

**SUPPLEMENT TO
INTERNATIONAL
JOURNAL OF
AGRARIAN AFFAIRS**

Vol. V, No. 4. July 1969

The Human Factor in Agricultural Management

**Proceedings of the First I.A.A.E. Intereuropean Seminar
Warsaw, May 1968**

*Seminar sponsored and
Proceedings published jointly by the
International Association of Agricultural Economists
and the Polish Academy of Sciences*

Price 10s. 6d. net from Institute of Agrarian Affairs
3 Magpie Lane, Oxford, England

PWN—POLISH SCIENTIFIC PUBLISHERS

The Human Factor in Farm Management. Some Research Findings from the Netherlands *

A. W. VAN DEN BAN

Agricultural University, Wageningen, The Netherlands

INTRODUCTION

One of the few constants in agriculture today is its constant change. In order to make a good income a farmer has to adjust his enterprise continuously to new technical possibilities and to changing price relationships. The question is how far farmers are able to make these adjustments. There can be several difficulties:

(1) Some farmers do not have enough capital and do not save enough of their incomes to be able to make these adjustments.

(2) Some farmers do not receive enough information about new developments in agricultural research and about changing market conditions.

(3) Perhaps some farmers do not have the intelligence and other personal qualities needed to make correct decisions on the basis of the information they receive.

(4) Farmers, just as other people, are influenced in their behaviour by the norms of the groups to which they belong. Changes in these norms frequently lag behind changes in the situation, e.g. the ideal of a good farmer might be adjusted to what a good farmer would have done a generation ago.

(5) Some of the goals of farmers are based on situations in the past and cannot be realized in present conditions, e.g. some farmers wish to continue to be farmers and to have incomes comparable to those in other occupations, without the human and material resources which make such incomes possible.

The last four points involve human factors in farm management which have been studied from different theoretical angles. Little research has

* I am indebted to Mr. B. van der Ploeg for a critical reading of a draft of this paper.

been done in the Netherlands within the framework of farm management research. More has been done by analysing the diffusion of new farm practices. This is done mainly by studying the characteristics of those farmers who first adopted new practices and by analysing the way in which they decided to adopt them. There are a few related studies which tried to evaluate farm management extension techniques.

FARM MANAGEMENT RESEARCH

There are large differences in farm income on farms which operate under similar conditions as to farm size, quality of soil and other production factors. One generally assumes that these differences are largely due to differences in the quality of farm management*. Therefore it is astonishing that in the Netherlands only a few attempts have been made to correlate farm income and related variables with the quality of the farm management. A first study was done by Hamming [2]. He analysed survey research data from a random sample of farms by factor analysis. By comparing this with a factor analysis of farm management data from non-randomly selected farms he estimated that 64% of the difference in farm income per man could be explained by differences in the number of man work units per man.

In his correlation matrix one of the variables the level of vocational agricultural education of the farmer or his son over 18 years, and another their contacts with the agricultural extension service. One factor had a loading of 0.88 for the number of man work units per man and one of 0.17 for vocational agricultural education and somewhat less for contacts with extension. The only other factor which had loading for vocational agricultural education (0.4) had no loading for the number of man work units per man. The other loadings in this factor indicated that on larger farms more people were employed and the production was more intensive.

There are several ways in which the limited effects of vocational agricultural education and contact with extension can be explained: (1) At the time the data were gathered (1957) the extension service had been giving more attention to increasing the production per ha. and per animal than per man. No measures were available in this study for the yields and costs per ha. or per animal. (2) The measurement of the level of vocational agricultural education of the farm family was not ideal. It was assumed for instance that on a farm where the farmer himself had no vocational agricultural education, but his son of 18 had attended an agricultural

* In the U.S. several studies have shown that a farmer's knowledge of modern farming, his value orientation and the way in which he makes his decisions, have much influence on his income, e.g. Ref. 1.

winter school, this education would have the same effect as on a farm where the farmer himself had attended one. Where a son is working on a small farm the income is probably rather low because of an oversupply of labour.

In a further study somewhat more serious attempts were made to measure the human factors [3]. For 40 farmers three variables were correlated with a three-year average of labour income per hour and 27 other farm management data, and a factor analysis was applied to this correlation matrix. These three variables were:

(1) Education: Vocational agricultural education as well as general education. The education of a son over 18 years old working full time on the farm was counted half of the education of the farmer himself.

(2) Interest in new developments. The adoption of seven recommended farm practices and contact with four sources of information excluding the extension service.

(3) Socio-economic status. Reading of national papers and of books, visits to the cinema, activity in associations, use of modern appliances in the home, education desired for a son, etc.

The correlation coefficient with labour income per hour was 0.07 for education, 0.12 for interest in new development and 0.38 for socio-economic status. Perhaps the low correlation with interest in new developments was partly caused by a tendency among these farmers to have higher gross incomes as well as higher expenses than farmers with less interest in new developments. The factor analysis gave three factors which were responsible for the correlation between socio-economic status and income:

(1) Farmer with higher socio-economic status had better quality grassland and therefore higher net incomes from their dairy cows without higher milk yields per cow.

(2) Their farms were larger.

(3) They lived predominantly in an area with somewhat more favourable conditions for production.

The low correlations found in this study are probably partly due to the system of selection of the farms studied. Unfortunately they were not selected randomly, but were chosen as being typical for the area and reasonably well managed. This makes it possible e.g. that only the more intelligent farmers with low levels of education were included in the study.

In one other study differences in the number of man work units per man were explained as being on a kind of empathy scale, the number of opinion questions on which the farmer had given no answer [4]. By dividing his respondents into three groups according to their levels of empathy, Benvenuti found in each of three farm-size groups that the high group was about 20% higher in the number of man work units per man than the low

group. These differences were about as large as the differences between the farm size groups, a factor to which agricultural economists have been giving a lot of attention. In other parts of his study Benvenuti shows that his measure for empathy is a rather good indication of the degree of acceptance of a modern cultural pattern, a modern way of thinking, by farmers.

At present at the Agricultural Economic Research Institute at the Hague an attempt is being made to explain differences in farm income which may be due to the psychological characteristics of farmers. These characteristics have been measured with graphological techniques. Apparently very low correlations have been found. This may be due to the low reliability of the techniques or to the fact that—not certain characteristic—but configurations of characteristics are important. It is possible for instance that a farmer's lack of intelligence may not reduce his income a great deal so long as he is willing to listen to good advice.

It is clear that not much attention has been given to the influence of human factors on farm income in the Netherlands. This is regrettable because without such research it is hard to design a good curriculum for the vocational agricultural schools in which most of our young farmers are trained. In addition there are some indications that not many intelligent boys enter agriculture. The army examination of recruits for instance gave indications about 15 years ago that of the recruits working in agriculture only 10% were in the top two intelligence classes, compared with 20% for the sons of farm labourers working outside agriculture. It is not known whether or not this is an undesirable situation for the future of Dutch agriculture.

Up to now most farm management research in the Netherlands has considered only income as a goal for farmers. Undoubtedly they have many other goals such as security, leisure, status and pleasure in cattle breeding or in other activities. Therefore farmers who organize their farms so that they do not achieve the highest income, may achieve their goals in quite a rational way, although this is sometimes not recognized by agricultural economists.

DIFFUSION RESEARCH

Characteristics of different adopter categories

Many diffusion studies all over the world among farmers and other groups have investigated which kinds of people are the first to adopt new ideas.

On the basis of the data in the Diffusion Documents Centre, Department of Communication, Michigan State University, Rogers and Stanfield

recently prepared a summary of these studies. Table 1 gives the number of studies in which a certain correlation was found between the characteristics of the decision-maker or of his firm and the adoption of new ideas.

In the Netherlands similar results have been obtained in a number of studies. In some of them the effects of one variable have been studied while keeping some other variables constant, or factor analysis has been employed (see e.g. [5]). Here again, not much effect of vocational agricultural education could be found. In several of these studies, too, the judge-

Table 1. Variables Related to Innovation

	Number of publications with each type of relationship to innovation				Total number of publications
	positive, %	none, %	negative, %	conditional	
Non-attitudinal characteristics of the unit of adoption					
Age	28	64	51	15	158
Education	144	31	10	8	193
Literacy	19	6	1	1	27
Income	90	12	7	3	112
Level of living	33	4	1	2	40
Attitudinal or interior characteristics of the unit of adoption					
Mental rigidity	5	6	12	1	24
Empathy	3	0	1	0	4
Knowledgeability	14	12	1	1	55
Attitude toward change	117	23	13	6	159
Business orientation	3	1	1	0	5
Achievement, motivation	11	4	0	2	17
Aspirations for children	19	2	1	1	23
Satisfaction with life	2	2	3	0	7
Type of relationship of the unit with social system					
Opinion leadership	9	3	1	1	14
Deviation from norms	15	4	8	1	28
Group participation	123	16	10	7	156
Cosmopolitizm (mobility)	59	8	2	4	73
Mass media exposure	42	6	0	1	49
Inter-personal exposure	28	6	6	0	40
Contact with change agencies	125	9	0	2	136

Rogers E.M. and Stanfield J.D., Adoption and diffusion of new products; emerging generalizations and hypotheses pp. 33 (1966) (mimeograph).

ment of the local extension officers of the quality of the management on different farms was used as an independent variable. Other variables correlate with this judgement in much the same way as with the adoption of new farm practices. I cannot prove that this judgement correlates with

farm income, but I assume it does, because in the Netherlands each local extension officer works in an area with about 500 farms and usually knows them pretty well.

At first the characteristics of the different adopter categories were assumed to be due to the fact that the culture of the Dutch countryfolk is changing from a traditional to a modern pattern, in which the people are

Table 2

Aspects	Traditionalists	Moderns
Reaction towards change	Resisted	To some extent accepted as natural
Value attached to		
agricultural science	Low	Rather high
manual labour	High	Indifferent
leisure	Low	Rather high
land	High	Rather low
Willingness to take risks in the farm		
business	Low	Rather high
Interest in education	Low	High
Expenditure calculations include	Cash expense only	Also depreciation, family labour, etc.
Relations with other members of the community	Open families	Closed families
Factions	Many	Few
Formal organizations	Not accepted	Accepted
Status differences	Rigid	Flexible
Confidence in the honesty of government officials	Low	Rather high
Opinion about events outside the community	None	Clear
Communications with extension officers	Very difficult	Rather easy

Van den Ban A.W., Cultural Change: The basis for increasing agricultural productivity, *Intern. Review of Community Development*, No. 12 (1963).

much better informed about what happens in the world, and are willing to consider whether new ideas might not help to achieve their goals. In the traditional culture many ideas are rejected without even being seriously considered, simply because they deviate from the old way of doing things [4]. The differences between modern and traditional farmers can be summarized as illustrated in Table 2.

Later on it was found that in areas with modern cultural patterns also, such as our new polders, the farmers frequently hoped to maintain their traditional way of life. Arable farmers might be quite willing to consider new plant protection methods, but not to switch to broiler production or to cooperate intensively with some neighbours in the use of labour and machinery, because that would change their way of life (see [6]).

DECISION MAKING

In the Netherlands farmers can receive information on new developments from many different sources. The government employs one extension officer for every 125 farmers and market gardeners, commercial companies employ even more, and there are about 150 agricultural journals published in the Country. In addition there are meetings, machinery shows, demonstration farm, etc. On many problems, therefore, farmers who really try can get the information they need, but not all farmers do try. Whether or not they receive much information depends on:

(1) The need they feel to adjust their enterprises to new development. Many old farmers, especially those without successors, do not feel such a need.

(2) The self-esteem they have and therefore their willingness to bother extension officers with their problems.

(3) Their knowledge of modern agriculture. Those farmers especially who are well informed about the results of agricultural research ask for more information, partly because some of the information is presented in language that is too difficult.

The type of farmer who receives much information on new developments corresponds roughly to the type who has adopted many new practices [5]. In general and speaking objectively, those farmers who are most in need of this information receive least. This is the case not only in the Netherlands, but also in all other countries from which I have seen research on this problem summary of this research gives [7].

Usually it takes several years after a farmer has heard of a new idea for the first time before he adopts it himself. Research shows quite clearly that farmers receive their first information about new farm practices mainly from the farm papers, radio and other mass media, but do not adopt them until they have discussed them personally with somebody in whose judgement they have confidence. In the Netherlands the more progressive farmers usually discuss these practices with their extension officers; the less progressive farmers mainly with their colleagues [5]. In this way new farm practices gradually trickle down through the community until nearly all farmers have adopted them. By this time, however, the innovators have often switched to an even never practice.

In most of these diffusion studies the adoption process has been studied for new farm practices in general, but in one study the adoption of the milking machine alone was studied [9]. This was done because 60% of the farms where agricultural economists considered it profitable to use milking machines did not have any in 1960. It was found that most of the farmers who had bought milking machines had done so because their labourers had left or because a member of the family was no longer able

to milk by hand. Usually it was not part of a long-term plan for the development of a farm. This may have been because farmers did not understand that a sizeable increase in their labour productivity would be necessary if they were to continue to farm, or because they saw the necessity, but did not see how to realize it.

EVALUATION OF FARM MANAGEMENT EXTENSION METHODS

Some small studies have tried to evaluate farm management extension methods. Most farmers in the Netherlands have their accounts kept for fiscal purpose and the extension service has stimulated them to keep, in addition, somewhat different accounts for farm management purposes. This is done by only about 4% of farmers despite the subsidies given for the purpose. Probably one reason is that an attempt was made to induce them to keep such accounts before they had been made to feel a need for information which could be provided in no other way. This was why it was necessary to study how farmers used the data from their accounts. In this study on dairy farms, which on the average had kept these accounts for 10 years, the farmers were asked to which data they gave special attention when they received the annual reports of their results and of some 30 other farms [10]. Only 9% of them mentioned the number of cows per man, whereas research shows that on this type of farm this is the major factor influencing farm income. It was mentioned more frequently by the high income farmers than by the low income farmers, who gave more attention to milk production per cow, information for which farm management accounts are not needed. It was also found that 45% of these farmers did not expect an increase in labour productivity on their farms in the next 10 years. Again, such an increase was expected more frequently by the farmers with high incomes than with low incomes. Apparently the high income farmers are more aware that they have to adjust their farms to the changing situation, which in our Country includes an increase in wages of about 100% in 10 years and in prices of farm products of about 20%.

Part of this group had their farm management accounts kept for research purposes without having to pay for it. At the termination of the research project they were given the option to continue for a fee. About half of them did so. They had annual net incomes about 4000 guilders higher than farms of about the same size which did not. Also, the farmers who agreed to discuss the annual reports of their accounts with a small group of other farmers had considerably higher incomes than those who were less favourable to this idea. A reason why farmers with low incomes frequently do not keep farm management accounts may be that these accounts can decrease their self-esteem and their status in the community.

In one district extension education in farm management is given, not by starting with economic theory, but by starting from the farming situation in the villages. This is analysed and discussed in a group of about 15 farmers in a series of 10 sessions. During these discussions the farmers discover for themselves that their situation is much less favourable than they thought and that important changes are necessary. In an evaluation of this method after the meetings were finished considerable differences were found between the participants and the non-participants in their opinions about what a good farmer does [11]. The participants gave much more attention to high labour productivity, which farm management research shows to be the major factor influencing farm income in this area, and less attention to good crops, not too many weeds, and good cattle, which used to be important for a farmer's success. The effects of these discussion groups have probably not only been that the participants have learned to apply modern farm management concepts, but also that the group norms on what a farmer ought to do have changed. The behaviour of most people, farmers as well as other people, is influenced by these group norms, by what other people expect them to do. Therefore it is difficult to change their behaviour without changing these group norms.

SUMMARY

It is generally believed that the personal qualities of a farmer make a lot of difference in his farm income, but it is not known which qualities correlate with a high income in the Netherlands. It is known, however, that the farmers who have adopted many new farm practices and are judged by the local extension officers to be good farmers, are well informed about what happens outside the gates of their own farms and outside their own villages. Also they have more resources and higher status in their communities than those who adopt these practices later.

In deciding about the adoption of new farm practices most farmers get their first information from the mass media, but they do not decide to adopt the practices without a personal discussion with somebody they consider competent.

Dutch farmers do not have much interest in farm management accounts, partly because they have not learned to recognize the most relevant parts of the information thus provided, and partly because for the less capable farmers it is not pleasant to get realistic information about their situation.

Group norms about what a good farmer ought to do are not infrequently based on the situation as it was a generation ago. Well directed group discussions can be used to change these norms.

REFERENCES

1. Hess C. V. and Miller L. F., Some personal, economic and sociological factors influencing dairyman's actions and success, *Pennsylvania Agr. Exp. Station Bull.*, 577, University Park (1954); Hobbs D. J., Beal G. M. and Bohlen J. M., The relation of farm operator values and attitudes to their economic performance, Rural Sociological Report, No. 33, Iowa State University, Ames, (1964).
2. Hamming G., Een bedrijfsvergelijkend streekonderzoek op de zandgronden (Comparing Farms on Sandy Soil by Survey Research), Rapport 384, Landbouw-Economisch Instituut, The Hague.
3. Aspecten van bedrijven op komgronden (Aspects of Farms on Heavy River Clay Soil), pp. 23, Landbouw-Economisch Instituut, The Hague, unpublished report (1960).
4. Benvenuti B., Farming in Cultural Change, pp. 335-339, Van Gorcum, Assen (1961).
5. van den Ban A. W., Some characteristics of progressive farmers in the Netherlands, *Rural Sociology*, 22, 205-212 (1957); van den Ban A. W., Boer en landbouwvoorlichting; de communicatie van nieuwe landbouwmethoden (The Communication of New Farm Practices), pp. 279, Van Gorcum, Assen (1963).
6. Constandse A. K., Boer en toekomstbeeld (Farmers and the Image of the Culture), *ASS-Bull.*, No. 24, 79, Wageningen (1964).
7. Rogers E. M., Diffusion of Innovations, pp. 367, New York, Free Press (1962).
8. Visser J., De houding van de tuinders in een drietal groenteteeltcentra van het Rijkstuinbouwconsulentschap Arnhem tegenover de tuinbouwvoorlichting (The Attitude of Vegetable Growers in Three Areas Towards the Horticultural Extension Service), pp. 70, Wageningen (February 1967); Bauwens A.L.G.M. and Heunks F. J., De landbouw in Sprang-Capelle; een economisch-sociologisch onderzoek (Agriculture in Sprang-Capelle; an Economic-sociological Study), Verslagen No. 66, pp. 91-92, Landbouw-Economisch Instituut, Den Haag (1963).
9. Velde S. T., Waarom wordt een melkmachine aangeschaft? (Why is a Milking Machine Bought?) Rapport 124, Proefstation voor Akker- en Weidebouw, Wageningen (1962).
10. Krabbenborg H. A., Verandering en verbetering; via voorlichting? (Change and Improvement; Through Extension Education?), pp. 79, Afd. Voorlichtingskunde van de Landbouwhogeschool, Wageningen (1967).
11. van Santen C. E., De studieclub; bedrijfseconomische discussiegroepen voor landbouwers in Zuid-Gelderland (The Study Group; Farm Management Discussion Groups for Farmers in Southern Gelderland), Afd. Voorlichtingskunde van de Landbouwhogeschool, Wageningen (1965).

BIBLIOGRAPHY

(Dutch publications which give some attention to human factors in farm management and which have not yet been quoted are as follows)

- Ban A. W. van den, Wie worden door de landbouwvoorlichtingsdienst bereikt? (Who are Reached by the Extension Service?), *Landbouwkundig Tijdschrift*, 65, 6, 317-327 (1953).
- Enkele kenmerken en eigenschappen van de vooruitstrevende boeren (Some Characteristics of Progressive Farmers), *ASS-Bull.*, No. 5, 54; No. 10, 78, Wageningen.

- Research in the field of advisory work, *Neth. Journal of Agr.*, 9, 2, 122-133 (1961).
- (with E. M. Rogers): Research on the diffusion of agricultural innovations in the United States and the Netherlands, *Sociologia Ruralis*, III 38-51 (1963).
- A revision of the two-step flow of communication, *Gazette*, 10, No. III, 237-249 (1964); The communication of new farm practices in the Netherlands, *Sociologia Neerlandica*, II, No. II, 1-18 (1965).
- Bauwens A.L.G.M., Sandt M.A.J. van der and Heunks F. J., *De landbouw in Rucphen, Economisch-Sociologische gezichtspunten (Agriculture in Rucphen from an Economic-sociological Point of View)*, Verslagen No. 67 Landbouw-Economisch Instituut, Den Haag (1963).
- Bergsma R., *Op weg naar een nieuw cultuurpatroon (On the Road to a New Cultural Pattern)*, p. 228, Van Gorcum, Assen (1963).
- Broecke A. M. van den, *Rapport betreffende een sociologisch onderzoek naar de investeringsbereidheid en de bereidheid krediet voor het landbouwbedrijf op te nemen in de Alblasserwaard (Report of a Sociological Study Regarding the Willingness to Invest and to Use Credit in the Alblasserwaard)*, p. 55, Stichting Landbouwbelang Alblasserwaard, Vijfherenlanden (1963).
- Felstehausen H., *Economic knowledge and comprehension in a Netherlands farming community*, *ASS-Bull.*, No. 26, 120, Wageningen (1965).
- *Economic knowledge and participation in farmer decision-making in a developed and an under-developed country*, *The International Journal of Agrarian Affairs*, Oxford, England (1967).
- Groot J. P. (with F. L. Verhey): *Moderne Agrarische bedrijfsopvolging (Transfer of Farms to the Next Generation)*, p. 83, Zwolle (1964).
- Hofstee E. W., *Over de oorzaken van de verscheidenheid in de Bederlandse landbouwgebieden (On the Reasons for Regional Differences in Dutch Agriculture)*, p. 32, Inaugurele rede, Wageningen (1946).
- *Sociologische aspecten van de landbouwvoorlichting (Sociological Aspects of Extension Education)*, *ASS-Bull.* No. 1, 26, Wageningen (1953).
- *Rural Life and Rural Welfare in the Netherlands*, p. 364, Staatsdrukkerij, Den Haag (1957).
- *Sociological Environment; Environmental Conditions for Agricultural Development. Proceedings of the 11th Intern. Conference of Agricultural Economics. The role of agriculture in economy, Mexico (1961)*.
- *General Review of the Human Factor in Agricultural Development. Rehovoth Conference on Comprehensive Planning of Agriculture in Developing Countries, Rehovoth, Israël, August 19-23, 1963*.
- *European Perspectives of Agricultural Changes and Societal Adaptions. Farm Goals in Conflict. Report of the Second Conference of the Iowa State University Center for Agricultural and Economic Development, February 1963, Ch. 18, pp. 188-200, The Iowa State University Press, Ames, Iowa (1963)*.
- *Over het modern-dynamisch-cultuurpatroon (On the Modern Dynamic-cultural Pattern)*, *Sociologische Gids*, 13, No. 3, 139-154 (1966).
- Arbeidsbezetting, bedrijfsoppervlakte, veebezetting en bedrijfsinkomen op de veenweidebedrijven in Friesland (Number of Labourers, Farm Size, Number of Cattle and Farm Income on the Dairy Farms on Peat Soil in Friesland)*, *B.E.M.*, No. 43, Landbouw-Economisch Instituut, Den Haag (1962).
- Muggen G., *De invloed van de boer op zijn bedrijfsresultaat; een literatuurstudie (The Influence of the Farmer on Farm Income; A Study of the Literature)*, p. 11, Unpublished Report, Dept. of Psychology, Agricultura University, Wageningen (1966).

- Ploeg B. van der, De betekenis van demonstratiebedrijven voor Walcherse boeren (The Importance of Demonstration Farms for Farmers on Walcheren), p. 92, Dept. of Extension Education, Agricultura University, Wageningen (1966).
- Veer J. de, De praktische betekenis van het bedrijfsvergelijkend onderzoek voor de landbouwvoorlichting (The Practical Importance of Comparative Farm Management Research for Agricultural Extension), *Landbouwvoorlichting*, 22, No. 6, 275-280 (1965).
- Wichers A. J., De beoefening van de bloemisterij en groenteteelt te Beesd (The Management of Floriculture and Vegetable Growing at Beesd), *ASS-Bull.*, No. 3, 66, Wageningen (1956).
- Voorkeuren voor voorlichting. Verslag van een onderzoek naar de voorlichtingspatronen voor tuinbouwbedrijf en huishouden in De Streek (Preferences for Different Extension Methods), *ASS-Bull.*, No. 13, 137, Wageningen (1959).
- De oude plattelandsbeschaving; een sociologische bewustwording van de „overherigheid” (The Old Peasant Culture), p. 285, Dissertation, Rotterdam (1965).