RELATIONSHIPS AMONG FARMERS' GOALS AND FARM ADJUSTMENT STRATEGIES: SOME EMPIRICS OF A MULTIDIMENSIONAL APPROACH

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A knowledge of farmers' goals provides an important basis for understanding farmers' preferences for, and choices among, various farm adjustment strategies. Such information is also valuable in estimating the acceptability to farmers of various government measures to assist rural adjustment. The goals of Queensland graziers, with and without a history of farm expansion, are compared. Different adjustment strategies are analysed in terms of the ways in which they satisfy different individual goals. A dimensional analysis of relationships among goals and adjustment strategies reveals that, for those willing to expand but without a history of expansion, income and social goals are at odds with each other. For these graziers, property expansion seemed to be the strategy most likely to meet both these goals. For graziers with a history of expansion, income goals were complementary with social goals.

Introduction

The idea that goals, or ends, operate as criteria for making choices among alternative courses of action, or between action and no action, has long been implicit in economics. Since Robbins's (1932) essay, the economic aspect of individual activity has generally been understood in terms of the allocation of scarce means among competing ends. Robbins's definition has been criticised for its static nature (Georgescu-Roegen 1967; Kirzner 1973), its assumptions of maximising behaviour and artificial separation of ends and means (Lutz and Lux 1979) and its mechanistic emphasis on resource allocation at the expense of human activity. While Robbins's definition was expressed as securing efficiency or maximising goal satisfaction, most economic analysts presuppose that the task of identifying ends and means has been completed elsewhere. A narrow conception of economic ends in terms of maximising income or, more generally, maximising utility, means that economic models provide a limited explanation or prediction of individual behaviour. Pasour (1981) points out that the measurement of farm efficiency is inescapably evaluative and cannot be defined and measured independently of the goals and knowledge of the decision maker.

In this study, farmers' goal structures are examined and we seek to show how the individual's choice of one adjustment strategy in preference to another is influenced by attempts to satisfy sometimes conflicting individual goals. Two multivariate approaches are used to show the relationships between goals and adjustment strategies and the dimensionality of goal structures. Goal structures and preferences for different adjustment strategies are compared for groups with and without

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past experience of farm expansion. The underlying assumption of this approach is that the economic behaviour and processes embodied in farm adjustment strategies reflect not only adaption to the economic environment of prices and incomes, but also the enduring attempts of individuals to reconcile and satisfy individually valued goals. The findings help explain farmers' preferences for certain adjustment strategies and have implications for the formulation of government assistance to encourage adjustment.

The autonomous adoption of adjustment strategies by farmers will be largely influenced by economic conditions and pressures. These pressures for adjustment will be modified—either exacerbated or ameliorated—by the extent to which given adjustment strategies satisfy personally preferred goals of the farmer and his family. Problems of rural adjustment are most often associated with the problems of low income and insufficient farm size. Government adjustment assistance is generally directed at facilitating the movement of resources which are perceived to be not responding quickly enough to longer-term changes in economic conditions. Assistance may also be directed to offsetting the effect of temporary falls in industry or farm income. In both autonomous and government-encouraged adjustment, an understanding of how various adjustment strategies meet farmers' goals will help explain the adoption of some forms of adjustment and farmer inertia in accepting other forms of adjustment. The popularity of some government assistance measures, such as farm build-up schemes, and the unpopularity of schemes such as retraining and rehabilitation (Barton 1978), will be largely reflected by whether or not they meet farmers' goals.

Farmers commonly consider multiple goals in their decisions and it is important to be able to identify relationships among relevant goals for the individual. Problems arise in determining the level of abstraction at which to identify and measure goals. The set of goals needs to be relevant to the context of the individual activities being considered. Goals tend to be hierarchical in nature[1], implying that some goals may have to be met before others can be satisfied, or that the satisfaction of 'lower' goals may create a desire for 'higher' goals. This suggests lexicographic orderings, in which the individual decision maker is not prepared to allow trade-offs among the satisfaction of different goals or ends. Other goals may be directly competitive and be traded off one against the other. Sometimes a given course of action will meet two independent goals, implying that such goals are complementary. In attempting to identify goals as bases determining the 'utility' of individual activity, we need to acknowledge that 'marginal' behaviour is determined by marginal utilities rather than total utilities (Lipsey 1977, p. 170). Were all the above relationships to be accounted for, a single analysis of farmers' goals would involve a formidable degree of complexity.

The study of farmers' goals presents some rather daunting problems. It is by no means certain that ends and means are always as distinct as Robbins assumed. Means often affect ends, the latter only becoming clear in retrospect, and ends may also affect means. It is also important to clarify the difference between goals and values. Goals may be defined as ends, objectives or states that an individual wishes to achieve. Goals may be

[1] Georgescu-Roegen (1954) points out this hierarchy is the essence of any argument explaining the principle of decreasing marginal utility.

ends in themselves, or intermediate to gaining more desired ends. Values are more enduring, more abstract, belief systems which represent both end states and an individual's basis for judging the correctness of any action. In practice, the distinction between goals and values may be fuzzy. The goal statements used in this study are referred to as values by Gasson (1973) and Kerridge (1978).

Studying Graziers' Goals

During the period 1965 through 1978, graziers in south-west Queensland experienced an abnormal incidence of business vicissitudes. Farming activity in this area is normally characterised by large fluctuations in income, but during this period graziers experienced an extended drought and prolonged low prices for both wool and beef. Such circumstances encouraged considerable farm adjustment and government intervention to facilitate adjustment activity. South-west Queensland is a low rainfall, predominantly leasehold, area with few opportunities to develop land to improve its productivity other than indirectly through better stock control and water facilities. Because of these limitations, business growth is constrained to relatively few options, principally property enlargement.

In 1978, a preliminary mail survey of resident graziers in the Murweh Shire of south-west Queensland[2] was used to identify three groups of graziers: those who wished to expand their property within the next five years but who had no history of property expansion (Group A); those with a desire to expand within the next five years, and with a history of some property expansion in the previous nine years (Group B); and those with a history of some property expansion over the same period, but with no intention of further expansion in the next five years (Group C). In Groups A, B and C there were 29, 20 and 33 graziers, respectively. Thirty-nine remaining graziers had neither recent expansion history nor intentions for future property expansion. These data suggest considerable structural adjustment and intended adjustment: 44 per cent of graziers had either purchased a larger property, extra land or extra leasehold from 1970 through 1978 and 40 per cent of graziers had intentions for future expansion. Sheep-cattle properties which had been enlarged over the 1970 through 1978 period were, on average, initially smaller than those which had not been enlarged. By contrast, exclusively cattle producing properties which were enlarged were of similar initial size to those which were not enlarged.

To study goals and adjustment in some detail, personal interviews were undertaken in a stratified sample from each of the three groups. Exclusively cattle-producing graziers were excluded and the sample numbers for Groups A, B and C were 10, 5, and 6 sheep-cattle graziers, respectively. Individuals were presented with a series of 16 goal statements printed on cards and randomly ordered, which they were asked to rank for a number of different situations. Rankings of goals were obtained in terms of personal importance for the individual; in terms of the order in which goals were satisfied by the individual's present proper-

[2] The survey population comprised all landholders in the Shire (244 properties), from which were excluded company or absentee-owned properties, deceased estates, and properties run as additional areas to other properties. The responses from 121 graziers represented 76 per cent of the eligible population.

ty; and in terms of the individual's perception as to how they would be satisfied by each of six relevant adjustment propositions or strategies. The goals were a modified version of Gasson's (1973) list of value statements. The procedure allowed the collection of comparable goal sets from a number of individuals. However, it does suffer some disadvantages. Presentation of a structured set of goals does not allow for other goals which individuals may see as relevant. Goals were sought from the principal decision maker; the goals of other family members are relevant when considering adjustment options and these may, or may not, be expressed in the rankings given.[3] Finally, goals will have different importance at different times and under different circumstances; the data presented reflect the circumstances at the time of the survey.

A number of different procedures can be used to measure relationships among goals, such as ranking, rating and pair-comparison (Feather 1973; Harper and Eastman 1980; Patrick and Blake 1980). A ranking process was used to reflect the hierarchical nature of goals and the ordinal nature of economic choice suggested by Georgescu-Roegen (1954). While there are some disadvantages with ordinal data, by adopting a multidimensional analysis of goals we are taking a course of action implied in Miller's (1956) observation that more information may be transmitted by the use of relatively crude distinctions on many dimensions than by fine distinctions on a few dimensions.

Goal Preferences

The goal preferences of the three groups (in terms of importance to self) are shown in Table 1. While the overall goal preferences are similar (Spearman coefficients of rank order correlation are all greater than 0.56), some important ranking differences appear for certain goals. The goals which all graziers regard as important are the income goals—*making a satisfactory income* and *safeguarding future income*, and, to a lesser extent, *independence* and *the challenge of achieving an objective*. The goals regarded as least important are *recognition and prestige as a grazier* and *continuing the family tradition*.[4] These results are consistent with Kerridge's (1978) results from a larger survey of W.A. graziers. Kerridge used a similar listing of value orientations and found similar predominating preferences for *independence, income* and *meeting a challenge*. Similarly, *gaining recognition and prestige* and *continuing the family tradition* were most eschewed.

For the two groups with expansion history (groups B and C), the *making maximum income* goal is more important, and *belonging to the grazing community* less important, than for those with no expansion history (group A). Graziers in group B (intending to expand and with expansion history) are relatively less concerned about *seeing their children in worthwhile occupations. Purposeful activity, value in hard work* is of low importance to group C graziers (past expanders with no future expansion intentions). Group B has a relatively low preference for a *healthy out-*

[3] Case studies drawn from the present data, which take account of such family constraints, are presented in Holmes (1980)

[4] Edwards (1957) discussed the problem of social desirability as a factor potentially influencing responses to statements in personality inventories. In the present research, it appeared from respondents' comments that many of them wished to distance themselves, publicly at least, from 'the grazier image'.

TABLE 1

Median Rankings of Goals for 'Importance to Self' [a]

Goal	Intention to expand		No intention to expand but with expansion history (C)
	No expansion history (A)	Expansion history (B)	
	($n = 10$)	($n = 5$)	($n = 6$)
Making maximum income	9.5	3.0	3.5
Making a satisfactory income	4.5	3.3	3.5
Safeguarding income for the future	4.5	2.0	4.5
Gaining recognition and prestige as a grazier	15.0	15.0	15.8
Belonging to the grazing community	10.5	12.0	13.5
Continuing the family tradition	13.0	12.0	10.5
Working with other members of the family	9.5	10.0	6.0
Seeing my children in worthwhile occupations	6.5	9.0	5.0
Feeling pride of ownership	11.0	12.0	7.5
Gaining self respect for doing a worthwhile job	9.0	7.0	7.8
Exercising special abilities and aptitudes	8.5	11.0	12.0
Meeting a challenge, achieving an objective	5.5	5.0	7.0
Enjoyment of work tasks	7.0	7.0	5.5
Preference for a healthy outdoor life	9.0	13.0	9.0
Purposeful activity, value in hard work	6.5	5.3	13.5
Independence, freedom from supervision	4.5	7.0	5.5

[a] Lower ranks indicate greater importance.
Spearman's rho: A and B = 0.73 ($P < 0.01$)
B and C = 0.71 ($P < 0.01$)
A and C = 0.56 ($P < 0.05$)

door life. Generally, those who have a history of expansion place a much higher value on *maximising income*, while those who intend future expansion place greater importance on *activity and hard work* and lesser importance on *pride of ownership*. Group B graziers show both these characteristics.

While the goal preferences of the three groups shown in Table 1 provide some explanation of property expansion in terms of goal rankings, consideration of a range of adjustment options in terms of meeting personal goals will help identify the relationship between goals and adjustment strategies.

Goals and Adjustment Strategies

Property enlargement is only one of a number of possible adjustment strategies which a grazier can make to satisfy particular goals. Those graziers intending some future expansion (groups A and B) also ranked the list of goals in terms of how the goals were met by their present property and in terms of how the goals would be satisfied if the individual

undertook six possible adjustments. There were a total of eight sets of goal rankings when the ranking in terms of personal importance was included. For each individual there was a data matrix of sixteen goals by eight propositions.

Such data sets can be analysed by methods used in psychology for the analysis of repertory grids (Fransella and Bannister 1977; Slater 1977). A repertory grid is a particular example of a cases-by-variables data matrix generated by a single individual. For an individual in this study, the goals are considered as variables and the propositions are analagous to 'cases'. In repertory grid psychology, the goals would be seen as constructs which are qualities an individual attributes to, or differentiates among, relevant objects. In this study the objects were six adjustment propositions, *present property*, and *personal importance to self* (a total of eight propositions). Data analysis was based on the data matrix of sixteen goals and eight propositions for each subject in the two groups intending future expansion. Initially a regression analysis was undertaken to identify differences between the two groups and the variation between propositions in satisfying each individual goal. Then an averaged grid for each of the two groups was analysed to examine the relationships between all the goals and adjustment options for each group.

Regression analysis

A method of analysing the variance of each proposition associated with each goal is to employ a regression with dummy variables (Kerlinger and Pedhazur 1973). Additionally, the differing contribution to the variance by individuals with and without expansion history can be established within this analysis.

The regression model is represented as:

$$Y_{ijk} = b_{j1} + \sum_{k=2}^{8} b_{jk} P_{ijk} + C_j H_i + E_{ijk}, \quad (1)$$

where Y_{ijk} = individual's (i) ranking of jth goal on kth proposition ($i = 1, \ldots 15$; and $k = 1, \ldots 8$ for all j);
b_{j1} = rank on proposition 1 for jth goal (a constant);
b_{jk}, C_j = beta weights;
P_{ijk} = dummy variable (0,1) categorising proposition k;
H_i = dummy variable categorising expansion history (1) or no expansion history (0); and
E_{ijk} = residual error term.

Coefficients in each of the 16 regression equations (Table 2) indicate the contributions of the *present property*, each of the six adjustment propositions and past experience of expansion to the overall rank of a given goal. For convenience, *importance to self* is used as a constant. Taking the goal *making maximum income*, the positive coefficient indicates that *present property* is significantly low in terms of satisfying this goal. The negative coefficients for each of the adjustment propositions indicate that the *making maximum income* goal would be satisfied by all the adjustment propositions (because it was ranked highly on all these propositions). The propositions *lease extra land, contract work, sell and do something else* and *invest off the property* are significantly more important in terms of maximising income. The negative coefficient for the past

TABLE 2

Relative Importance of Goals and Expansion History for Different Adjustment Propositions (Partial Regression Coefficients: $n = 15$)[a]

Goal	Importance to self (constant)	Present property	Enlarge property	Lease extra land	Trade up to larger property	Contract work	Sell and do something else	Invest off the property	Past expansion group[b]	R^2	F ratio
Making maximum income	9.4	3.4*	−0.7	−4.5†	−2.4	−3.7*	−5.2†	−5.7‡	−2.3*	0.32	6.5‡
Making a satisfactory income	5.9	−1.2	−2.3*	−3.7‡	−2.3*	−3.6‡	−2.8*	−3.1*	0.8	0.15	2.5*
Safeguarding income for the future	5.0	1.8	−2.6*	−2.4*	−1.9	−1.7	−0.5	−1.9	0.4	0.18	3.1†
Gaining recognition and prestige as a grazier	14.2	−1.2	−0.5	−0.4	−1.1	−0.7	0.4	0.3	0.2	0.05	0.8
Belong to the grazing community	10.1	0.3	2.3*	2.3*	2.3*	2.6*	4.0‡	3.4†	1.6†	0.22	3.9‡
Continuing the family tradition	10.8	−2.3	−0.8	0.7	−0.9	1.9	3.0*	0.5	2.0†	0.22	4.3‡
Working with other members of the family	9.1	−0.3	−0.3	−1.2	−0.3	2.0	0.9	1.0	0.2	0.06	0.8
Seeing my children in worthwhile occupations	6.2	1.3	−0.3	0.7	0.7	0.8	1.3	0.1	2.8‡	0.11	1.7
Feeling pride of ownership	10.2	−0.7	−0.1	2.7	−1.5	2.3	−0.1	−0.4	0.5	0.11	1.7
Gaining self respect for doing a worthwhile job	7.8	−0.5	0.9	0.9	0.5	0.7	0.9	0.7	−1.0	0.06	0.9
Exercising special abilities and aptitudes	9.5	0.6	0.3	1.8	0.3	−2.4	−2.7*	−0.9	−1.7*	0.18	3.0†
Meeting a challenge, achieving an objective	6.7	−0.7	−1.2	0.7	−0.7	0.2	0.8	−0.4	1.6†	0.11	1.7
Enjoyment of work tasks	8.3	0.3	1.9	0.6	1.3	−0.7	−1.7	1.8	0.4	0.12	1.9
Preference for a healthy outdoor life	8.6	−0.5	1.3	1.3	2.5*	0.3	1.0	3.1*	2.5‡	0.19	3.3†
Purposeful activity, value in hard work	8.9	−0.3	1.1	0.5	1.5	−1.8	0.5	1.7	−2.3‡	0.19	3.3†
Independence, freedom from supervision	6.2	−0.5	1.2	1.1	2.7*	3.9†	0.7	−0.2	0.3	0.14	2.3*

[a] Lower weights indicate higher importance rankings.
[b] Weights indicate mean differences (on all propositions) between the 'expansion history' group and the 'no expansion history' group.
* Significant at $P < 0.05$
† Significant at $P < 0.01$
‡ Significant at $P < 0.001$

expansion group indicates that, overall, this group ranks *making maximum income* more importantly than those without expansion history. The coefficient for the past expansion group is an average weighting which reflects the mean difference between how this group views the propositions compared with those with no past expansion history. The past expansion group see the goal *making maximum income* as being more satisfied by their *present property* and generally view this goal as more important in terms of all the adjustment propositions.

Based on the F statistic, the regression equations are significant predictors of individual rankings for nine of the goals and discussion is confined to these goals. Inspection of the size and significance of the adjustment proposition beta weights for these goal equations suggests that *making maximum income, making satisfactory income, belonging to the grazing community, independence,* and *preference for a healthy outdoor life* are the goals which discriminate most between the different adjustment propositions, *present property* and *importance to self.* The beta weights for the expansion history variable show the significantly higher ranking placed on *maximum income, purposeful activity* and *value in hard work* by those in the past expansion group and the greater importance this group attaches to *exercising special abilities.* Goals which are ranked significantly lower over all propositions by those in the past expansion group include *belonging to the grazing community, continuing the family tradition,* and *preference for a healthy outdoor life.*

For the three income goal equations, all six adjustment propositions show higher importance rankings than indicated for *importance to self* (i.e. all have negative beta weights). However, the six adjustment propositions are ranked lower than personal preference in terms of *belonging to the grazing community.* For the high priority goal of *independence,* the propositions *enlarge property* and *contract work* are ranked significantly lower than *importance to self.*

The regression equations show the size of discrepancies between various adjustment propositions, present property and the personal importance of each goal. The equations also establish the goals for which there are significant differences between those with and without past expansion history. However, the independence of each of the goal equations and the number of coefficients in Table 2 present a problem of establishing which propositions best fit with the goal preferences expressed in terms of importance to self. This problem can be tackled with a dimensional analysis of the relationship between the goals and the eight propositions.

Dimensional Relationships

In the regression analysis we examined a data matrix of propositions by individuals (with group membership identified) for each goal. We now analyse a data matrix of goals-by-propositions. In the analysis of repertory grids, this is normally done on a single individual basis.[5] Here, two consensus grids, representing 'single cases' for groups A and B, are considered. The consensus grids for each group were formed by averaging the cell values of individuals for each cell in the individual goal-by-proposition matrices. Therefore, in group A, 10 goal-by-proposition

[5] See Holmes (1980) for an analysis of the present data on a case-by-case basis.

matrices were reduced to one mean goal-by-proposition matrix. For group B, the consensus grid was derived from five individual matrices.

The analysis of a matrix, such as a grid, presents a problem in ordination—the provision of a concise summary of the data set to provide for easier understanding and easier communication of the data. There are a number of ordination methods available (see Williams 1976). They have the common objective of providing a parsimonious summary of the data set by seeking a lower-dimensional representation of the original data. A commonly used method is principal components analysis (PCA). PCA consists of transforming an original set of variables to a set of hypothetical components which have the property of being uncorrelated. The components are chosen so that the first component accounts for maximum variance, the second component accounts for ma imum variance subject to being uncorrelated to the first, and so on. Algebraically, PCA involves finding the latent roots and vectors of the grid data matrix, this generally being performed on the variance-covariance matrix or the correlation matrix. PCA is, therefore, an alternative way of expressing the variance contained in the matrix.

PCA can be used to provide a description of the 'structure' or dimensionality of the original set of variables (Gower 1967). The two consensus grids were analysed using Slater's (1977) INGRID program which performs a PCA of the variance-covariance matrix of the goals. This calculates component loadings both in terms of the goals and propositions. The loadings can be used to represent the results of the grid matrix graphically by plotting the dispersion of the adjustment propositions in the component space within the goals space (using the proposition component loadings). In addition, the dispersion of the goals in the component space within the proposition space (using the goal component loadings) can be plotted. Such 'maps' of the dispersion of the goals in the proposition space and of the propositions in goal space represent two different views of the same variation, for the variation of a component in the proposition space is identical with its variation in the goal space. If suitable conventions are adopted, either map may be projected on to the other (see Slater 1977). PCA is generally an efficient technique for resolving matrix variance into a relatively few components. Usually most of the variance is described in no more than two or three dimensions (components) and such results can be summarised in two- or three-dimensional maps.

Mapping relationships between goals and adjustment strategies

For group A graziers, weights for the first two components in Table 3 (explaining 79 per cent of variance) are plotted as co-ordinates in Figure 1. The goals are represented as direction-lines in the component space and the propositions appear as points.[6] The relationships between propositions and between goals will first be considered separately. The principal components, by providing a stationary co-ordinate system in both spaces, also allows the relationships between the two dispersions to be considered jointly.

[6] The variance of every goal is implicitly reduced to one when correlations between them are calculated. Consequently, they are all placed at an equal distance from a common origin in the proposition space and differ by scattering away from the origin in different directions.

TABLE 3

Component Weights for Adjustment Propositions and Graziers' Goals

Propositions and goals	Graziers with no expansion history ($n = 10$)			Graziers with expansion history ($n = 5$)		
	Component 1	Component 2	Component 3	Component 1	Component 2	Component 3
Propositions:						
Importance to self	4.69	1.90	1.61	0.05	−0.08	1.98
Present property	9.93	1.49	0.40	1.30	−1.16	4.20
Enlarge present property	2.26	−1.79	−1.64	−3.55	2.68	1.19
Lease extra land	−2.20	−1.94	−0.33	−6.49	−2.01	−1.45
Buy larger property	0.10	−3.68	−1.00	0.68	2.94	−1.50
Contract work	−4.41	3.59	−3.91	1.55	−3.22	−2.05
Sell and do something else	−5.93	3.90	2.72	3.88	−0.95	−0.37
Invest off property	−4.44	−3.47	2.15	2.56	1.81	−1.99
Goals:						
Making maximum income	−10.85	−0.56	1.74	−2.50	1.43	−2.61
Making a satisfactory income	−4.04	−1.22	−1.64	−0.41	−1.02	0.66
Safeguarding future income	−3.17	−1.91	−1.46	−3.69	1.44	−1.83
Gaining recognition and prestige	0.65	−0.72	−1.04	−1.65	0.02	2.00
Belonging to community	4.21	0.68	−0.27	−1.65	0.19	0.97
Continuing family tradition	4.39	−2.82	−0.49	−1.01	1.34	1.49
Working with family	1.67	−0.72	0.78	−2.27	1.26	−0.31
Children in worthwhile occupation	0.07	−2.47	−0.04	0.17	−1.34	0.99
Pride of ownership	1.86	−1.62	1.30	4.22	2.96	0.97
Self respect in worthwhile job	0.81	1.38	0.03	−0.51	−1.19	−0.34
Exercising special abilities	−1.62	3.30	0.04	4.23	0.11	−3.49
Meeting a challenge	1.05	−1.63	−1.25	2.80	1.18	1.49
Enjoyment of work tasks	−0.35	3.43	1.14	1.09	−2.17	−0.48
Healthy outdoor life	2.10	2.72	−0.02	−1.07	−2.08	0.19
Purposeful activity, value in hard work	0.54	2.69	−2.05	1.51	−2.16	−0.66
Independence, freedom from supervision	2.77	−0.96	3.89	0.79	−0.22	0.78
Eigenvalue-latent root	204.83	66.43	33.80	80.88	35.78	35.62
Eigenvalue as per cent of total component roots	59.7	19.3	9.8	40.9	18.1	18.0

In Figure 1, the configuration of points representing the adjustment strategies, *present property* and *self*, reflects the structural relationships between these propositions in terms of the goals. The greater the dissimilarity between the propositions, the further apart they appear in the spatial map. Distance from *self* of the seven remaining propositions is an indicator of their acceptability in terms of personal goal preferences. *Present property* and *expansion of present property* are equi-distant in terms of relatively meeting the goals important to *self* for graziers with no history of expansion. *Enlarging present property* is the most attractive option, with the other adjustment propositions all located at greater distances in terms of meeting personal goals. The least

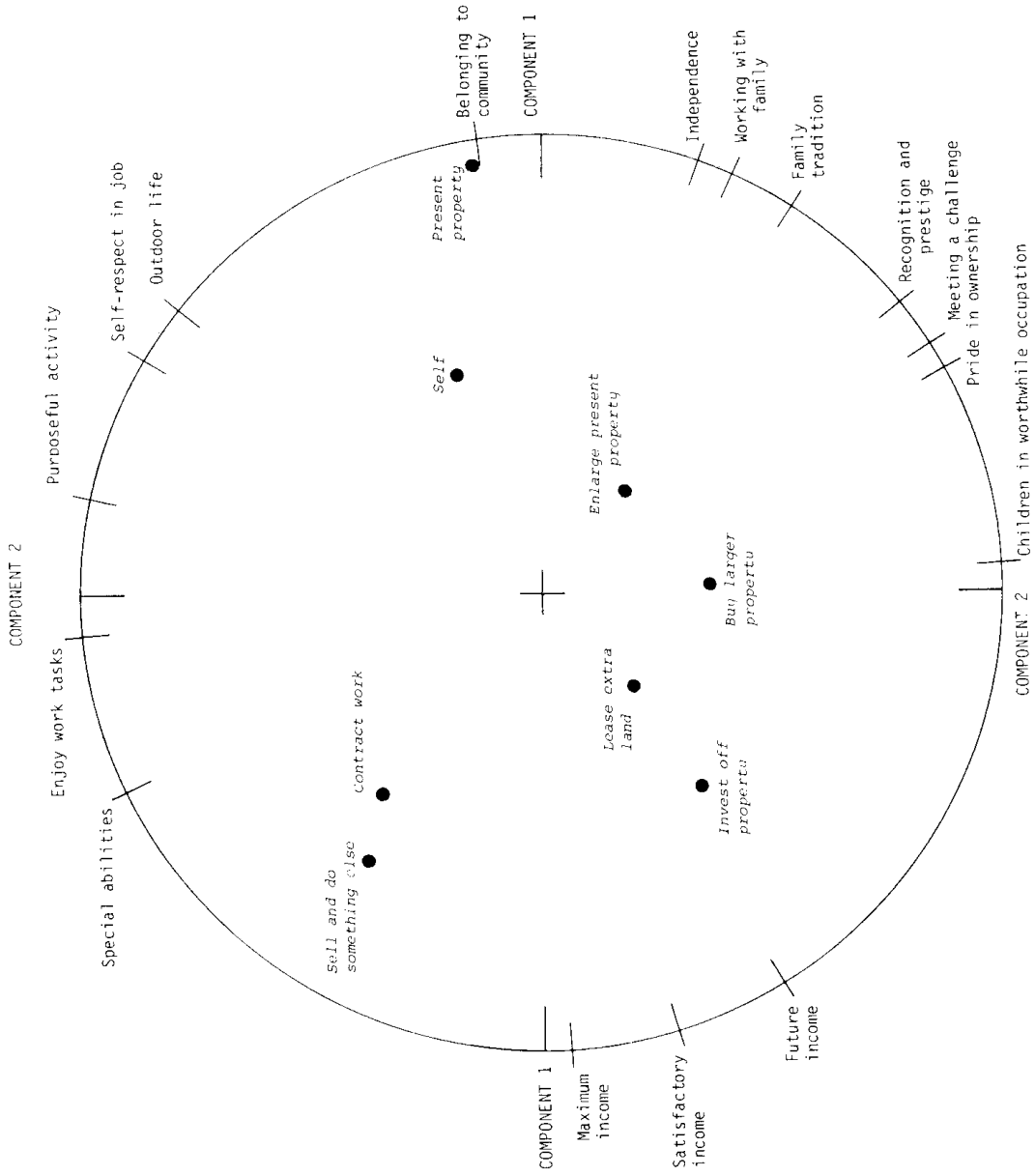

FIGURE 1 – Adjustment and goal dimensions for graziers with no past expansion experience

acceptable adjustment options are those unrelated to farming (*sell and do something else* and *invest off the property*). As the two component axes in Figure 1 are orthogonal, it is also useful to observe the characteristics of propositions located at the poles of each component. For group A graziers, on the first component there is a contrast between off-property and on-property propositions. To a lesser extent, on the second component there is a contrast between propositions involving expansion and those which do not.

The goals in Figure 1 are represented as direction lines from the origin. Those goals closest together are most similar, in terms of their rankings for the eight propositions. The three income goals are linked together and are viewed differently from the other goals, particularly such goals as *belonging to the community, independence* and *continuing the family tradition*. Income goals and social plus independence goals are contrasting goals on the poles of the first component. Goals which weight heavily on only one component (i.e. are close to the pole of only one component) are orthogonal to goals which weight similarly on the other component. Such goals will be independent. In Figure 1, *enjoying work tasks* and *making maximum income* are independent goals. Goals which weight at the opposite ends of a given component tend to be negatively correlated and trade-offs between them will involve increasing one goal at the expense of the other.

Comparing the positions of the propositions with the directional location of the goals reveals the relationships between the two.[7] For example, group A's *present property* and *self* are associated with the goals of *belonging to the community* and *independence* and are ranked lowest (relative to the other propositions) for the income goals. The strategies *sell and do something else, contract work, investing off the property* and *lease extra land* all satisfy the three income goals. For graziers without expansion history, *present property* is the least satisfactory proposition in terms of income. In order to see which strategies would most acceptably meet personal income goals we need to look at propositions which are important in terms of income but which are not too distant from the proposition *self*. Personal income goals seem to be most satisfactorily met by *enlarging present property*, and to a lesser extent, *leasing extra land* and *buying a larger property*, but both these latter adjustment strategies are less likely to meet the *independence* goal and family and community goals. There appears to be an obvious (but largely unacceptable) trade-off, in terms of adjustment strategies, between income goals and social and independence goals for group A graziers.

For graziers with expansion history (group B), the first two components account for only 59 per cent of variance (Table 3). Therefore, three dimensions (accounting for 77 per cent of variance) are considered in Figures 2 and 3. The *self* proposition is centrally situated within the

[7] One of the editors suggested, with no pun intended, that Figures 1, 2 and 3 were reminiscent of football fields. This analogy could be developed, with axes through the origin to each of the goals (representing the angular distances between the goals) regarded as 'scoring lines'. If the axis for a given goal is drawn across the circle and perpendiculars are dropped onto it from the points occupied by the propositions, they are found to fall in an order which agrees fairly closely with the order actually given in the grid matrix for the group. For example, the *independence* goal for group A is ranked highest for *present property* and then for *self*, and lowest for *contract work* and *sell and do something else*. For further discussion, see Slater (1972).

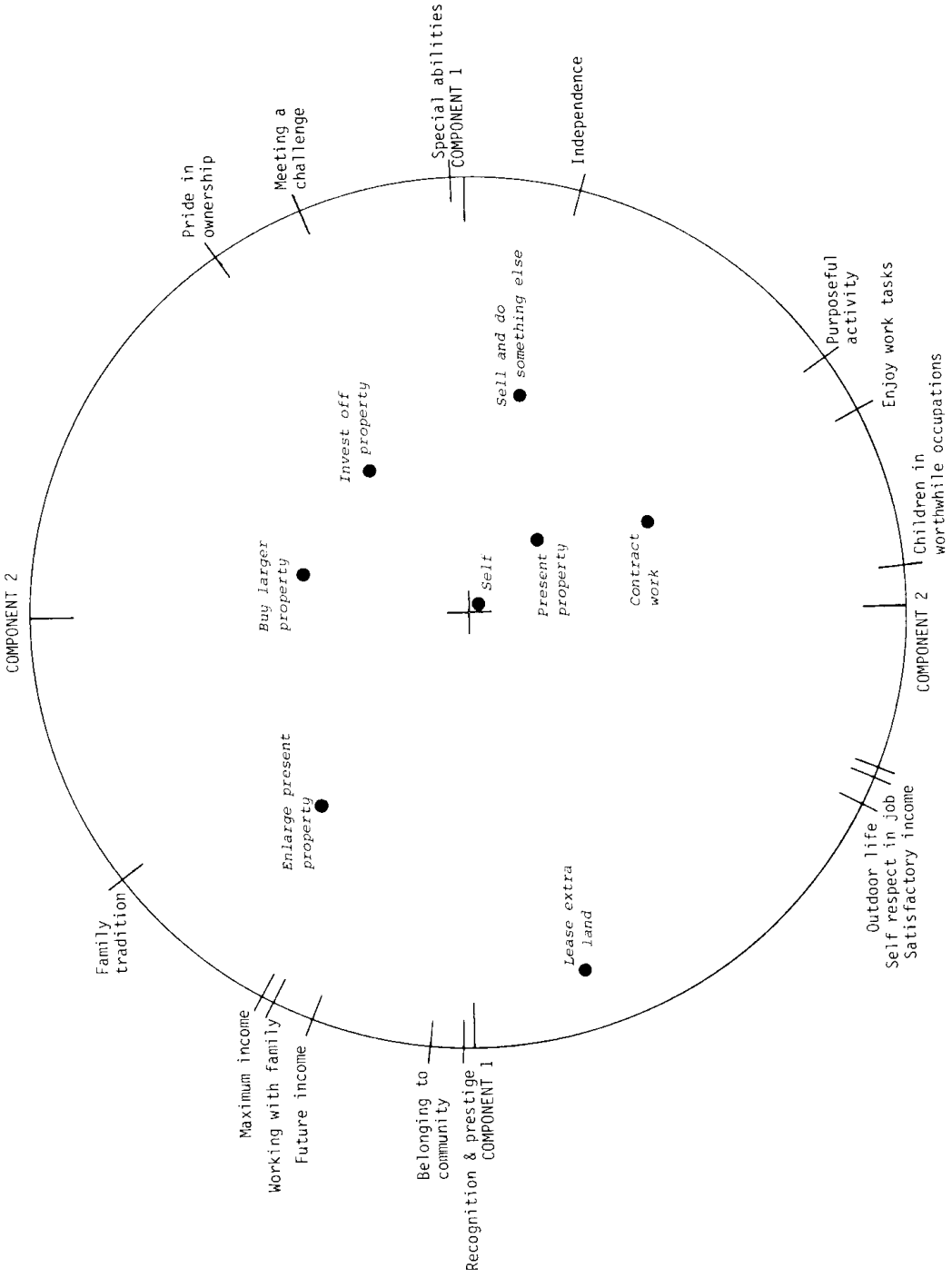

FIGURE 2—Adjustment and goal dimensions for graziers with past expansion experience (components 1 and 2)

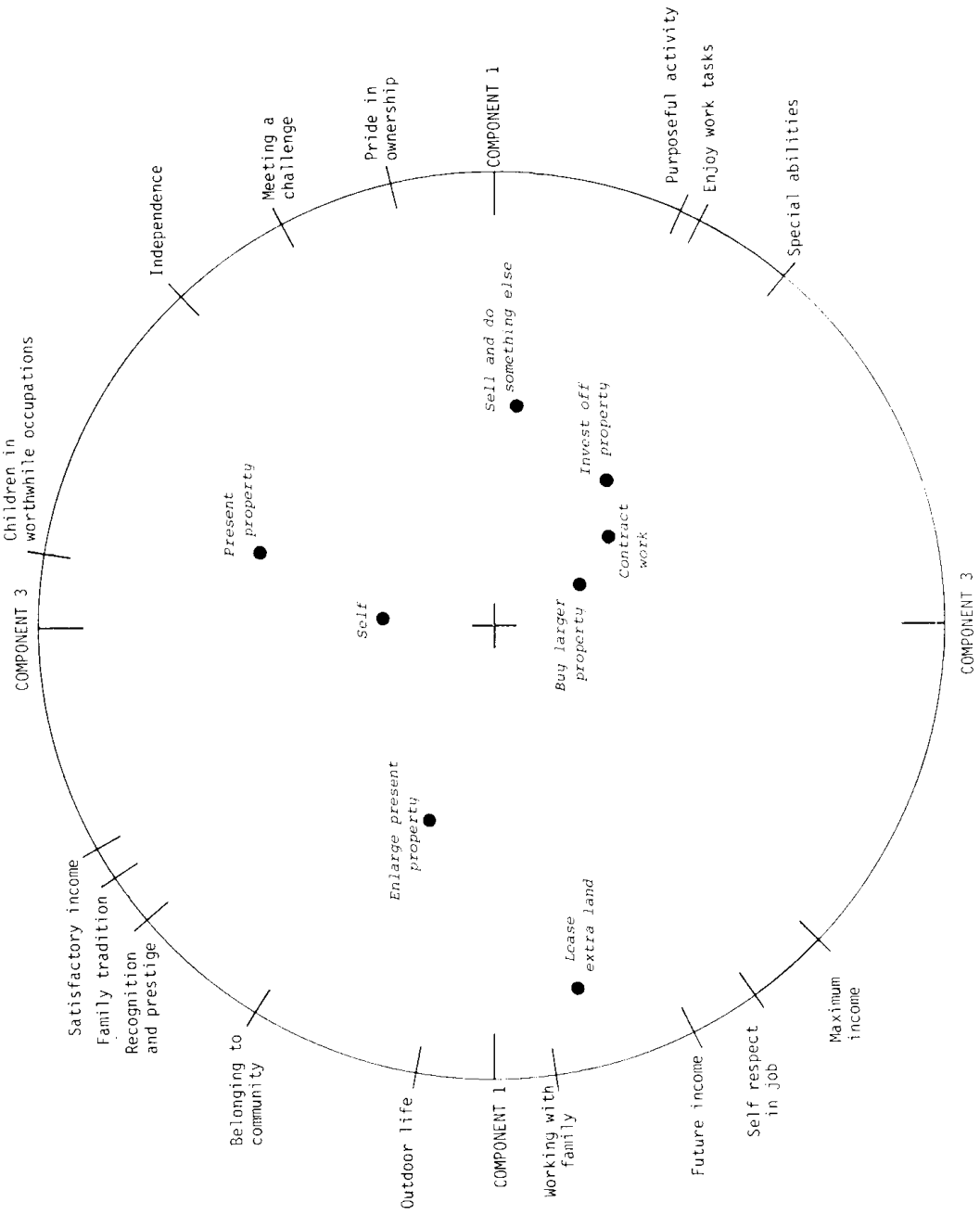

FIGURE 3—Adjustment and goal dimensions for graziers with past expansion experience (components 1 and 3)

dispersion of propositions in both figures, suggesting that, for graziers with a history of expansion, there is greater differentiation in the way adjustment propositions meet different personally-valued goals. *Present property* is relatively closer to *self* than all adjustment propositions in both Figures 2 and 3, indicating that *present property* comes closer to meeting personal goals for these graziers. The goal groupings of group B graziers differ from those without expansion experience. On the first two components, *maximum income* and *future income* are differentiated from *satisfactory income*; they are linked with social goals and contrast with the expressive, personal fulfilment goals—*pride in ownership, meeting a challenge* and *special abilities*. For both groups A and B the *independence* goal contrasts with the maximum and future income goals.

The relationships between adjustment propositions and goals are more complicated for the past expansion graziers. On the first component, *enlargement of present property* and *leasing* (associated with both social and increased income goals) contrast with the 'off-farm' adjustment strategies (associated with expressive and personal fulfilment goals). The position of *self* is centred between these two poles. The *present property* is not seen as important in providing a sense of belonging to the community. Thus, for group B, the adjustment choices (shown in Figures 2 and 3) are between strategies which provide additional income as well as meeting social goals, and strategies which would allow more expression of personal abilities. Such a choice may reflect a more 'entrepreneurial' personality and appears to be provided by the *present property* producing a satisfactory income.

The diagrams for the two groups show the relations among the propositions and among the goals, and their relations with each other. The degree of accuracy of these dimensional relationships will depend on how much of the variation recorded in the grids is absorbed by the latent roots of the components depicted in the diagrams. In this study, the small sample sizes, and the nature of farming conditions in the survey area, suggest that the results should not be generalised too widely. The techniques for establishing the relationships between adjustment strategies and farmers' goals can be applied to other groups of farmers.

Conclusions and Implications

Graziers' goals were analysed in terms of personal importance, in terms of how they would be satisfied by various adjustment propositions (the regression analysis) and in terms of the structural relationships between goals and adjustment propositions. All groups of graziers place most importance on the goals of making *satisfactory income* and *safeguarding income for the future*. Graziers with a history of expansion, in contrast to those without that history, also view *maximum income* as important. To some extent, this pre-eminence of income goals reflects a long period of economic adversity for these graziers.

When adjustment propositions are considered by graziers intending to expand in the future, there are significant differences between those with and without a history of expansion for such goals as making *maximum income, belonging to the grazing community, continuing the family tradition, preference for an outdoor life*, and *purposeful hard work*. The analysis of dimensional relationships between goals and adjustment

strategies for graziers intending to expand in the future showed graziers with a history of expansion are more satisfied with their present property, and are less constrained in their view of potential adjustment strategies. Those without a history of expansion face a trade-off between income and social goals. Income and social goals seem to be complementary rather than competitive for those with a history of expansion – for them the trade-off appears to be between propositions meeting income-social goals and those meeting expressive or personal fulfilment goals.

Government intervention in the adjustment process, to expand the land base for given farm units, is likely to be directed more at those graziers willing to expand, but who have not yet done so. In this study, those without a history of expansion have smaller properties and are less satisfied with their properties, but are likely to be less responsive to income increasing strategies which do not satisfy their social and independence goals. For these graziers, measures which encourage the enlargement of the present property are likely to be the most acceptable. Assistance which encourages strategies such as selling and doing something else or contract work, while meeting income goals, will not fulfil social goals. Government intervention to encourage individuals to move out of grazing (sell and do something else) seems to be particularly unattractive to those who intend to expand but have not yet done so. Such an option does not appear so unattractive to those with expansion experience, but they are less likely to need such forms of adjustment encouragement.

The conflicts between, on the one hand, adjustments which would best satisfy the income or instrumental goals and, on the other, adjustments which would satisfy the non-income goals means that for some, the strategy giving most satisfaction of the latter goals is to do nothing. For most graziers, property enlargement is the preferred adjustment strategy, since it entails the least disruption to a valued lifestyle yet still helps achieve the instrumental goals. It is assumed that those graziers who show the most tendency to an income or instrumental goal orientation will be most highly motivated to make income-seeking adjustments. To the extent that their non-instrumental goals act as constraints, they will probably stop short of adopting income maximising off-property adjustments and will settle for buying more land. The extension of this argument is that any scheme designed to induce people to leave the land, either by retraining or by premature retirement, will depend for its success on the existence of large numbers of farmers or graziers with strongly instrumental goal orientations. Gasson (1973) found that low income farmers tend to play down the instrumental goals which they are not achieving and to stress the non-income attributes of a life on the land. Schemes which aim to induce such people to leave the land are unlikely to be successful, since they rely on instrumental incentives.

References

Barton, L. M. (1978), 'Agricultural assistance measures: a survey and assessment', *The Australian Economic Review*, 3rd Quarter, 71-82.

Edwards, A. L. (1957), *The Social Desirability Variable in Personality Assessment and Research*, Dryden Press, New York.

Feather, N. T. (1973), 'The measurement of values: effects of different assessment procedures', *Australian Journal of Psychology* 25(3), 221-31.

Fransella, F. and Bannister, D. (1977), *A Manual for Repertory Grid Technique*, Academic Press, London.

Gasson, R. (1973), 'Goals and values of farmers', *Journal of Agricultural Economics* 24(3), 521-37.

Georgescu-Roegen, N. (1954), 'Choice, expectations and measureability', *Quarterly Journal of Economics* 68(4), 503-34.

——— (1967), *Analytical Economics*, Harvard University Press, Cambridge.

Gower, J. C. (1967), 'Multivariate analysis and multidimensional geometry', *The Statistician* 17, 13-25.

Harper, W. M. and Eastman, C. (1980), 'An evaluation of goal hierarchies for small farm operators', *American Journal of Agricultural Economics* 62(4), 742-7.

Holmes, W. E. (1980), Property build up in a semi-arid grazing area: a study of south west Queensland sheep-cattle graziers' aspirations for property enlargement, their reasons for desiring more land, and their causes of past failures to expand, M.Agr.Sc. thesis, University of Melbourne.

Kerlinger, F. N. and Pedhazur, E. J. (1973), *Multiple Regression in Behavioural Research*, Holt, Rinehart and Winston, New York.

Kerridge, K. W. (1978), 'Value orientations and farmer behaviour – an exploratory study', *Quarterly Review of Agricultural Economics* 31(1), 61-72.

Kirzner, I. M. (1973), *Competition and Entrepreneurship*, The University of Chicago Press, Chicago.

Lipsey, R. G. (1977), *An Introduction to Positive Economics*, Weidenfeld and Nicolson, London.

Lutz, M. A. and Lux, K. (1979), *The Challenge of Humanistic Economics*, Benjamin/Cummings, Menlo Park.

Miller, G. A. (1956), 'The magical number seven plus or minus two: some limits on our capacity for information processing', *Psychological Review* 63, 180-92.

Patrick, G. F. and Blake, B. F. (1980), 'Measuring and modelling farmers' goals: an evaluation and suggestions', *Southern Journal of Agricultural Economics* 12(1), 199-204.

Pasour, E. C. (1981), 'A further note on the measurement of efficiency and economies of farm size', *Journal of Agricultural Economics* 32(2), 135-46.

Robbins, L. (1932), *An Essay on the Nature and Significance of Economic Science*, Macmillan, London.

Slater, P. (1972), Composite diagrams and systems of angular relationships applying to grids. Paper presented to the Royal Statistical Society, Multivariate Analysis Study Group, London.

——— (1977), *The Measurement of Intrapersonal Space by Grid Technique: Volume 2 Dimensions of Intrapersonal Space*, Wiley, London.

Williams, W. T. (1976), *Pattern Analysis in Agricultural Science*, CSIRO and Elsevier, Melbourne and Amsterdam.