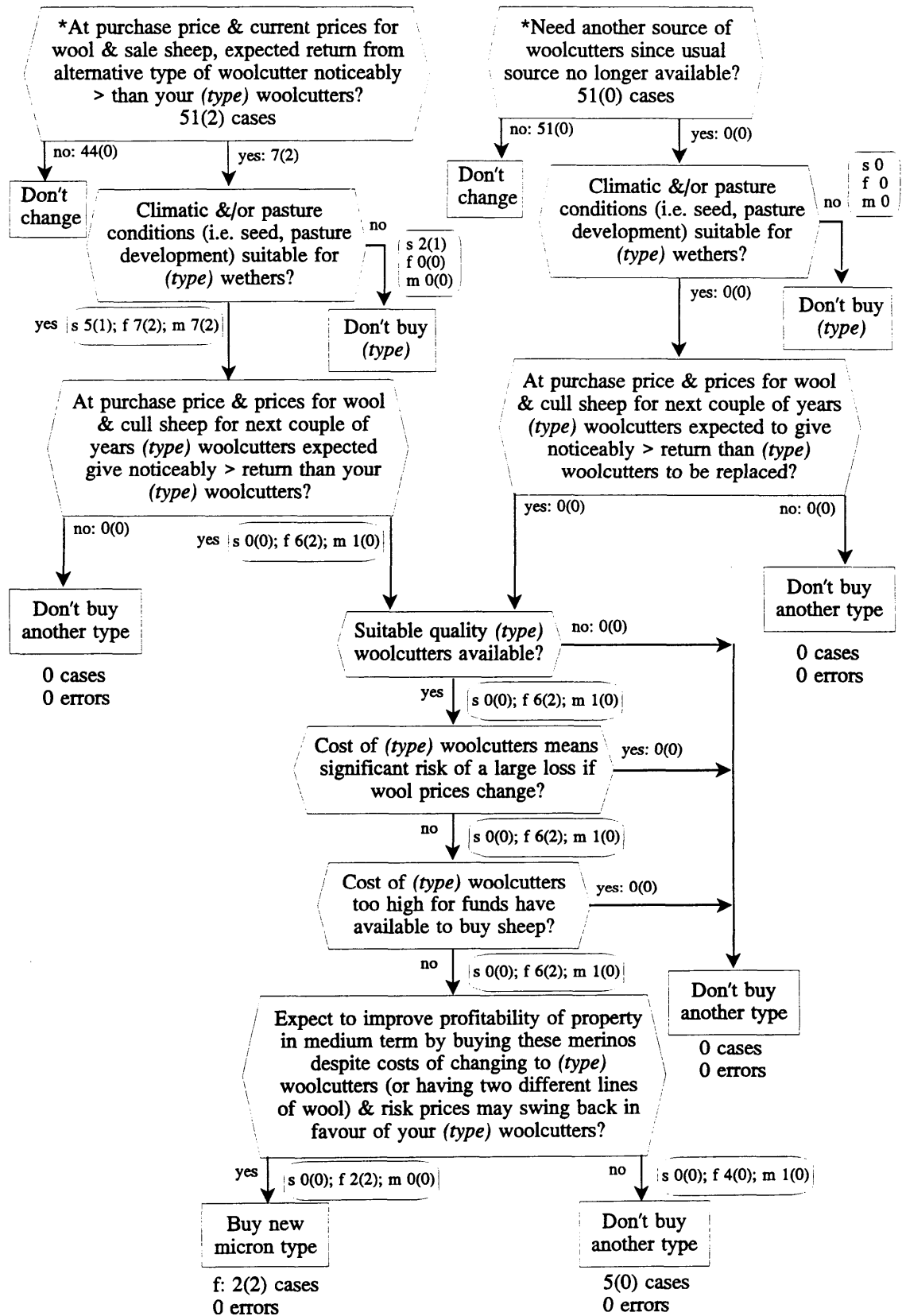
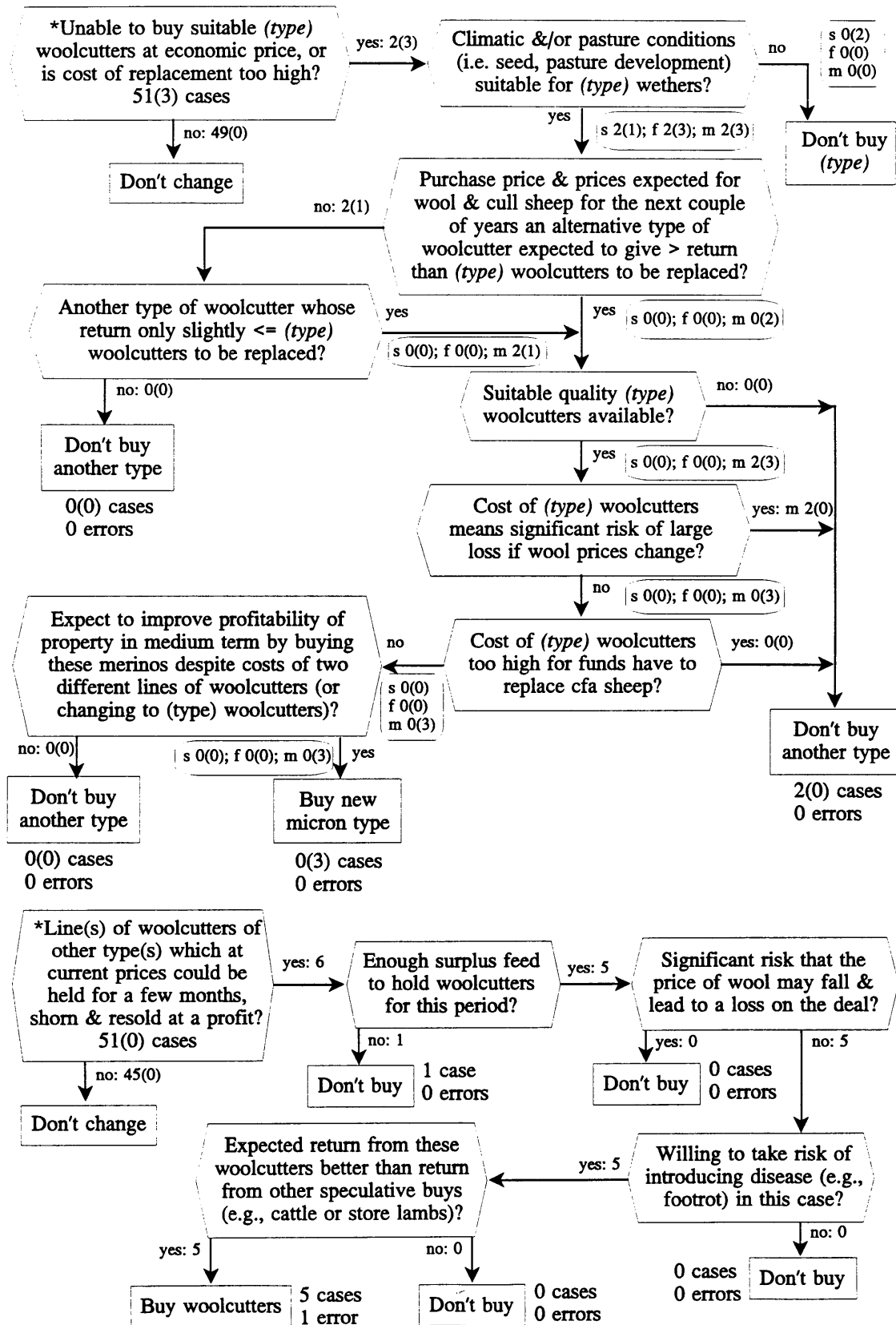


Figure A3.14c
Decision to buy another micron type of woolcutter (continued)



Producers were also asked to make a judgement about the costs of having different lines of wool if the new type was purchased (see earlier discussion in A3.8.2). In some models this judgement was combined with the costs of changing to another type in the medium term. In one sense these were different aspects, however, which one was appropriate depended on a series of factors. Although they could have been elicited and modelled, it would have made the model extremely complex. Each division would have been applicable to very few producers and thus difficult to test. Anyhow, since change to another type would sometimes have taken several years, there would have been higher selling costs associated with different lines of wool.

One person bought another micron type of woolcutter because of a land purchase, but the most important triggers were changes in the relative returns from the different micron types of sheep and the cost of replacing woolcutters. Both of the latter reasons were caused by the same underlying factors, although they triggered different aspects in the producers' minds.

For the period 1989-92, most producers had not considered change. One person commented: 'I haven't worked out if I would get more from broader ...'; another: 'I don't follow the market that closely.' Change in relative returns for different types of woolcutters (see Figure A3.14b) initiated consideration of change in seven cases. Six of these involved consideration of buying fine wool and one of buying medium wool. All passed every criterion except the last, but only two decided to buy another type of woolcutter. This last criterion asked producers to consider the medium-term return from change, while taking in to account the risk of further price changes and the costs of change. Comments recorded on this included:

'... fine better in the medium term and soon as change prices change back.'

'... may be better off with medium [wool woolcutters] but in medium term better off where I am.'

'... would have to have two lines of wool.'

'... can't chop and change all the time ...'

Again the most common reaction was to follow a strategy of sticking with the existing behaviour.

During the 1980s and early 1990s sheep with finer wool were eagerly sought after because of high prices for this type of wool. Prices for fine woolcutters were at historically high levels. Even after the collapse of wool prices, some sheep were still relatively expensive. Sometimes producers were unwilling to pay these prices. Some tended to use a rule-of-thumb when buying wethers. This idea was expressed by one person as: 'I didn't buy replacements because they were too expensive ... take two years to cut out their cost - I like to cut out in 18 months at most.' A maximum purchase price for replacements was generally based on the expected gross value of the wool that would be cut from the wethers in a certain time. This tended to range from one year to 18 months, with most preferring one year.

Between 1980 and 1989 three producers bought another type of woolcutter because of the high cost of replacements (Figure A3.14c). From 1989-92 two cases out of 51 considered change because of this reason. They did not change because the alternative types of merino woolcutters were also considered too expensive and there was a risk of making a loss on them. A second-best option was included in the model for producers who thought the replacement cost of their existing type of wethers was too high but who did not think another type would provide a better return. In cases where the alternative type was expected to give a return only slightly less or equal to their existing type, they passed on to consider the other criteria to decide if it would be purchased instead of the existing type.

Decisions to buy wethers for speculative reasons resulted in other micron types of woolcutters being purchased in four instances (Figure A3.14c). Speculative purchases were also made of the same type of woolcutters, but this model only includes cases where different types were bought. The model is essentially the same as the one used for speculative purchases in the model of the decision to begin to buy woolcutters because similar aspects were used for the decision. Less importance seemed attached to the risk of introducing disease, perhaps because producers were already buying mobs of sheep.

An error arose in one case for this part of the model because the producer passed through all criteria, implying the stock would be bought. They were not bought

because family labour was used to shear their sheep and they had other commitments at the time. The profit margin was not considered sufficient to justify employing someone else to do the shearing. Another producer, who also dealt in sheep, bought several mobs of different types of sheep, but only one case is recorded for each year in which this occurred.

No errors occurred with any of the other four models in this section. An error occurred with the models as a whole, however, as one decision could not be modelled because the person could not remember clearly the reasons for the change.

A3.10 Decisions to stop buying a micron type of woolcutter

Although 14 of those interviewed began a merino woolcutter enterprise between 1980 and 1992, 17 stopped buying merino woolcutters during the same time. Eleven of these made the final decision to stop between 1980 and 1989, while six did so between 1989 and 1992. Models of these decisions are found in Figure A3.15a and Figure A3.15b.

Three reasons were used in these models as triggers to begin decisions to stop buying woolcutters: belief that bred wethers were better than bought; purchase of another type of woolcutter; and relative profitability of alternative sheep enterprises. The first two of these were the most important in stimulating change, resulting in eight and five decisions to stop, respectively.

Producers who were breeding merinos generally believed it was more profitable and less risky to breed their own and run these instead of buying woolcutters (see Figure A3.15a). This situation arose most commonly because producers had recently begun merino breeding and had decided to keep their own wethers as woolcutters. It also occurred when producers with a merino flock had bought more land and decided to buy woolcutters to stock it. As their own sheep became available they were likely to replace the bought sheep. Others had been merino breeding for a considerable time, but for various reasons, could not breed sufficient of their own wethers to replace the bought woolcutters.

Figure A3.15a
Decision to stop buying a micron type of woolcutter

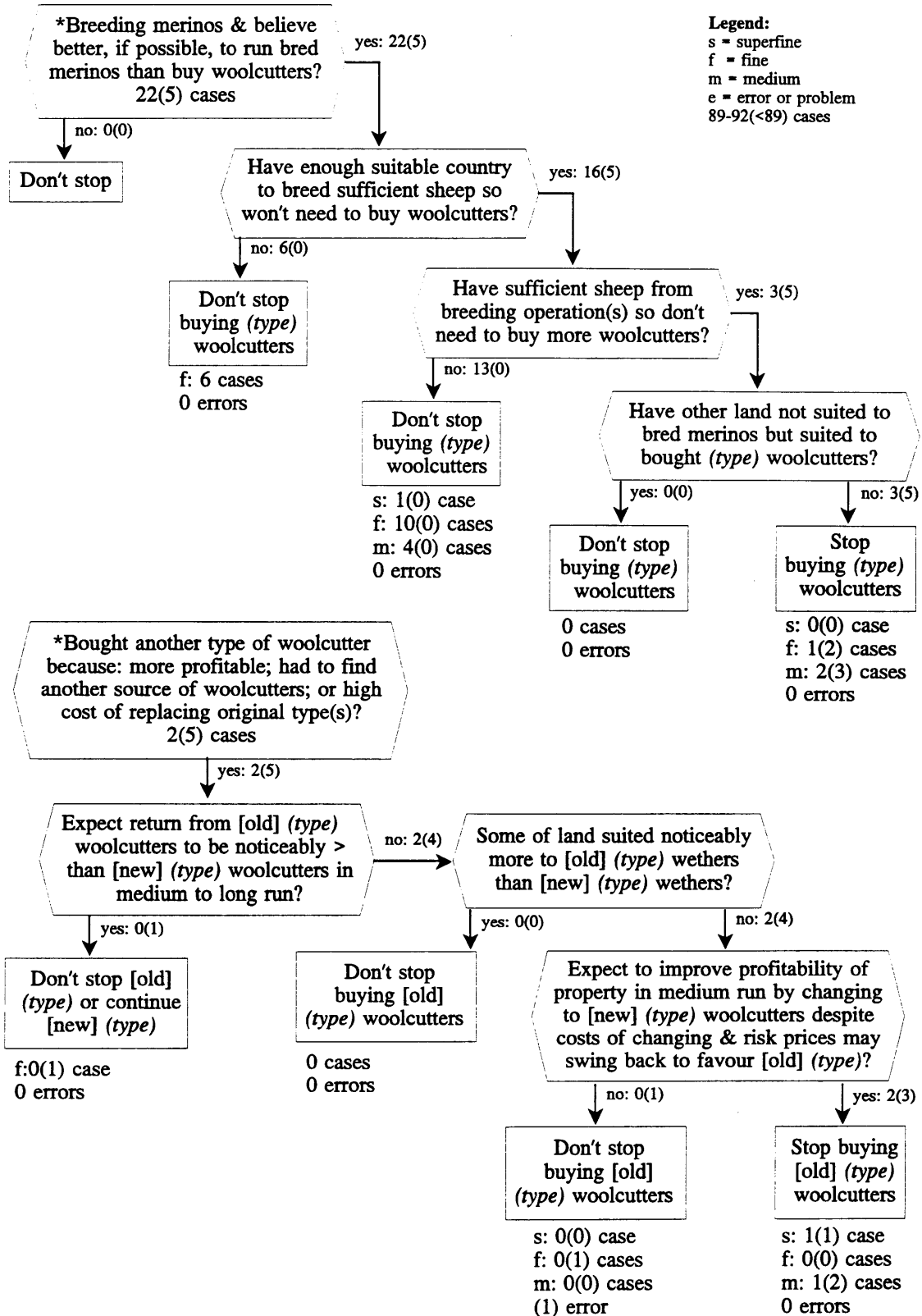
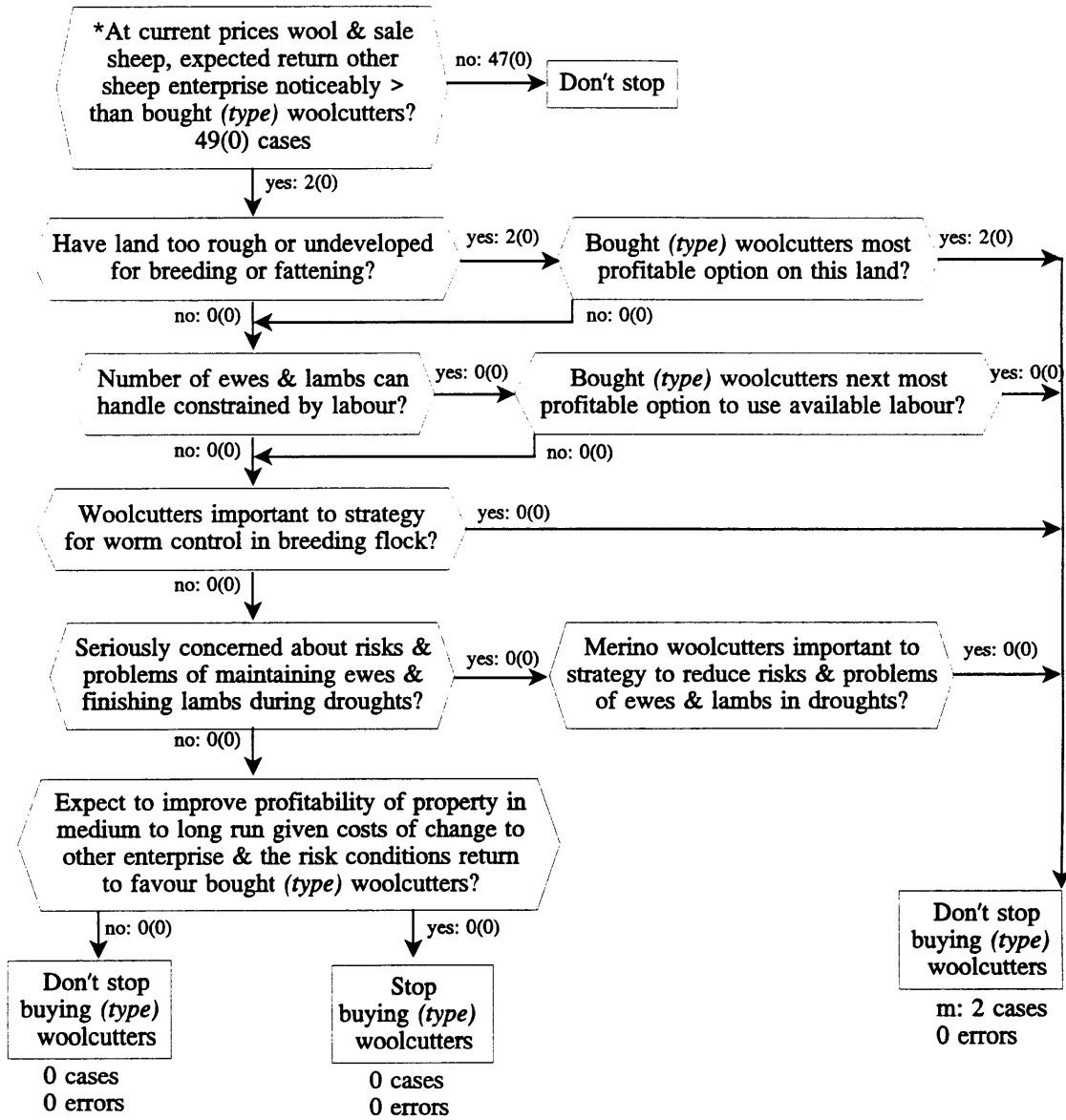


Figure A3.15b
 Decision to stop buying a micron type of woolcutter (continued)



An explanation for the occurrence of cases where producers still had bought woolcutters despite their preference to run their own sheep is provided by the first two criteria in the model. Some did not have enough suitable country to run sufficient ewes to breed all their own merinos. In the other cases sufficient sheep had not yet been bred to replace the wethers. Bought woolcutters were not necessarily replaced by wethers. Occasionally their place was taken, at least in the initial stages, by ewes and young sheep.

Although no cases were found in the 'test' series, in the 'initial' series cases occurred of producers selling some of their own wethers and replacing them with bought wethers. In some years this occurred because of differences in return for micron types, while in other cases it was because some land was unsuitable for the type of merino being bred. The latter scenario is the reason for the final criterion in the model.

When producers made a decision to buy another micron type of woolcutter invariably the question arose about whether this would entail a total change to the new type of woolcutter, or whether purchases of the original type would continue in the future. Three aspects were found to influence this decision: the relative returns of the two micron types; land constraints on which micron types could be run; and the medium-term view of whether a total change outweighed the costs of changing and the risks of future price changes.

It was found a producer who had been forced to buy another type of woolcutter because the preferred type was not available, or was too expensive at the time, may still consider the old type would give a noticeably better return in the medium to long run. If they answered yes, then the model predicted that the purchase would be a one-off occurrence. In future they would buy the old micron type and not buy any more of the new micron type. In other words the change was a temporary one forced by circumstances. Of course, if conditions changed in the future, it was possible for producers to change their mind again.

Again a criterion was required that dealt with the strategy of 'not chasing markets'. For this aspect similar wording was used to earlier models. In this instance most passed this criterion. However, the four cases from before 1989 were of producers who had decided to stop buying the old type of woolcutter, so it might be expected they would pass it. In fact one did not which resulted in an error for the model. It occurred because, although the new type was not expected to be more profitable in the medium term, it was expected to be less risky than the old type. This was the reason a change was made. A further influence that weakens the effect of this criterion is that in deciding to buy another type of woolcutter, a decision has already been made to change and therefore the next step is not as great.

A further model was used for the case where producers considered other sheep enterprises (e.g., 1x or 2x lambs) might bring a noticeably greater return than bought woolcutters (see Figure A3.15b). Despite the dramatic changes in wool prices, both in absolute and relative terms, there was little interest in changing to other enterprises like prime lamb production. At the time, however, prime lamb prices were low and many were having problems finishing lambs because of poor seasonal conditions. For the two cases where alternative enterprises were considered more profitable, the property had land that was more suited to woolcutters than breeding or fattening so there was no question of stopping the woolcutter enterprise.

Although this model was not important in the period of this study it might become so in another period when relative prices were different. In its present format it is extremely general because there were few opportunities to make it more detailed. In a situation where more changes were being considered in this area, it might need to be expanded to maintain a decent level of prediction and to provide more information about the aspects being considered.

Apart from the error already discussed, the models did not predict two other cases where decisions to stop buying woolcutters were triggered by other factors. One producer stopped because of uneconomic levels of pizzle rot in the wethers. This aspect has also caused a problem for other models. It could possibly be included in the models without too much difficulty, but may not be worth the effort since it is

likely to occur in few cases. The other error arose because another producer predicted a crash in the wool market (after wool prices began to decline, but before the collapse of the Reserve Price Scheme). It triggered a decision to sell all woolcutters and to change to cattle. While this trigger is no longer relevant a change to cattle is a possibility in some situations for some producers. In the 1970s there was a shift into cattle and this could occur again.

A3.11 Decisions to produce 1x lambs from bought merino ewes

A few producers bought merino ewes and mated them to prime lamb rams. The most common reason for this was to produce 1x ewe replacements for their 2x lamb enterprise. A few instances occurred of producers buying merino ewes to produce 1x lambs for sale, either as ewe replacements or as prime lambs. An attempt was made to develop models of these decisions from the limited cases found in the 'initial' series of interviews. Both models were inaccurate when tested and are not presented here.

While the initial attempt was unsuccessful, it provided a basis for questions and for exploration of the problem. Based on these discussions a revised model was developed (Figure A3.16a and Figure A3.16b). It was not tested and would need to be pretested and revised further before this could be done. Nevertheless, it provides an outline of the types of aspects used for this decision.

Like the related decision for merino breeding ewes (see discussion in A3.7.2), the model is complex because there are several options and it is related to other decisions. The options considered are to buy, breed, or buy and breed 1x replacements. The model approaches these options by assessing whether a change will be made to the usual practice. Factors that might initiate a change are built-in to the model.

Four factors are included that might trigger a producer who buys 1x replacements to consider buying 1x ewes and breeding them instead. These are: buying more land; a large number of 1x ewes to be bought in the future; cost of buying replacements; and the risk of a footrot outbreak.

Figure A3.16a
 Revised model of decision to buy merino ewes and breed 1x ewes

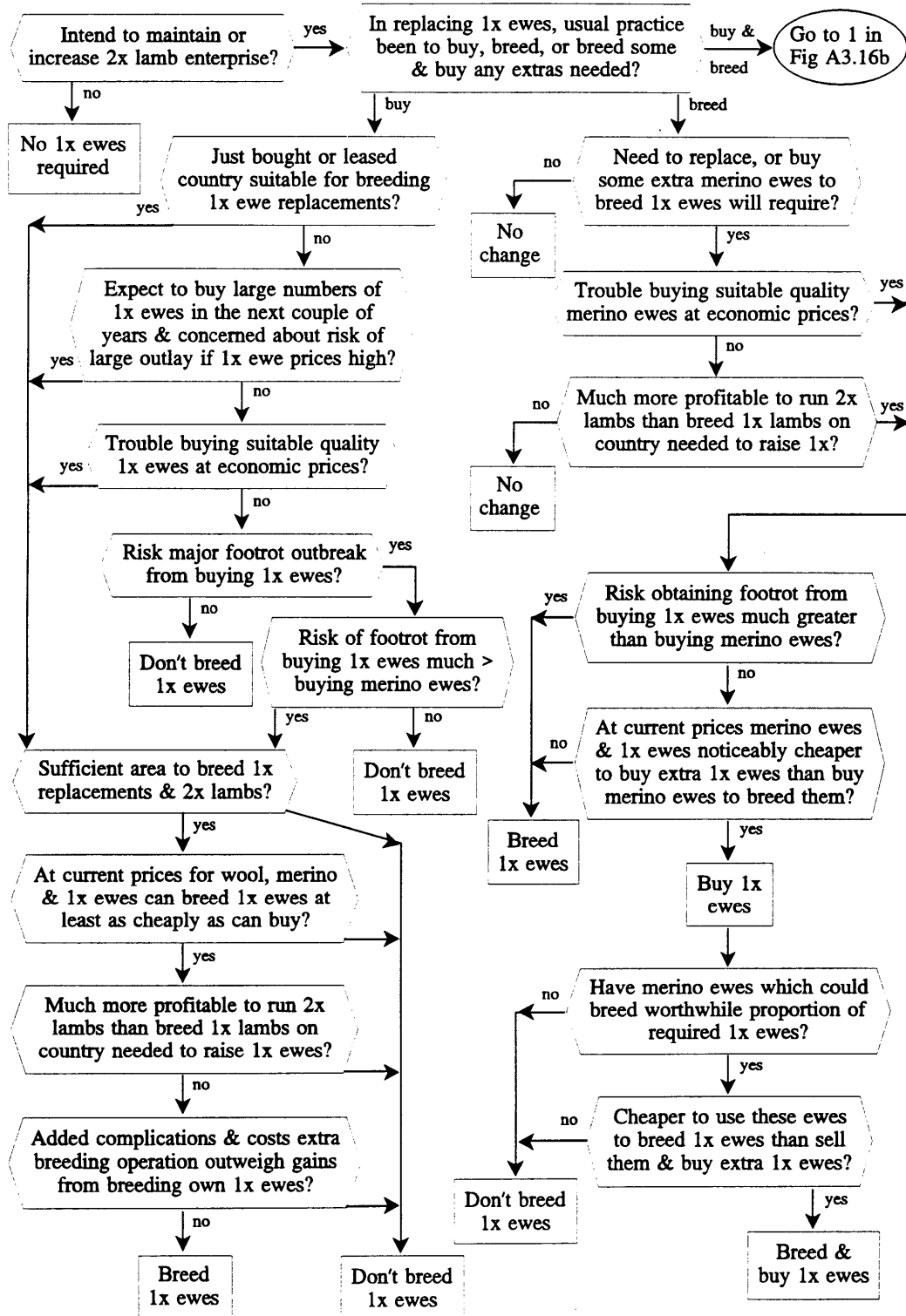
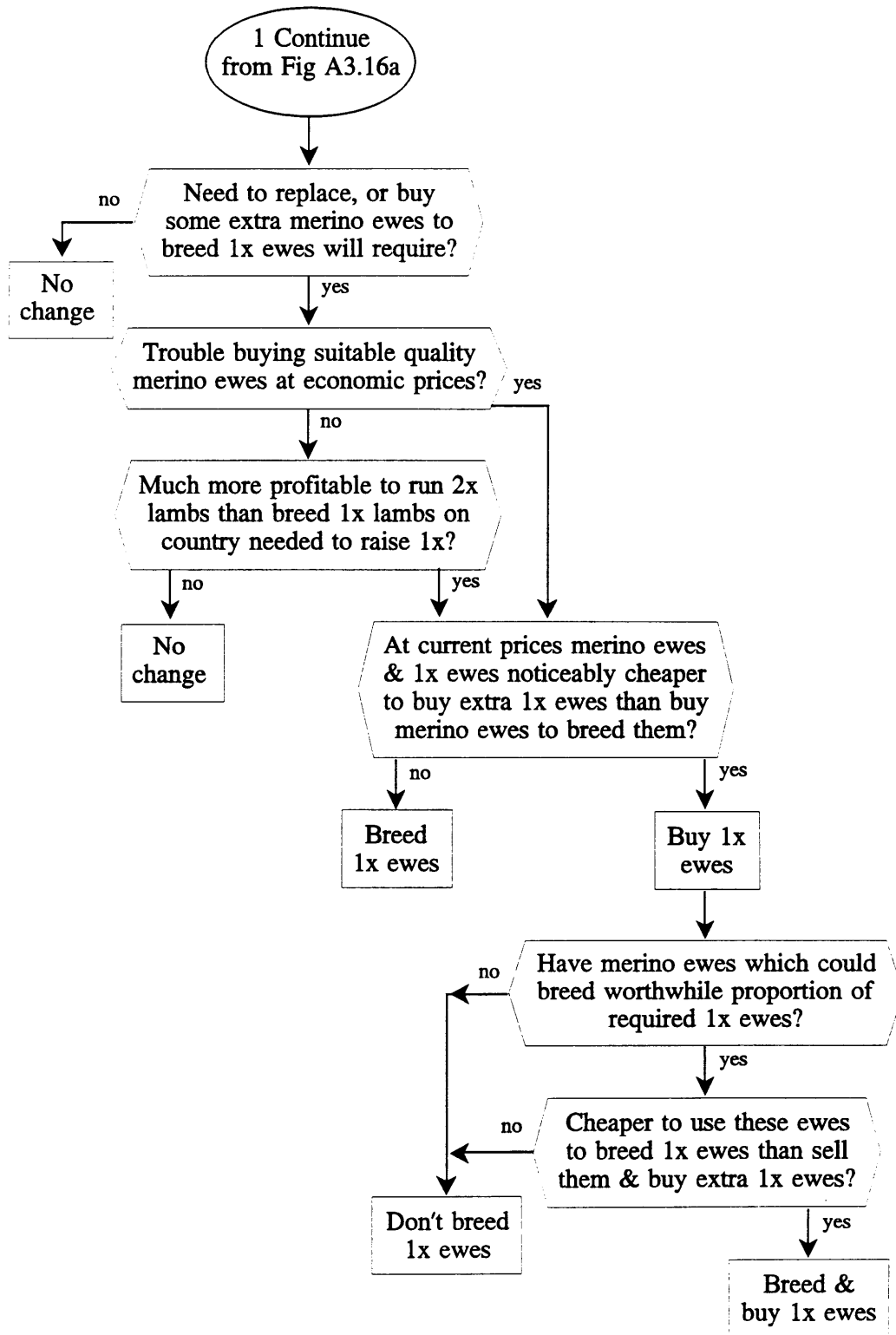


Figure A3.16b
 Revised model of decision to buy merino ewes and breed 1x ewes (continued)



Once producers pass the initial phase, two criteria ask producers to compare breeding 1x replacements with the cost of replacement ewes and the relative profitability of 1x and 2x lambs. In the initial model one criterion encompassed these factors, but they appeared to be considered separately and the single criterion was too complex. Both these issues were raised by producers, but whether this is the best way of presenting them would need to be sorted out by further testing and experimentation. Some producers were also unwilling to begin breeding their replacements, even though it might be more profitable, because they considered the extra return was not worth the extra complications and costs associated with running an extra breeding operation.

For producers who breed their own replacements, two factors are included that might trigger a decision to buy replacements: cost of suitable quality merino ewes; and relative profitability of 1x and 2x lambs. A producer who considered one of these situations to have arisen would then have to consider two other aspects: the risk of introducing footrot by buying 1x ewes compared with merino ewes; and the relative costs of buying 1x and merino ewes. The model then discovers whether the producer would continue to breed some 1x ewes or whether they would all be bought.

Some producers breed some of their replacements and buy the rest, so a model was also developed to predict change from this situation (Figure A3.16b). It is similar to the model for producers who breed their replacements without the criterion asking about the risks of introducing footrot. It aims to predict if a producer will continue to breed some 1x ewes without assessing whether a decision will be made to breed them all. This would require further criteria.

A3.12 Reasons for changes in sheep numbers

Initially it was hoped models might be developed to predict changes in livestock, or at the very least, the direction of change of livestock numbers. It quickly became apparent, even before interviewing began, that this might prove an impossible task. Responses in the initial interviews showed this to be the case. In livestock industries, with animals that have multiple uses and supplementary and complementary

relationships, decisions about livestock numbers quickly become situation specific. A variety of price factors were found to trigger and influence decisions to change livestock numbers, while environmental factors also had an important role to play.

Because of limitations on the number of areas that could be covered in detail in an interview, it was decided not to spend a significant amount of time trying to develop such extremely complex models. Even if time were available it is unlikely that hierarchical decision models could be used to model changes in livestock numbers, at least in the Australian wool industry. An approach that makes greater simplifying assumptions is required.

Presented in this section are the reasons given by producers in the 'test' group for changes in the numbers of the various merino types on their property at the end of each financial year from July 1989 to June 1992. An open-ended question was used to elicit the information. Categories of answers were derived from their replies and the replies of producers in the 'initial' series. The number of flocks that increased, decreased, or made no change in sheep numbers are also given for the same period.

A3.12.1 Change in the numbers of merino ewes mated to merino rams

Total matings of merino ewes to merino rams for the 'test' series (Table 8.3) increased from 1989 to 1990, but declined slightly in 1991 (2.2 percent) and again in 1992 (1.8 per cent). This gives a skewed picture of what happened on most properties because it is affected by one large property that went out of merinos entirely between 1990 and 1991. Table A3.6 gives a truer indication of changes on a property by property basis. Approximately 55 per cent of flocks increased the number of ewes mated between 1989-90 and 1990-91. The number of flocks that decreased matings was less than this, but increased from 25 per cent to 35 per cent over the same period. Between 1991-92 the number of flocks that increased matings declined to 44 per cent, while the number that decreased matings increased to 50 per cent.

The reasons for these changes are given in Table A3.7. Increases in merino matings from 1989-92 are dominated by decisions to start merino breeding and the

Table A3.6
Change in matings of merino breeding flocks to merino rams
'test' series 1989-92

Change ^a	Year		
	89-90	90-91	91-92
Number increasing matings	18	20	16
Per cent increasing matings	56%	54%	44%
Number decreasing matings	8	13	18
Percent decreasing matings	25%	35%	50%
Number not changing matings	6	4	2
Per cent not changing matings	19%	11%	6%
Total changes	32	37	36

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

buildup following those decisions, especially between 1991-92. Many decisions were made when wool prices were still rising. Seasonal effects, property improvements and property purchase were also important factors in the early part of the period. Matings of ewes were increased in two cases between 1991-92 to make up for poor lambings in the previous year caused by poor seasonal conditions.

On the other hand, decreases in matings were dominated by seasonal conditions, with the drought of 1991-92 causing many producers to cull heavier (11 mentions). Few said they had decreased their ewe matings because of the decrease in wool prices. Only four cases for 1991-92 related to price and one of these was a shift back towards merino wethers caused by lower prices for cull young stock. This might seem surprising to some since wool prices began declining after May 1988, about one year before the 1989-92 period examined here. Total matings to merino ewes decreased by less than 4 per cent from 1990 to 1992 and almost as many increased as decreased their matings between 1991-92. It appears producers were not yet ready to change their strategic positions in the wool industry.

Table A3.7a
*Reasons for change in matings of merino breeding flocks to merino rams
 'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Decided to start merino breeding - see model.	2	2	0	4
Build-up following decision to begin merino breeding.	4	6	6	16
Decided to change to this micron type of merino - see model.	0	1	0	1
At prices of wool and stock, expect better return from increasing merino breeding compared to other enterprises e.g., cattle, 2x lambs, bought wethers.	2	1	2	5
Expect better return from merino breeding compared with 1x lambs this year.	1	1	0	2
Sale price of cfa ewes poor, season OK, better return if keep, mate and shear.	0	1	0	1
Seasonal conditions good, decided could carry more stock.	1	0	0	0
Mated more to decrease age structure of flock by replacing larger number of cfa ewes or wethers.	1	1	2	4
Mated more so can cull heavier and improve wool quality.	1	0	0	1
Need to make up replacement numbers because of a poor lambing.	0	0	2	2
Increased carrying capacity due to fertilising, pasture improvement and/or improved grazing control.	4	1	2	7
Increased numbers because leased, bought or planning to buy another property.	3	4	0	7
<u>Reasons for unplanned change or no change</u>				
No significant change and/or reason for change.	6	5	3	14
Result of replacing bought ewes with own ewes after begun breeding.	1	1	0	2
Result of differences in lambings, proportions of ewes, deaths, and culling of young and old sheep.	5	5	4	14
Drought resulted in loss of ewes and poor lambing.	0	0	1	1

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

Table A3.7b
*Reasons for change in matings of merino breeding flocks to merino rams
'test' series 1989-92 (continued)*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for decrease</u>				
Decided to stop merino breeding - see model.	0	2	0	2
Phasing out following decision to change to another micron type of merino - see model.	0	1	0	1
At prices of wool and stock, expect less return from merino breeding than other enterprises e.g., cattle, 2x lambs, bought wethers.	1	1	2	4
Expect better return from increasing 1x lambs compared with merino breeding this year.	2	0	1	3
Expect better return from increasing self-replacing flock compared with merino breeding this year.	0	0	1	1
Uncertain wool market and/or talk of quotas.	0	1	0	1
Lower prices for wool means more economic and less risky to decrease stocking rate.	0	1	0	1
Dry/drought conditions, shortage of feed: culled ewes heavier, pitted ewes, and/or didn't mate maiden or other ewes.	0	5	11	16
Been above optimum long term stocking rate.	0	0	1	1
Sufficient young sheep and less cfa ewes or wethers to replace.	0	0	1	1
Higher culling rate because trying to improve quality of flock.	2	1	1	4

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

A3.12.2 Change in numbers of merino ewes mated to prime lamb rams

In contrast, matings of merino ewes to prime lamb rams show dramatic fluctuations (see Table A2.4) reflecting its status at this stage as a marginal and speculative type of industry compared to merino breeding. Matings of merino ewes to produce 1x lambs doubled from 1989-90 but had declined by almost two-thirds by 1992. Matings of merino ewes to produce 1x ewe replacements fluctuated in response to demands from the 2x enterprises that on the whole were declining. Between 1989-90 and 1990-91 approximately the same number of flocks increased as decreased matings to prime lamb rams (Table A3.8). In 1991-92 most flocks had decreased matings.

In further contrast to merino breeding, the reasons for changes in matings of merino ewes to prime lamb rams were heavily dominated by price factors (Table A3.9). First-cross lamb production tends to be a more speculative industry than merino breeding, therefore, short-term expectations about prices were more important. This has to be put in the context, however, of lamb prices performing poorly compared with other prices in the last decade (see Figure 2.4). An additional factor was the poor seasonal conditions during 1991 and 1992 that resulted in high costs of finishing lambs and the need to sell others as store lambs. Drought conditions appeared directly as the most important reason for a decrease in numbers between 1990-91.

Some producers tended to speculate on lamb prices, for instance, saying that since many had been going out of the industry in recent years, it must be about time prices improved again. Some were hoping to pick the year of the \$40 lamb and to make a windfall gain. There was also acknowledgment that there appeared a long-term trend against lamb consumption and that there would be less total demand for lamb.

Another tendency (as shown in the models of 1x lamb production) was for some producers to view 1x lamb production as providing cash at another time of the year and as providing 'another string to the bow' or 'spreading the risk'. This reason appeared to become less important when prices were supported by the Reserve Price Scheme and lamb prices were declining relative to wool prices. There was a

Table A3.8
Change in matings of merino breeding flocks to prime lamb rams
'test' series 1989-92

Change ^a	Year		
	89-90	90-91	91-92
Number increasing matings	3	4	1
Per cent increasing matings	50%	44%	13%
Number decreasing matings	3	5	6
Percent decreasing matings	50%	56%	75%
Number not changing matings	0	0	1
Per cent not changing matings	0%	0%	13%
Total changes	6	9	8

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

suggestion by a couple of producers that it might become more important now that the Reserve Price Scheme was gone.

A3.12.3 *Change in the numbers of dry ewes (2T or older) in merino breeding flocks*

From 1989-90 the numbers of dry ewes (2T or older) in the merino breeding flocks were relatively stable (see Table A2.3), with approximately the same proportions of flocks increasing, decreasing and making no change (Table A3.10). Conversely, between 1990-91 and 1991-92, the proportions of dry ewes in the merino flocks increased, as did the proportion of merino flocks that had increased numbers of dry ewes.

Table A3.11 contains a summary of the reasons for the changes. In normal seasons, some producers did not mate their ewes until 4T so that any fluctuation in the number of dry ewes in the merino flocks was a result of mating decisions in previous years, lambing percentages, proportions of ewes born, and the normal culling regime.

Table A3.9
*Reasons for change in matings of merino breeding flocks to prime lamb rams
'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Expect better return from increasing 1x lambs compared with merino breeding this year.	2	2	1	5
Mated more because expect to replace larger number of cfa 1x ewes.	0	1	0	1
<u>Reasons for decrease</u>				
At prices of wool and stock, expect less return from 1x lambs than other enterprises e.g., cattle, 2x lambs, bought wethers.	0	0	1	1
Expect better return from increasing merino breeding compared with 1x lambs this year.	1	3	1	5
Expect better return from increasing wethers compared with 1x lambs this year.	0	0	1	1
Uncertain wool market; and/or talk of quotas.	0	1	0	1
Dry/drought conditions, shortage of feed: culled ewes heavier, pitted ewes, and/or didn't mate maiden or other ewes.	0	0	3	3
Mated less because expect to replace smaller number of cfa 1x ewes.	1	1	0	2
Other reason	0	0	1	1
<u>Reasons for unplanned change or no change</u>				
No significant change and/or reason for change.	0	0	1	1
Number of culls from ewes bought to begin merino breeding enterprise.	1	1	0	2
Numbers cull/cfa sheep left after requirements for merino breeding met.	1	0	0	1

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

Table A3.10
*Change in dry ewes (2T or older) from merino breeding flocks
 'test' series 1989-92*

Change ^a	Year		
	89-90	90-91	91-92
Number increasing	4	8	13
Per cent increasing	40%	62%	68%
Number decreasing	3	3	5
Percent decreasing	30%	23%	26%
Number not changing	3	2	1
Per cent not changing	30%	15%	5%
Total changes	10	13	19

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

In 1990-91, and to a much greater extent in 1991-92, larger numbers of ewes were kept dry because of the shortage of feed and because some 2T ewes were not considered large enough to mate. Cfa/cull ewes were kept for an extra year on two occasions because their disposal price was poor and a gamble was taken that it would be possible to carry them through to shearing and get more for the wool.

A3.12.4 *Change in numbers of bred merino wethers*

Total numbers of merino wethers in the 'test' group were largely unchanged between 1989 and 1990, but declined by 9.8 per cent for 1990-91 and by a further 5.4 per cent for 1991-92 (Table A2.7). If the totals are divided into bred and bought wethers a totally different picture emerges. Bred wether numbers increased by 7.5 per cent for 1989-90, by 11.3 per cent for 1990-91 and only declined by 1 per cent for 1991-92. The decline in total wether numbers over the period was almost entirely due to a decline in bought wether numbers.

Table A3.11
*Reasons for change in dry ewes (2T or older) in merino breeding flocks
'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Expect better return from increasing dry sheep compared with merino breeding and/or fat lambs this year.	0	1	1	2
Price of cfa/cull ewes poor, thought get more if kept and shorn.	0	0	2	2
Didn't mate some ewes because of wool market turmoil and talk of quotas.	0	1	0	1
Because of poor season/drought, feed shortage and/or some ewes not in suitable condition, didn't mate some 2T, 4T and/or older ewes.	0	0	7	7
Didn't mate 2T ewes this year because of poor season/drought and/or not well grown.	0	1	3	4
<u>Reasons for decrease</u>				
2T ewes well grown & needed to maintain ewe numbers.	1	0	0	1
One off - other.	0	0	1	1
<u>Reasons for unplanned change or no change</u>				
Mate ewes at 4T - numbers result of previous matings, lambings, etc.	8	9	9	26
Numbers from group of cfa sheep run through winter as dry sheep.	2	2	2	6
Variation in number of 2T ewes of suitable size for mating.	0	0	1	1

^a More than one reason was allowed.

On a flock by flock basis the story is the same (Table A3.12). Nearly two-thirds increased their bred wether numbers from 1989-90 and more than two-thirds increased still further from 1990-91. Between 1991-92 about the same number increased as decreased their flock size.

Two related factors stand out in the reasons given by producers for the increase in their bred wether numbers (Table A3.13): the decision to begin merino breeding and the buildup following this decision; and the view that bred wethers gave a better return than bought wethers. The reasons for decisions to begin running wethers after merino breeding began, have already been discussed in A3.6. Some of the move out of bought wethers was due to their high replacement cost in the mid to late 1980s, which prompted decisions to replace some or all of them with bred wethers. Others began because of the poor returns being received from prime lambs. They are further examples of long-term changes being carried through to a period where the original reasons for the changes were no longer valid. The increases were taking place when wool prices were declining and replacement wether prices were also low.

Other reasons of note were increased carrying capacity of properties and purchase of land. In some situations wether numbers were adjusted to maintain total stock numbers when lower numbers of breeding or young stock were available. In a couple of cases producers also kept extra wethers for a year because their sale price was low.

Like merino breeding, the major reason given for the declines in wether numbers was seasonal conditions. The fall in wool prices, dramatic as it was, was only mentioned a couple of times as the reason for a decline in numbers.

A3.12.5 *Change in numbers of bought merino woolcutters*

As intimated in the previous section, numbers of bought merinos in the 'test' series declined by 35 per cent between 1989 and 1992, by 5.6 per cent for 1989-90, by 23.8 per cent for 1990-91, and by 9.5 per cent for 1991-92. During the same period about one-half the flocks decreased their numbers each year, while between one-quarter and one-third increased their numbers (Table A3.14).

Table A3.12
*Change in bred merino wethers
 'test' series 1989-92*

Change ^a	Year		
	89-90	90-91	91-92
Number increasing	16	22	18
Per cent increasing	62%	71%	55%
Number decreasing	6	6	15
Percent decreasing	23%	19%	45%
Number not changing	4	3	0
Per cent not changing	15%	10%	0%
Total changes	26	31	33

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

Increases in sizes of flocks came about mainly because better returns were expected for bought wethers than 2x lambs or cattle and because changing price relativity had resulted in decisions to change the proportions of different micron types of wethers (Table A3.15). Most properties made no conscious decision to change their flock size and changes that occurred were a result of culls, deaths and the size of replacement mobs.

Most of the decreases in the sizes of bought wether flocks were related to decisions to replace bought wethers with bred wethers, either because of a recent decision to begin merino breeding, or because the long term aim had been to replace bought wethers with bred wethers as they came available through breeding. In a few cases 2x prime lamb enterprises had been combined with bought wether enterprises. Thus, when merino breeding replaced the prime lambs, an indirect consequence was that bred wethers also began to replace bought wethers. Some flocks decreased because

Table A3.13a
*Reasons for change in bred merino wethers
'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Decided to carry own wethers after beginning merino breeding - see model.	2	2	3	7
Build-up following decision to begin merino breeding and to carry own wethers.	3	3	6	12
Changed to breeding this micron type of merino - see model.	0	1	0	1
Build-up following decision to change to breeding this micron type of merino.	0	0	1	1
At prices of wool and stock, expect better return from increasing bred wethers compared to other enterprises e.g., cattle, 2x lambs.	0	0	1	1
Expect better return from increasing wethers compared with 1x lambs this year.	0	1	0	1
Expect better return from increasing wethers compared with breeding this year.	0	0	1	1
Bred merinos give better return than bought merinos - replace bought as own available.	2	2	1	5
Sale price of cfa/cull wethers poor, expect better return if keep and shear.	0	3	0	3
Good wool prices and seasons OK, decided to carry more wethers.	2	0	0	2
Seasonal conditions good, decided could carry more stock.	1	0	0	1
Seasonal conditions poor, mated less ewes, maintained total numbers with wethers.	0	1	1	2
Increase to make up for lower numbers of breeding and/or young stock.	1	1	1	3
Increased carrying capacity due to fertilising, pasture improvement and/or improved grazing control.	3	2	1	6
Increased numbers because leased, bought or planning to buy another property.	2	3	3	8
<u>Reasons for unplanned change or no change</u>				
No significant change and/or reason for change.	7	5	2	14
Result of differences in lambings, proportions of wethers, deaths, and culling of young and old sheep.	6	6	3	15

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

Table A3.13b
*Reasons for change in bred merino wethers
'test' series 1989-92 (continued)*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for decrease</u>				
Phasing out following decision to change to breeding another micron type of merinos - see model.	0	1	0	1
At prices of wool and stock, expect less return from bred wethers than other enterprises e.g., cattle, 2x lambs.	0	0	1	1
Expect better return from increasing 1x lambs compared with wethers this year.	1	0	0	1
Expect better return from increasing merino breeding compared with self-replacing flock this year.	0	1	1	2
Uncertain wool market and/or talk of quotas.	0	1	0	1
Dry/drought conditions, shortage of feed: sold or pitted cfa/cull and/or extra wethers to decrease stocking rate.	0	0	7	7
Decreased numbers because have been above optimum stocking rate.	0	0	3	3
Lower prices for wool means more economic and less risky to decrease stocking rate.	0	1	2	3
Higher culling rate because trying to improve quality and/or decrease age of flock.	1	0	2	3
Needed to make room for higher numbers of breeding and/or young stock.	0	1	1	2

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

Table A3.14
*Change in bought merino woolcutters
 'test' series 1989-92*

Change ^a	Year		
	89-90	90-91	91-92
Number increasing	8	8	8
Per cent increasing	28%	27%	31%
Number decreasing	15	17	13
Percent decreasing	52%	57%	50%
Number not changing	6	5	5
Per cent not changing	21%	17%	19%
Total changes	29	30	26

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

non-merino enterprises were expected to give a better return than bought wethers. Dry/drought conditions between 1990 and 1992 also resulted in four flocks decreasing in size.

A3.12.6 *Change in numbers of bought merino ewes mated to prime lamb rams*

Buying merino ewes to mate to prime lamb rams was undertaken for two main purposes: to supply 1x ewes to a 2x lamb enterprise; and to sell 1x prime lambs or 1x replacement ewes. Neither was very common between 1989 and 1992; less than 10 per cent of properties undertaking either of them.

Throughout the period 1989-92 the number of flocks that decreased matings was greater than the number that increased matings, with none increasing matings

Table A3.15a
*Reasons for change in bought merino wethers
'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Decided to start a bought wether enterprise - see model.	1	0	0	1
Build-up following decision to start a bought wether enterprise.	0	1	0	1
Build-up following decision to change to this micron type of bought merinos - see model.	0	1	0	1
At prices of wool and stock expect better return from increasing bought wethers compared to other enterprises (e.g. 2x lambs, cattle).	2	3	2	7
Purchase & wool price influenced decision to increase this micron type and decrease other type.	2	2	1	5
Bought wethers on spec for shearing and later sale.	1	0	3	4
Increasing numbers to compensate for lower wool prices.	0	0	1	1
Increased carrying capacity due to fertilising, pasture improvement and/or improved grazing control.	1	1	0	2
Increased numbers because leased or bought another property.	0	0	1	1
<u>Reasons for unplanned change or no change</u>				
No significant change and/or reason for change.	8	5	5	18
Numbers left after few culls and deaths.	7	4	4	15
Numbers left after culling older sheep and buying replacement groups.	2	0	0	2

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

Table A3.15b
*Reasons for change in bought merino wethers
 'test' series 1989-92 (continued)*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for decrease</u>				
Decided to stop bought wether enterprise - see model.	0	1	0	1
Phasing out bought wethers after decision to breed own merinos and run own wethers - see model.	3	4	4	11
Phasing out after decision to change to another micron type of bought wethers - see model.	0	2	0	2
At prices of wool and stock expect better return from decreasing bought wethers compared to other enterprises (e.g. 2x lambs, cattle).	2	1	1	4
Purchase & wool price influenced decision to decrease this micron type and increase other type.	0	0	1	1
Bred merinos give better return than bought merinos - replace bought as own available.	1	3	1	5
Replacements wethers too expensive because cut out period too long.	0	1	1	2
Didn't buy wethers on spec for shearing and later sale.	0	0	1	1
Dry/drought conditions, shortage of feed: sold or pitted cfa/cull and/or extra bought wethers to decrease stocking rate.	0	2	2	4
Decreased to make way for breeding of own 1x ewe replacements.	0	1	0	1
Decreased numbers because have been above optimum stocking rate.	1	1	0	2

^a More than one reason was allowed and a producer may have commented on more than one merino flock e.g., if changing from one micron type to another.

between 1991-92 (Table A3.16). One reason given for increasing matings was to decrease the risk of having to pay high prices in the future for 1x ewe replacements (Table A3.17). The main reason given for decreasing matings was the high cost of replacement merino ewes compared with 1x ewe replacements. When wool prices were high in 1989-90 this was a particular problem because quality merino ewes were bringing historically high prices. Many changes were unplanned and were a result of culling and deaths.

A3.13 Decisions to delay the sale of wool

A decision to change the combination of enterprises on a property was often a major decision and made only rarely. The aspects to be used in reaching such decisions had to be decided in the context of the particular change. It meant there was less opportunity to develop set patterns of decision making. Another major decision, in monetary terms, which was made at least once a year, was the decision about when to sell wool. Aspects used in this decision were therefore well scripted. Often the decision appeared to be made almost unconsciously. Little thought seemed given to changing from what had been done last year, and the year before, and so on.

Decisions about when to sell wool also influenced the supply of wool, although generally only in the short term. Traditionally wool has not been sold until it has been shorn, therefore the shearing time has a large bearing on when the wool is sold. The bulk of shearing in the New England takes place between July and December. The factors that have fixed shearing times in the New England were not examined in this study, however, informal discussion with wool producers suggested management reasons and availability of shearers were important. For instance, many wool producers preferred to pre-lamb shear their ewes. Fly control was another reason for spring, early summer shearing in the New England. Apart from crossbred wool most New England wool was sold at Newcastle between October and February.

The model presented here (Figures A3.17a to A3.17c) looks at the question of whether a wool from a shearing was delayed beyond the first sale it was ready for. Only sale at auction was considered. Whether a producer sold at auction or privately

Table A3.16
*Change in matings of bought merino ewes to prime lamb rams
'test' series 1989-92*

Change ^a	Year		
	89-90	90-91	91-92
Number increasing matings	1	1	0
Per cent increasing matings	25%	25%	0%
Number decreasing matings	2	2	2
Percent decreasing matings	50%	50%	50%
Number not changing matings	1	1	2
Per cent not changing matings	25%	25%	50%
Total changes	4	4	4

^a Property may have more than one merino flock e.g., if changing from one micron type to another.

Table A3.17
*Reasons for change in matings of bought merino ewes to prime lamb rams
'test' series 1989-92*

Reasons	Times mentioned ^a			
	89-90	90-91	91-92	Total
<u>Reasons for increase</u>				
Started breeding own 1x replacements because of risk of paying high prices for 1x ewes.	0	1	0	1
Other reason	1	0	0	1
<u>Reasons for decrease</u>				
At prices of wool and stock, expect less return from 1x lambs than other enterprises e.g., cattle, 2x lambs, bought wethers.	0	0	1	1
Didn't replace cfa/culls because replacement merino ewes too expensive.	1	1	1	3
Dry/drought conditions, shortage of feed: culled ewes heavier or decided to decrease mating to fat lambs because of difficulty of finishing.	0	1	0	1
Other reason.	1	0	0	1
<u>Reasons for unplanned change or no change</u>				
Numbers left after culls and deaths.	2	2	3	7

^a More than one reason was allowed.

was scrutinised in another model. No attempt was made to say when (meaning what date) the wool was sold. This would have required a more complicated model. Sale of crutchings and the odd or very small shearing were also ignored.

Three main approaches or beliefs about selling wool were found to have a major influence on when wool was sold. These were:

Prices for wool would be higher, on average, at a particular sale or time of the year. For example many superfine/fine-wool producers believed November or February were the best times to sell superfine/fine wool.

It's not possible to predict the wool market so the best strategy is to sell at the same time every year and that way what you lose out on one year you will pick up the next year.

It's not possible to predict the wool market so the best strategy is to sell the wool as soon as it's ready.

Most producers held or followed one of these approaches. Their decision about the sale of wool was generally the most important decision they made every year since wool provided the bulk of their income. Although some producers felt comfortable picking the cattle or lamb market, they were almost universally dubious about their ability (or anyone else's ability) to pick the wool market.

The first belief, for fine-wool producers, was based around the notion that the designated fine-wool sales held in Newcastle attracted buyers who were after this type of wool and therefore competition was greatest. Some believed the last sale in February (the last of these sales) was best because it was the last chance for buyers to obtain any substantial amount of this type of wool. In one instance, wool was held from a July shearing to February because that was the 'best sale'. December and January sales were frowned on by some because they believed they were affected

Figure A3.17a
Decision to delay sale of wool

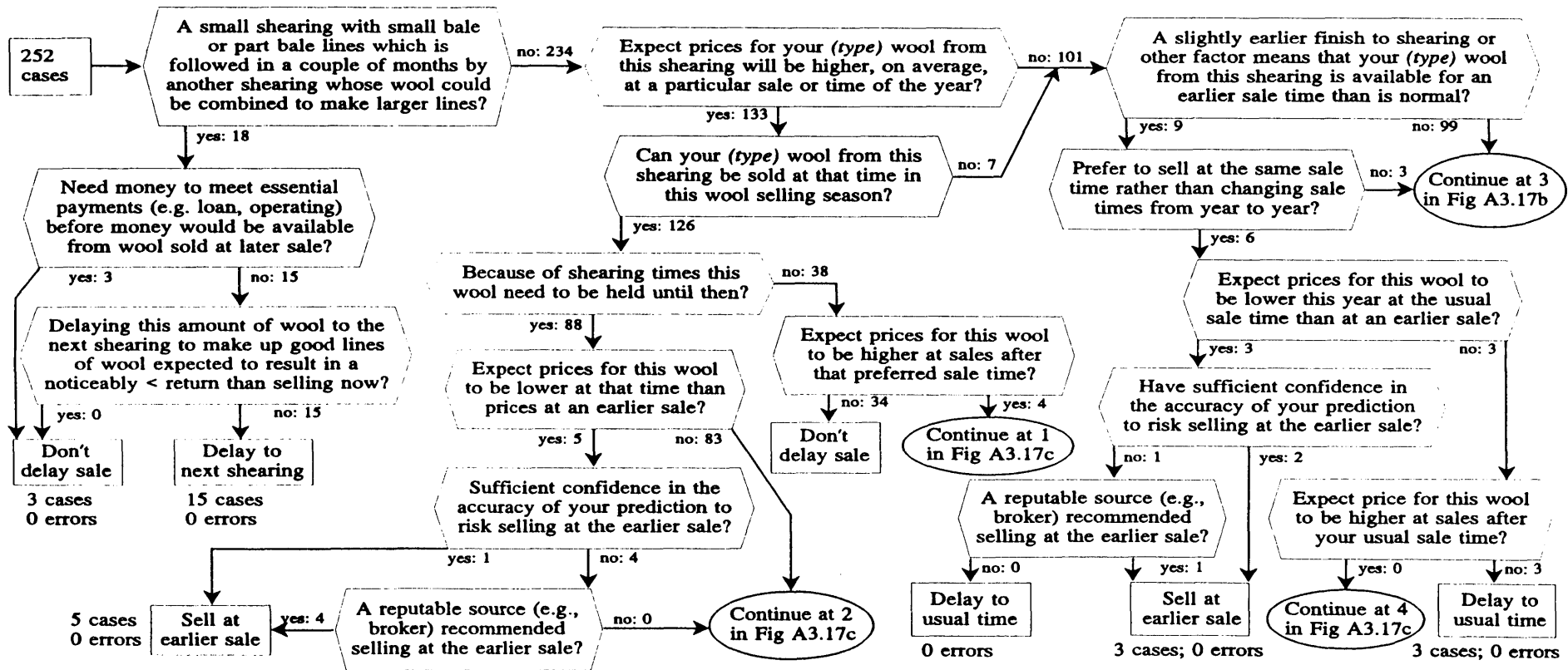


Figure A3.17b
Decision to delay sale of wool (continued)

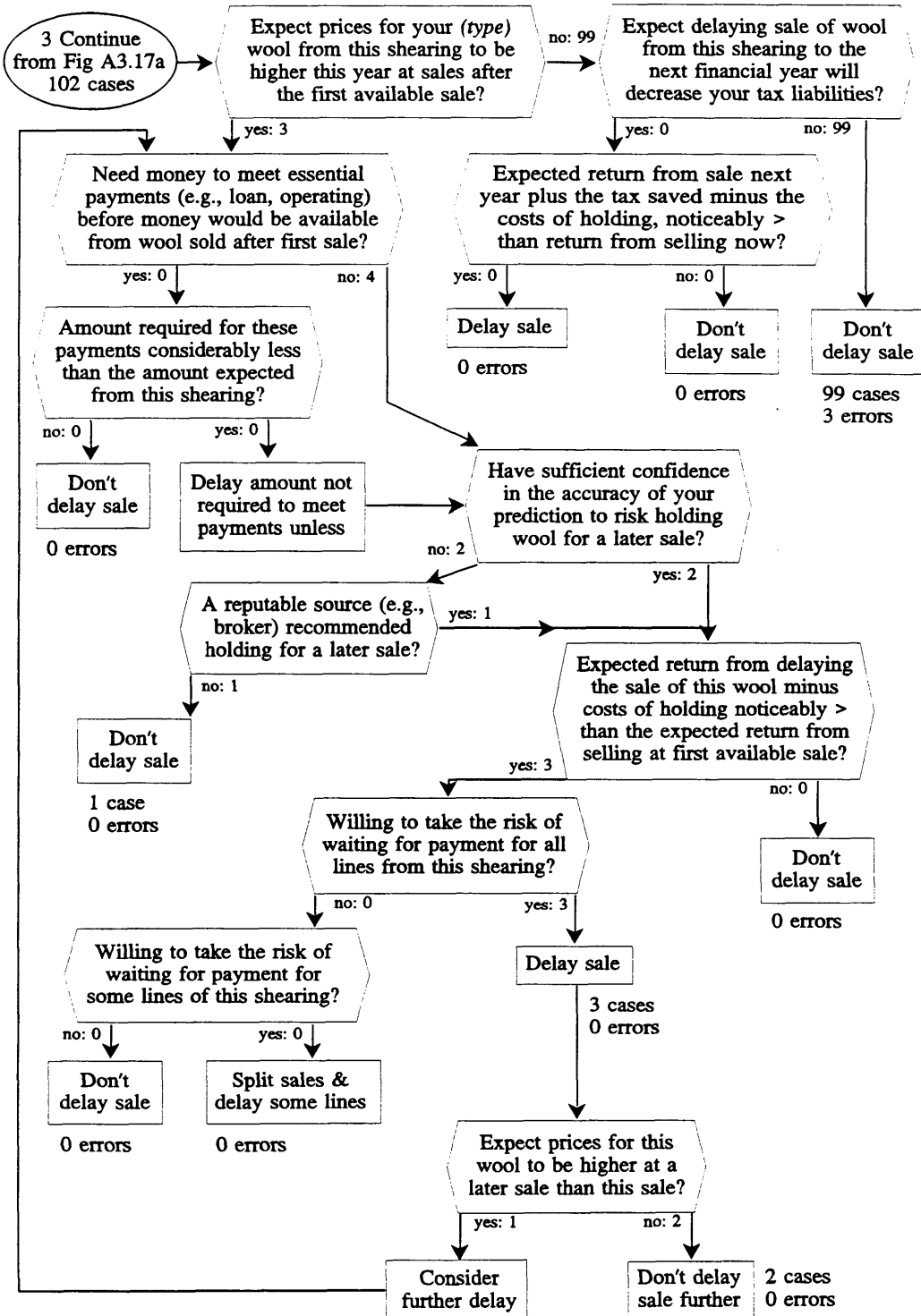
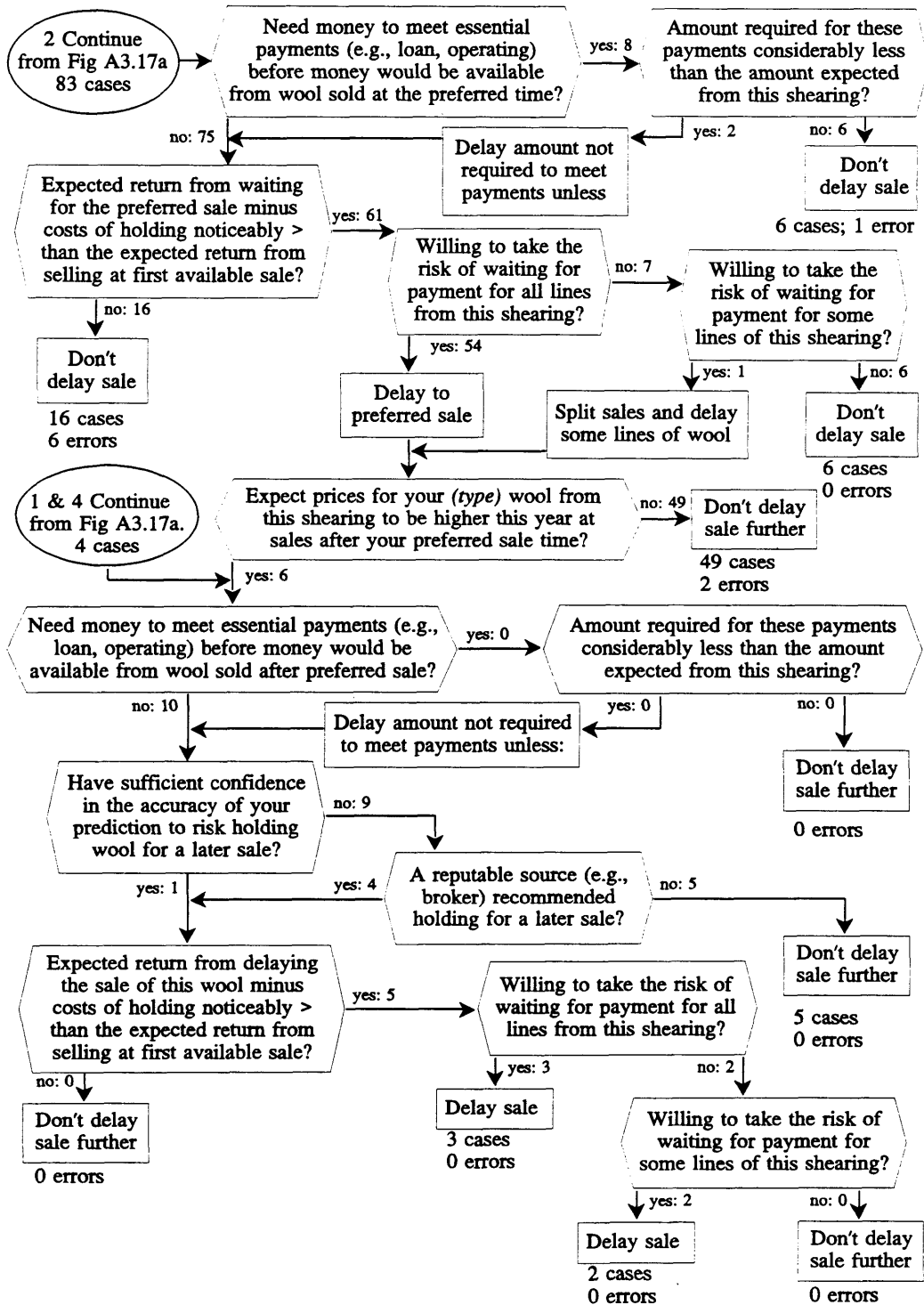


Figure A3.17c
Decision to delay sale of wool (continued)



by Christmas (both in Australia and overseas) and that some buyers were not operating actively during that period. Producers who held the first belief sometimes also shared the idea that one should not try to pick the market and therefore the wool should be sold at the same time every year. This construct was subordinate to the belief about the 'best sale' in the sense that they did not believe in changing from the 'best sale' even if the market signals suggested it might be an advantage to do so.

The second belief was based on the idea that, since it was not possible to predict the best time to sell, it would all average out in the long run if the wool was sold at the same time every year. Such was the faith in the 'law of averages' that, sometimes, producers with this belief continued to sell at the same time even when their shearing had been moved forward (for management or shearer reasons) and the wool could have been sold a month or two earlier.

The final belief was that since no time was better to sell than another time the wool should be sold when it was ready. It did not involve trying to pick the market. It was a random occurrence decided by other factors and therefore prices would average out. An added advantage was that the money was obtained quickly and therefore attracted the minimum opportunity cost possible (apart from private sale).

Apart from these overriding beliefs, several other factors were found to influence the sale time. Some small producers had two shearings within a few months of each other. The first shearing, often lambing ewes, produced only a few bales of wool that were costly to sell on their own. When combined with the later shearing they made up decent lines of wool that were expected to sell better and cost less to sell.

Despite their lack of confidence in their ability to pick the market, in a few limited cases producers took a gamble and made a decision to sell later (or earlier) than was their normal practice. Most were not confident in their own expectations about the market. They sought advice from their broker about the wisdom of their prediction. This advice was followed. Some decisions were also influenced by the need to meet a payment. In this instance part or all of a particular shearing was sometimes sold

earlier than normal to avoid obtaining a loan or making another financial arrangement.

When producers considered delaying sales, one consideration was the cost of holding the wool to a later sale. Since they were not charged storage costs, the main cost was interest. Although the criterion mentions costs of holding wool, no consistent way of calculating this was used. Producers who had payments to meet or overdrafts to finance, usually, but not always, made a rough calculation of interest costs. Producers who did not have loans were often likely to say there were no holding costs. The opportunity cost of their money was ignored.

A further consideration was the risk attached to holding wool. One strategy to mitigate the risk was to split the sale and sell some at the normal time and some later. Others were not willing to take the risk and did not delay the sale.

Delaying the sale of wool for tax reasons was another trigger reason included in the model, but not found relevant for the 'test' series. Very few producers shored their wool towards the end of the financial year, so there was little reason to consider this aspect.

Several structures for the model were tried out, but it was found that if a small shearing was delayed the major consideration would be the cost of selling small lines of wool. If it was a large shearing then the other beliefs were more relevant. The model then divided the producers into those who believed particular sales or times resulted in higher prices and those who did not believe there was any difference. Those who believed in higher-priced sales still had the options of delaying to later than this sale, or of selling earlier than this sale if this was appropriate.

The belief about selling at the same time each year only became relevant if the shearing time meant the wool would have to be held until that time. If not, there was no decision to be made and they were in the same position as those who believed in selling immediately after shearing. This left those who believed in selling

immediately after shearing. They also had the option of selling later if they thought they would get a better return and were willing to take the risk.

In practice, decisions about the sale of wool were sometimes made at different times, and in a sequence; with decisions to delay sale still further being made after the initial decision was made. A feedback loop was included to account for this option although it was used only once.

Two hundred and fifty-two cases entered the model for the period July 1989 to June 1992. Eighteen cases considered delaying because they involved small lines of wool that could be combined with a later shearing. Fifteen of these were delayed. Of the 234 remaining, over half considered their wool would receive a better return at a particular sale or time of the year. Seven could not get their wool into this time because it was shorn too late. Two-thirds of those who could, had to hold their wool for the higher-priced sale. In five cases producers did not hold their wool to the higher-priced sale because they expected the market to fall and were willing to break with the usual strategy and sell earlier. After the remaining aspects in this section of the model were considered (see Figure A3.17c), 54 cases were predicted to delay all lines to the higher-priced sale. Even then a further decision was required about whether the wool should be held from sale for a longer period.

One hundred and eight cases passed on to consideration of whether there were other reasons for delaying the sale of wool. Only nine cases had earlier shearing times that required consideration of whether the wool should be held until the normal sale time. Two-thirds of these agreed with the criterion that it would be better to sell at the same time every year rather than changing times. This is based on the second important belief discussed above. Following consideration of the other criteria in this section of the model, three sold at an earlier sale and three delayed to the usual sale time.

One hundred and two cases passed on to the next section of the model (Figure A3.17b) in which producers decided whether to gamble on prices being

higher at a later period. Only three cases elected to consider this gamble. All three delayed their sales, with one reentering the model to consider a further delay.

Of the 252 cases that entered the model, 12 of the predictions were errors. All were errors that predicted producers would not delay a sale when they did. Three errors occurred with one producer who combined small lots of wool to sell them together because of convenience. The wool could not be combined into a line so the first criterion in the model was not considered appropriate. Nor was the delay expected to bring more money. In fact the producer commented that it was done for '... the convenience of selling, I'm not concerned about the money'.

Another error occurred with a producer who shored in August and would have preferred to have sold after Christmas. Because loan payments were due the wool was sold in November. The model predicts no delay because of the payments, however, the sale was delayed to a second-best sale time, which was November. Two further errors occur in the section that covers decisions to delay sale to after the preferred sale time (Figure A3.17c). One producer split his clip on two occasions and sold a few bales at a later sale to test the market and to see if different figures were obtained from the wool testing procedures.

The largest concentration of errors occurs after 2) in Figure A3.17c. Sixteen cases were predicted to sell at the first available sale because they did not need money to meet payments and did not expect to make more money from holding to the preferred sale time. Six of the predictions were wrong. On three occasions one producer said the expected benefits from holding to the later sale were about equal, rather than noticeably greater than, the return from selling at the first available sale. This producer also made the comment: 'I haven't got to worry about interest costs', meaning there were no costs of holding to the later sale. Another producer delayed the sale of crossbred wool on two occasions, but not for any of the reasons in the model. It was only a relatively small amount of wool, the producer was busy at that time of the year, and was not concerned about the money or the interest. The other error in this section arose because a producer delayed sale of the wool for tax reasons. Questions about tax were not asked then because of the structure of the

model. However, when the questions from elsewhere in the model were asked the correct result was obtained.

A3.14 Decisions to sell main lines of wool by auction or private sale

By far the bulk of the wool from the New England has been sold at auction, but various methods of private sale were available. Producers were more likely to sell part bales or small lines of wool by private sale. They accounted for a very small proportion of the total wool sold and were unimportant; therefore, they were not modelled.

Two hundred and seventy-two cases were used to test the model of auction and private sale of main lines of wool (Figure A3.18a and Figure A3.18b). Again this is an example of a major decision made at least once a year, which may sometimes have been made with little conscious consideration. Pretesting suggested this type of decision was difficult to remember very far into the past and so only the last three wool selling seasons were appraised. A distinction was made in the model between those who had sold wool privately before and those who had not. Trigger criteria were used to detect situations that lead to consideration of changes in behaviour.

Where producers had sold privately before, their attitude to future sales was influenced by their experience with private sales. If returns had been perceived to be as good as expected from auction they continued with their consideration of the expected return for the current clip. If this was expected to be positive, then a buyer (or buyers) was contacted.

Where producers had not sold wool privately before, many producers, especially if they had good quality fine or superfine wool, gave little thought, if any, to private sale. Common comments on the matter included:

'I've never thought about selling privately.'

'Private buyer will only sell it at the auction anyhow and has to make his cop so I might as well get the benefit by selling direct.'

Figure A3.18a
Decision whether to sell main lines by auction or private

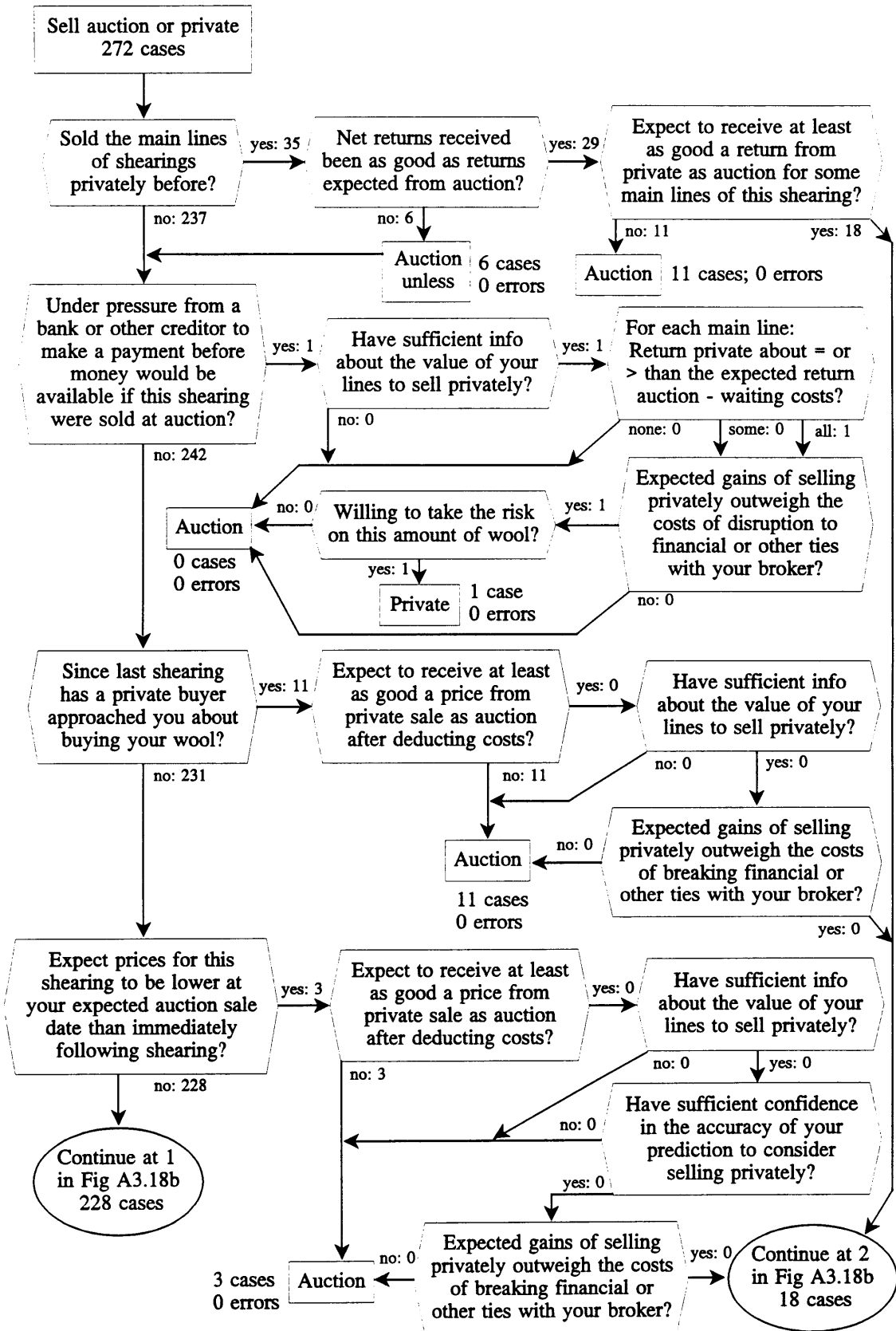
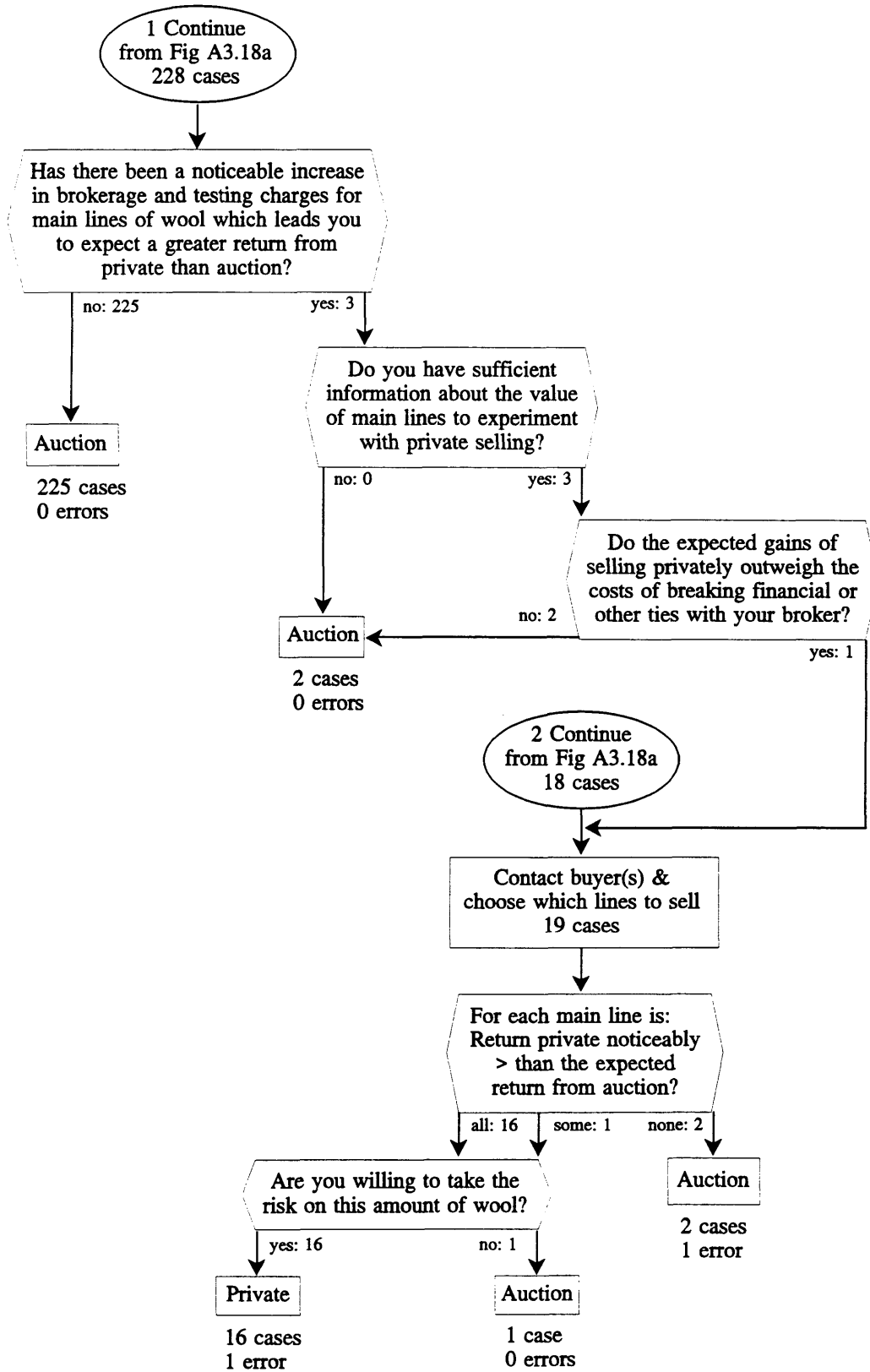


Figure A3.18b
 Decision whether to sell main lines by auction or private (continued)



'Better off at the auction where there's plenty of competition.'

'Private buyer knows more about wool than I do ... wouldn't know if I was selling at a fair price or not.'

'Happy with our broker and the service we're getting from him.'

They show many producers preferred the competition provided by the auction system, both for its obvious benefits, but also because it eliminated concern that someone with superior knowledge of the system would take advantage of them. There was also a widespread view that by selling at auction they were eliminating the middleman.

Factors that sometimes triggered a reconsideration of private selling were found to have been: pressure from a bank or creditor for a payment; an approach from a private buyer; an expected fall in the market; and an increase in brokerage and testing charges.

Although not common, situations arose where producers came under pressure from banks or other creditors to consider private sale so that payments could be made earlier. Further aspects contemplated when this eventuated included: knowledge of value of wool; relative return for the lines to be sold; costs of disruption to ties with broker; and risk involved in private sale of wool. A slightly weaker criterion was used when comparing the two types of sale, with private sale only having to be about equal or better than auction. This arose because pressure from the creditors helped overcome a normal reluctance to make a change unless it promised to be an improvement to the status quo.

When the market was falling, or was expected to fall, some producers were prompted to consider selling privately because this offered the opportunity of selling immediately rather than waiting for auction. Under some circumstances a higher price might be expected. Several aspects were relevant to this decision: the relative returns for private and auction sale; information about the likely sale price of the lines of wool; confidence in the accuracy of the prediction about a fall in the market; and costs of breaking ties with the broker. Typically brokers were found to have established good

personal and financial links with producers, often over many years. Producers were often unwilling to upset this relationship because of feelings of loyalty to the brokers, but also because of the long-run benefits the close relationship was perceived to produce.

Increases in brokerage charges prompted a few producers to consider private selling. Initially this was more likely to lead to an experiment with private selling that sometimes led to a change if it proved profitable. Again financial and other ties to the broker had to be considered.

After the initial criteria associated with each of the trigger reasons were passed, the model predicts producers contacted a private buyer and then made the decision about which lines of wool to sell. The same questions were used for this section for each of the trigger reasons (apart from creditor pressure). A line of wool was sometimes treated as a separate decision because some speciality lines of wool (e.g., hogget wool in some years) had a chance of receiving a premium at auction. In making the comparison producers allowed for the extra direct costs of sale by auction and sometimes the opportunity cost of their money. The risk associated with selling the amount of wool privately was also a factor. Nineteen out of the original 272 cases entered this section of the model, with the model predicting 16 would sell at least some wool privately and three would sell none.

Two errors in prediction occurred for the 'test' series. One arose for a producer who sent the wool to auction, but at the time of interview had not sold the wool because when the market fell he decided to delay sale until the following year. It is possible, therefore, although not probable, the wool could still be sold privately. In the other case the model predicted private sale because it was expected to give the best price and the risk was not a problem, but the producer sold the wool by auction. The reason given was that the sheep had been bought and financed through the agent and as part of the deal the wool was sold through them also.

Although they did not result in errors in the model, discussions with friends and/or neighbours who had sold privately had resulted in a couple of producers going

through the initial stages of a decision to sell privately. This reason could therefore be considered as an extra trigger reason that might initiate a change to private sale.