VOL.10 No.4 OCTOBER 1971

REQUIREMENTS FOR CONTRIBUTIONS

Articles in the field of agricultural economics, suitable for publication in the journal, will be welcomed.

Articles should have a maximum length of 10 folio pages (including tables, graphs, etc.), typed in double spacing. Contributions, in the language preferred by the writer, should be submitted in triplicate to the Editor, c/o Department of Agricultural Economics and Marketing, Pretoria, and should reach him at least one month prior to date of publication.

The Journal is obtainable from the distributors: "AGREKON", Private Bag 144, Pretoria.

The price is 25 cents per copy or R1 per annum, post free.

The dates of publication are January, April, July and October.

"AGREKON" is also published in Afrikaans.

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by

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INTRODUCTION

The scale described in this article was envolved in the course of an attempt to formulate a South African concept of agricultural progressiveness and to construct suitable instruments for its reliable measurement.[1]

Progressiveness in the farmer was previously defined as including both a particular brand of managerial ability and resonsibility towards natural resources.[2] During Burger's research, attempts were made to construct and validate scales for the determination of each of these qualities.

Whereas success was achieved in respect of managerial ability (or aptitude, as it was finally called), this was not possible in the case of the responsibility aspect. Progressiveness as defined, is consequently not yet measurable.

However, the scale of managerial aptitude in itself appears to be a potentially useful tool inter alia in the assessment of the managerial input in the agricultural production process and its development is described fully in this contribution.

THE CONSTRUCTION OF THE SCALE

Emery, Oeser & Tully[3] stated in 1958:

> ".... propaganda (i.e. exposure) will undoubtedly induce some farmers to adopt a particular advanced practice and high situational motivation would also help; but if a man can see how his problems are interrelated, if he understands how to commit himself financially, if he plans ahead, then he adopts new practices as a thinking, purposive individual and not as a mere gambler playing in the hope of a pay off; and then he will also do other sensible and far-seeing things such as educating his sons and keeping records of his plans and operations".

In the course of their research into the reasons for the slow rate of adoption of agricultural innovations in Australia, these authors put forward the view that a farmer's ability to co-ordinate the many diverse operations of the farm, is indicative of his powers of conceptual, abstract thought and the degree to which he can relate concepts learned in the past to present stimuli and future goals.

They selected the term "conceptual skill" to denote "that mediating dimension" which links intelligence and perception, on the one hand, to integrated farming operations on the other.

Employing this concept as a point of departure, Kolbé (unpublished) in South Africa, formulated an instrument which he designated "The conception of management scale" and which was used in many investigations to assess managerial ability in the South African farmer. However, this scale was never validated until employed by Burger[4] in the course of an extensive agro-sociological investigation of the Upper-Orange River catchment, after which he renamed it "The scale of managerial optitude".

According to Nelson's Highroads Dictionary, "aptitude" means fitness or capacity. Funk and Wagnalls (1963) state that to be apt is to "have a natural, habitual or inherent inclination or ability". Thus, managerial aptitude would appear to denote a natural, inherent ability for management. This description admirably suits the concept underlying the scale and it is therefore proposed that this term be adopted in its future use.

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1) Burger, P.J. (1967) Agricultural progressiveness - a South African concept. D. Agric. (Inst. Agrar.) dissertation, University of Pretoria

2) Burger, P.J. & Groenewald, J.A. (1971). The measurement of managerial inputs in agriculture:

II. A South African concept of agricultural progressiveness. Agrekon Vol. 10 No. 3.

3) Emery, F.E., Oeser, O.A. & Tully, Joan (1958) Information, decision and action. Melbourne University Press

4) Burger, P.J. op. cit.

The scale was constructed as follows:

1. Future image

Please state briefly what plans you have to improve on your present system of farming over the next few years.

Score	Interpretation
5	Has definite plans which indicate rational planning and self-confidence.
4	Has plans and ideas, but exhibits lack of confidence
3	Has "possible" plans but finds it difficult to come to decisions or take action
2	Hasn't really any plans. Finds it more expedient to be guided by what the season indicates. Then there is less risk
1	Can't perceive the direction of the question; cannot comment. Lives from day to day.

2. Records

Do you keep any records of production (e.g. breeding and/or income and expenditure)? May I see your records?

Score	Interpretation
5	Has complete range of meticulously kept records
4	Keeps good records but not complete (or vice versa).
3	Poor and incomplete records and has to refer tax return to a third party
2	Keeps no records other than receipts and papers for annual tax return
1	Does not concern himself with records, therefore keeps none.

3. Office

Do you have a private office or place from which you manage your farming? May I see it?

Score	Interpretation
5	Has a separate, neat, well-organised office
4	Has an administarative "nook" in some or other room which appears well-organised
3	Has a separate room, untidy and disorganised which passes for the "office".
2	No office, but keeps receipts and papers in a drawer or behind door in a file
1	No administrative centre or system whatsoever

4. Budget

Will you please tell me what your farming is going to cost in the coming year (total farming expenditure), and may I ask how you arrived at this estimate?

Score	Interpretation
5	Draws up complete and rational budget in which, for instance, accurate estimates are made for labour, implements, pest control, fodder, fertilizer, seed, fuel, repairs, etc.
4	Draws up rational budget for a few of the main expense items
3	No budget. Relies on reasonable estimates
2	No budget. Relies on incomplete and uncertain "guestimates"
1	Has no idea of what will happen. Takes it as it comes.

5. Maintenance

When and how do you attend to the many maintenance tasks on your farm, such as fence and windmill maintenance, care of implements, keeping sheds in good order, care of the homestead, roadmaking etc.?

Score	Interpretation
5	Has an organised and systematic procedure. All operations taken on strictly according to plan
4	Has good intentions and tries to work systematically but good organisation lacking
3	Has no system. Does maintenance when opportunity arises.
2	Has no system. Maintenance done only when emergency arises
1	No maintenance done.

6. Organisation and control of labour

What is your position with regard to labour? Do you experience more or fewer problems than your neighbours? Do you have a special compound? (Inspect its condition). What are your mealtime arrangements and what rations do you supply? What wages do you offer? Are the labourers contented and do you have a good foreman?

Score	Interpretation
5	Outstanding organisation, excellent labour relations and very good living conditions and other amenities
4	Very good in certain respects but lacking in other
3	Reasonable organisation and facilities.
2	Not very satisfactory in most respects.
1	Poor organisation, relations and facilities.

The conceptualisation underlying the selection of scale items closely resembles that employed by

Emery et. al. [5] Construction of the scale involved the selection of those items of behaviour that were judged as likely to occur if the determining factor, managerial aptitude, existed. Thinking of farming not as a way of life but as a highly involved business which is, perhaps more than any other subject to a great many uncontrollable factors, one can visualise many ways in which a farmer can exhibit managerial aptitude.

Taking the scale items as examples, it can be seen that he has to consider how to organise his available labour effectively and create working and living conditions which will maximise satisfaction and, thus, productivity. He has to show ingenuity in planning and integrating the varied farming operations into one smooth-functioning whole. He must have knowledge and a businessman's keen instinct for predicting future trends in order to be able to formulate plans for future development of his enterprise. To this end he requires good records upon which to base financial estimates. Having a well organised administrative centre will greatly facilitate his executive function. In the words of Emery et al. [6] "the farmer has to combine in some measure and to varying degrees the functions of manager or executive, planner and economist".

EVALUATION OF THE SCALE

Evaluation of the scale was carried out following its application to 799 farmers in the study of the Upper-Orange River catchment area, as well as a total of 1 605 farmers in 25 other investigations. [7] For the purposes of this article details of procedures followed in the latter studies have not been considered.

(a) Intercorrelation of scale items

The correlation matrix in Table 1 indicates that extra-ordinarily strong bonds exist between the scale items.

(b) Internal stability

The availability of modern computing facilities made it possible to employ Guttman's "least squares" technique [8] for estimating the scalability of the six items selected as indicators of managerial aptitude. The more usual "scalogram analysis", followed by tests for reproducibility, was therefore not applied.

The Guttman "least squares" solution of scalability allocates maximally differentiated weights to item categories and calculates the correlation ratio for a given set of replies. Using McNemar's [9] formula, a value of F is obtained which may be compared directly with F-tables in order to determine significance and thereby the extent to which the items constitute a scale.

The result of this procedure when applied to the data obtained in the Upper-Orange River catchment survey is as follows:

Item	Score	Category loading
1	1	-0,642065
	2	-0,453709
	3	-0,113226
	4	0,237788
	5	0,443748
2	1	-0,719611
	2	-0,363985
	3	-0,042268
	4	0,293647
	5	0,533439
3	1	-0,565764
	2	-0,299359
	3	0,030500
	4	0,251587
	5	0,452864
4	1	-0,609229
	2	-0,349542
	3	0,074141
	4	0,327835
	5	0,545189
5	1	-0,778717
	2	-0,488684
	3	-0,073200
	4	0,245018
	5	0,529350
6	1	-0,784170
	2	-0,514023
	3	-0,042884
	4	0,314014
	5	0,582901

Correlation ratio: 0,6537
Number of cases : 793 (six were rejected for incomplete data)
Number of categories: 30
F-value ($n_1 = 29$; $n_2 = 763$): 49,67 (significant at the 1% level of significance)

The highly significant F-value obtained in this test indicates that the internal stability of the scale is satisfactory. The near-to-ideal spread of category loadings for each item indicates balanced representation in the different categories and, consequently, good variance in the population.

(c) Factor analysis

The technique of factor analysis is a radical departure from the statistics associated with experimental tradition in that it does not accept arbitrary choices as to what are important va-

5) Emery, Oeser & Tully, op. cit.

6) Ibid.

7) Burger, P.J., op. cit.

8) Torgerson, W.S. (1958). Theory and methods of scaling. John Wiley & Sons, New York, pp. 338-345.

9) McNemar, Q. (1955). Psychological statistics. John Wiley & Sons, New York, p. 264.

TABLE 4 - Correlations between the scale of managerial aptitude and certain selected variables (N = 624)

Variables*	Correlation coefficients
1	0,360^{xx}
2	0,181^{xx}
2	0,404^{xx}
4	0,681^{xx}
5 (Interviewer assessment)	0,572^{xx}
5 (Bank assessment)	0,270^{xx}
5 (Attorney assessment)	0,336^{xx}
6	0,354^{xx}
7	0,325^{xx}
8	0,282^{xx}
9	0,141^{xx}
10	0,409^{xx}

* Variables have been accorded the same number as in the foregoing description

^{xx}Significant at the 1% level of significance

validity came to hand. The Upper Orange catchment was sub-divided into eight ecologically different sub-regions and the eight sets of data in respect of the scale tested separately for internal consistency by means of the Guttman "least squares" solution. The findings are submitted in Table 5:

TABLE 5 - The internal consistency of the scale of managerial aptitude in eight sub-regions of the Upper-Orange catchment

Sub-region	Frequency	k	n_1	n_2	F
A	138	30	29	108	8,77^{xx}
B	67	30	29	37	1,92^{x}
C	101	30	29	71	3,62^{xx}
D	72	30	29	42	3,10^{xx}
E	99	30	29	69	5,37^{xx}
F	100	30	29	70	6,03^{xx}
G	110	30	29	80	5,04^{xx}
H	111	30	29	81	4,99^{xx}

^{x} Significant at the 5% level of significance

^{xx} Significant at the 1% level of significance

The findings of Table 5 together with what has gone before, eliminate the necessity for further tests. At this stage the conclusion must be drawn that the scale of managerial aptitude is a most satisfactory measuring device which appears to reflect adequately the concept on which it is based.

PRACTICAL APPLICATION OF THE SCALE

The following comments in respect of each scale item provide a useful guide in the practical application of the scale:

1. Future image

Comment: In this item, as in those to follow, the respondent should be given the opportunity, as far as possible, for free discussion of the subject in question. Where necessary, further relevant questions may be asked so that in actual fact, a frank discussion is stimulated.

In item 1 it is not the nature of the plans the respondent puts forward that is of significance in awarding points, but rather whether he has any clear-cut aims which he confidently expects will improve his enterprise. Here it is especially important to gauge whether the question has suddenly stimulated the plans, or whether the respondent's ideas and schemes are really deeply-seated and almost, as it were, part and parcel of his approach to his farming enterprise. The arguments which the respondent puts forward in explaining his schemes will be important aids in assessing to what extent he really has a "future image" and a cosmopolite, goal-directed awareness of his position in relation to the local and national farming industry.

It is rather essential that the interviewer, through practice, gets the "feel" of item 1 as it is one of the more important components of the scale. Basically, it is a question of being able to separate the progressive "looking-ahead" individual from the locally-orientated one who lives from day to day.

2. Records

Comment: This item and its interpretation is much more straightforward than item 1. What should be stressed, however, is that interviewers must see the records. It is not good enough to rely on what the respondent says he does. Discussion of his records will assist the interviewer immeasurably in applying a score. It is essential that the interviewer acquaint himself, prior to the survey, with record systems kept on farms and fix his norms very clearly.

3. Office

Comment: Again, this item is easy to score, but the interviewer is compelled to inspect whatever administrative facilities are mentioned by the respondent.

4. Budget

Comment: As in item 1, the respondent should be given full rein to explain the position and is welcome to consult whatever record he may have made of planned expenditure. Discussion should be stimulated, but the interviewer should be on his guard to determine whether the budget has been pre-determined or is being thought out during the interview. The time of year (i.e. phase in the production cycle) will naturally have to be taken into consideration.

Here, as in item 1, points are not awarded for the accuracy of the estimates but for the fact that estimates have been made, indicating a business-like approach.

5. Maintenance

Comment: This item necessitates rather full discussion in order to come to grips with the real situation. Replies like "during wintermonths" or "when it rains" are not of great assistance in arriving at a score. The interviewer should prepare himself thoroughly in order to be able to lead a revealing discussion of the topic of maintenance on the farm and should have very definite norms to facilitate judgement. Such norms will vary from area to area.

6. Organisation and control of labour

Comment: This item necessitates full and frank discussion of labour matters on the farm and includes inspection of labour facilities as well as, where in any way possible, subtle evaluation of the appearance of labourers themselves. The interviewer must obtain an accurate impression of the manner in which the respondent organises his labour and the working and living conditions he creates in order to maximise satisfaction and thus labour productivity.

This item is a primary indicator of managerial aptitude or, in other words, the ability to get things done in the most satisfactory way. The good manager gets other people to implement his plans and arranges matters so that working for him is an enjoyable occupation. On the other hand, the poor manager relies on his own labour and finds it difficult to control labour efficiently and productively.

The interviewer should acquaint himself fully with labour matters in his area and draw up definite norms in order to be in a position to score this rather difficult item satisfactorily.