FARMING PRACTICES CORRECTNESS INDICATOR FOR FAMILY FARMS IN POLAND

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ABSTRACT

The aim of the paper is to examine the state of affairs in farming practices in the sector of commercial farms in Polish Agriculture. Analysis of farming practices and farmers opinions on their appropriateness was based on the results of the survey in the sample of 721 farms from different regions of the country. Farming practices related to crop production, animal husbandry, farm management and environment were measured against the ideal model drawn from the Integrated Farming System guidelines.

Keywords: farming practices, Integrated Farming System, Farming Practices Correctness Indicator

INTRODUCTION

Challenges of market pressures and changes in agricultural and environmental policies, especially after Poland's accession to the European Union, require substantial structural adjustments from Polish farmers and, in many cases, modernization of technologies they apply.

Polish Agriculture is very diverse in terms of farm area structure, productivity level and profitability, but also in terms of technological advancement as well as its conformance with the modern farm management principles. Obvious as that seems to be, the heterogeneity of Polish farming seldom is taken into consideration. Polls and analyses carried out on the representative samples of farmers in Poland, as well as national statistics result in an inevitable averaging, which frequently distorts the picture, exaggerates it or hides real problems. This also applies to the issue of farming practices.

In the research project, conducted between the years 1999 and 2001, it was attempted to analyse farming practices in a large sample of Polish commercial farms. The main objective was to determine the state of affairs, but also to recognize farmers perception on how the practices they apply should be corrected. Finally, the Farming Practices Correctness Indicator (FPCI) was constructed, which measures the distance between the actual and the ideal, model farming practice derived from the Sustainable Agriculture concept.

RESEARCH METHODOLOGY

The survey conducted on the sample of 721 commercial farms was carried out by agricultural advisors from ODRs (Agricultural Extension Centres), who interviewed farmers with the use of an interview questionnaire. Farms were chosen by the advisors themselves according to the following criteria:

• Farm location – in predominantly agricultural communes with soils typical of the voivodship ;

• Income source - only commercial farms in which agricultural production constituted the main source of income, and with types of production that are dominant in Polish agriculture;

• Minimum area of arable land – 7 ha (farms that have an area ranging from 7 to 10 ha should not account for more than 10 % of the sample), maximum area – 500 ha of arable land.

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• Other criteria: farmer's age – maximum 65.

An interview conducted with farmers has provided a great deal of detailed information on the state of farm resources and agricultural practices applied by farmers. On the basis of collected information, and considering answers to the questions about most appropriate, according to the farmers, ways of performing various measures or operations, an attempt was made to specify the synthetic Farming Practices Correctness Indicator (FPCI).

Guidelines for Integrated Farming System were adopted as the point of reference [Verijken, Wijnands 1992, IOBC 1993; Majewski et al. 1997]. They were considered as the most appropriate benchmark, being in accordance with the best agricultural knowledge and, from the ecological point of view, ensuring sustainability of agricultural production systems.

The applied research concept of idealization and reality consists of three models considering the quality of farm management and the correctness of farming practices (Figure 1).

Table 1. Area, structure and quality of arable land in area farm groups

Area groups in ha	Farms		Arable land area [ha]	Share of group in land area [%]
	Number	%		
7 – 10 ha	57	7,9	7,7	1,9
10-15 ha	142	19,7	12,8	8,1
15-25 ha	219	30,4	19,1	18,5
25-40 ha	171	23,7	31,2	23,6
40-75 ha	92	12,8	53,5	21,8
over 75 ha	40	5,5	147,0	26,1
Total	721	100,0	31,3	100,0

Real model was actually defined for the set of applied agricultural practices in the farm according to farmers' information.

Farmer model drawn up on the basis of farmer statements as „how it should be" has a "wish" character. Depending on the type of practice farmers defined as the most appropriate, or as the best method of performing various activities subject to assessment. It could be assumed that this model reflects the state of knowledge and professional awareness of the surveyed farmers.

Theoretical model was constructed on the basis of the integrated production guidelines and constitutes a point of reference for the farmer and real models.

The calculated Farming Practices Correctness Indicator is a measure of compatibility of management practice in a farm with the guidelines of the Integrated Farming System (IFS):

• real FPCI reflects the existing level of management quality, defined on the basis of management practices applied in reality (real farm model).

• potential FPCI constructed on the basis of farmer opinions concerning the most appropriate (optimal) way of management (farmer model).

Theoretical Farming Practices Correctness Indicator is a measure specifying the highest level of management quality, adopted in accordance with the IFS guidelines (theoretical model).

Calculation of the indicator was conducted in three steps:

1. Comparison of suitable variables (in total characterizing 55 farming practices) for which it was possible to construct appropriate models.

The number of variables is different for individual farms due to the fact that not all of the

analysed practices appear in each of them. FPCI is therefore a relative indicator which takes into consideration the actual number of variables appearing in a given farm.

2. Evaluation of various variants of answers within the range from 0 (no compliance with the IFS guidelines at all) to 1 (meeting the IFS requirements), depending on the assessment of compatibility with the integrated production guidelines. If partial fulfilment of the IFS guidelines was acceptable, in case of some practices, the score could have a value of between 0 an 1. The theoretical correctness indicator for each single practice had the maximum value of 1.

3. Calculation of the indicator in relative terms by dividing the total number of points in the real and farmer models by the maximum score set for the theoretical model.

The FPCIs were constructed for the following areas:

- crop production (18 variables);
- animal husbandry (29 variables)
- farm and environment management (8 variables).

Profile of the sample of farms

More than half of voivodships (26 of 49) have been chosen in order to carry out the research (according to the "old" administrative division of the state) with the exception of neighbouring voivodships with a very similar type of agricultural structures and regions characterised by specific agricultural production conditions (e.g. highland regions).

The structure of the sample in terms of the farm size distribution is presented in Table 1. The sample was divided into six size clusters.

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To a large extent the sample of farms reflects the structure of the commercial sector of Polish agriculture .

Table 2 presents synthetic characteristics of the surveyed population of farms with a division into "good" and "poor" farms. The words "good" or "poor" refer to the farms that were nominated as such by the advisors, who had selected farms for the survey. However, no precisely defined judgement criteria were used ("poor" was understood as relatively "worse").

On average, the farms considered "good" have greater resources of fixed assets. The number of livestock in "good" farms is twice as big as in "worse" farms. However, livestock density per 100 ha in both farm groups is at the same level due to the differences in acreage of agricultural land.

"Good" farms are characterised by a higher level of production intensity; they achieve markedly better production and economic results.

Table 2. Characteristics of the surveyed population farms

Specification	Farms	
	Good	Poor
Number of farms	587	134
Arable land area in ha	34,2	18,3
Average farmer age	40,9	39,2
Average farmers education level*	3,3	3,0
Number of full-time employees/100 ha UR	6,1	10,2
Number of tractors/average age in years	2,1 / 13,5	1,4 /16,1
Fertilization NPK kg/ha	197,2	152,7
Amount of active substance kg/ha	1,1	0,8
Average LU number per farm	20,0	10,6
Livestock density in LU per 100ha of agricultural land	60,0	60,0
Average Net Farm Income [PLN/farm]**	21663	5353
Agricultural Net Income [PLN/ha of agricultural land]	632	284
Average Gross Farm Income plus depreciation[PLN/farm]	25218	8330
Personal Income [PLN/1 full-time employee]	12110	4436

**1-primary, 2-primary+agricultural training course, 3-vocational, 4-secondary, 5-higher*
*** 1 Euro = appr. 4 PLN*

RESULTS

The synthetic indicator, encompassing the whole set of analysed farming practices, was calculated for each of the 721 surveyed farms. The real and potential indicators in subsequent farms are presented in the Figure 2.

For the surveyed population of farms the synthetic real FPCI reaches the average value of 49,6%, whereas the potential indicator on average accounts for 72,5%.

The indicator has a value lower than 100% for each farm. That means that within the surveyed population there is not a farm in which farm organization, applied agricultural practices and farmer knowledge would fully be in line with the theoretical model.

The real FPCI in individual farms ranges from 17,3% to 81,2%, whereas the potential indicator ranges from 39,9% to 93,8%. That means that the spread between the lowest and highest levels of the indicator in the groups of farms, selected according to particular criteria, is greater for the real model than the one that characterizes the farmer model. Concluding, individual farmers differ more in terms of the real way of farming than in opinions on correct farm organization and production processes.

Table 3 presents data concerning the real and potential summary correctness indicator of agricultural practices, as well as their characteristics in farm groups selected according to various criteria.

Both, the real and the potential indicators are characterized by large variability, especially of the Real FCPI, as the value of standard deviation shows. The variability of the Potential FCPI measured by standard deviation is much lower what indicates, that the majority of farmers has a similar knowledge and understanding of which farming practices are the most appropriate. According to the data in Table 3, there is a positive correlation of the indicators with the farm size as well as with farmers' education. Also, farms considered as "good" have significantly higher FPCI than "poor" farms. The gap between groups of farms with the smallest and highest value of real indicators narrows for potential indicators, although the pattern is still the same – farms which are smaller, poorer and run by less educated farmers achieve lower FCPI.

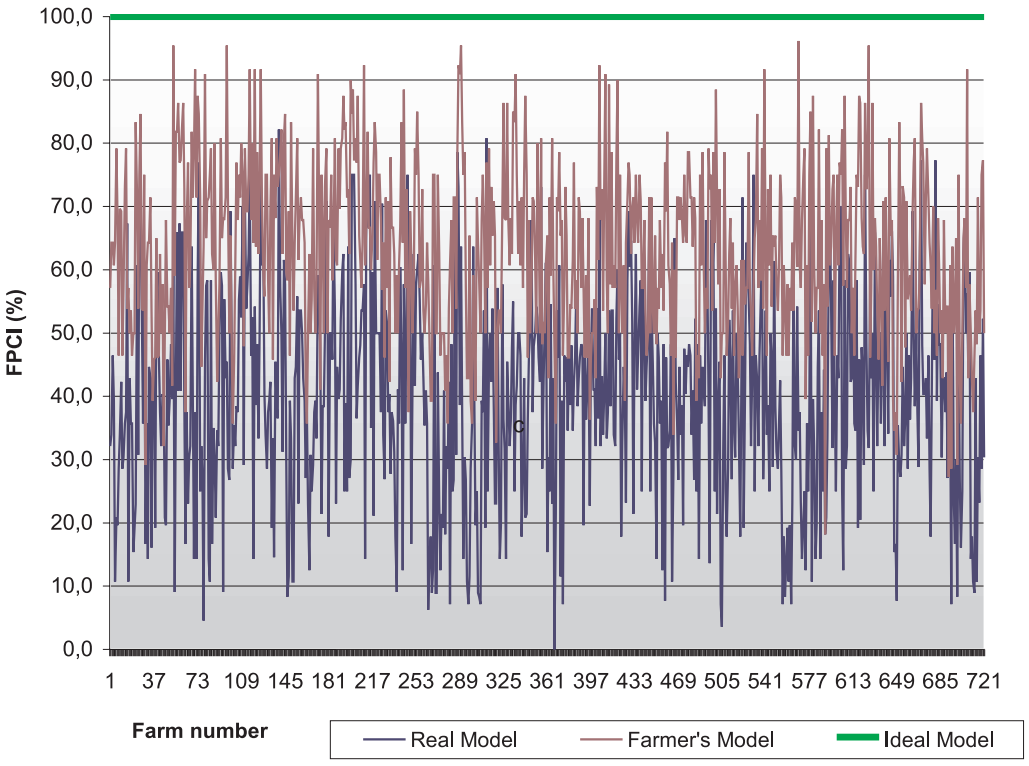

Table 3. Synthetic correctness indicator of agricultural practices in farm groups

Farm groups	Number of farms	Synthetic real FCPI (%)	Synthetic potential FPCI (%)	Difference
Total population	721	49,6	72,5	22,9
Minimum		17,3	39,9	22,6
Maximum		81,3	93,8	12,5
Standard deviation		16,68	13,57	-
Farm size in ha				
Below 10 ha	57	44,9	69,9	24,9
10-15 ha	142	45,0	67,7	22,7
15-25 ha	219	48,0	70,5	22,5
25-40 ha	171	51,1	71,2	20,1
40-75 ha	92	52,6	72,7	20,2
Over 75 ha	40	56,0	75,0	18,9
Farmer education level				
Primary	129	46,5	69,3	22,8
Vocational	298	48,7	70,6	21,8
Secondary	247	50,1	71,1	20,9
Higher	47	53,4	73,1	19,7
Farms „good – poor”				
Poor	134	41,1	67,5	26,5
Good	587	50,7	71,3	20,6

***Source**: Own research*

The analysis of FCPI formation shows a positive correlation between the real indicator and the potential indicator, even though the gap between them is becoming narrower with the increase of the Real FCPI. This phenomenon is illustrated by the growing, along with the real indicator values, trend of the potential indicator, which can be seen in Figure 3. In order to draw up this chart, farms were put in order, from the smallest to the largest real FCPI. That indicates that farmers from farms in which agricultural practices are at a higher level have knowledge about management that is much closer to the ideal described in the theoretical model. Only in 3 farms the potential indicator takes lower values than the real indicator.

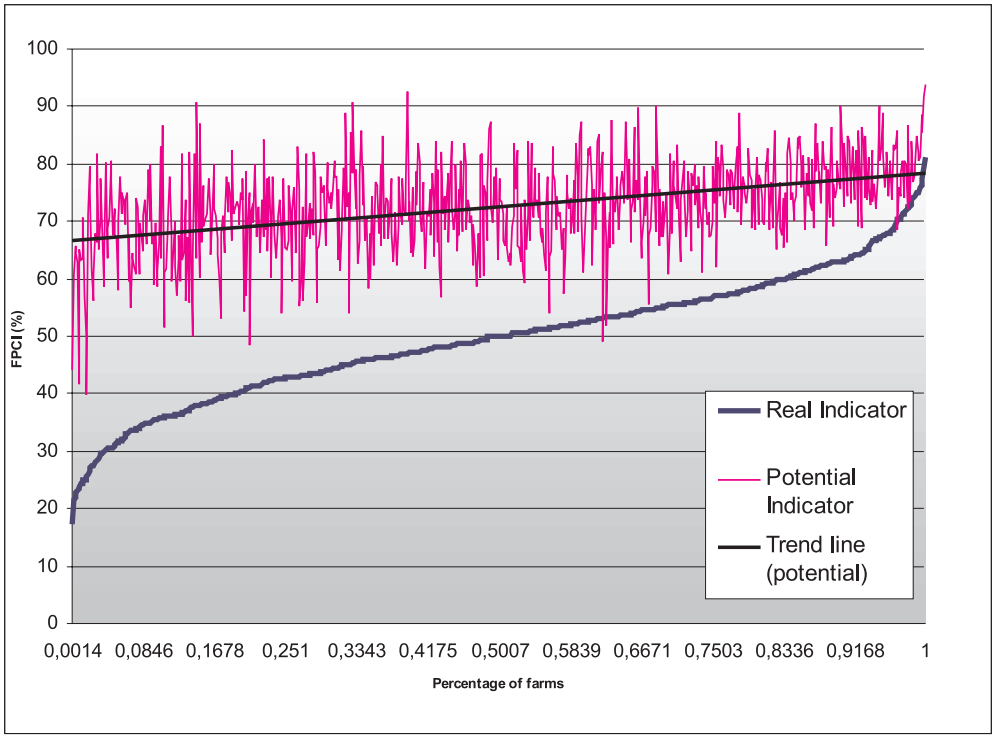

Figure 3. Potential and real correctness indicator of agricultural practices

The partial Farming Practice Correctness Indicator was also calculated for the key three areas of farm operations: crop production, animal husbandry and farm management (including environment management). The results are presented in Table 4.

The lowest real FCPI characterizes crop production, whilst the highest was the indicator for animal husbandry. This is probably due to the importance of animal production, which is for the majority of farms in the sample the main source of income. This observation is strengthened by the increase of the indicator (both, real and potential) alongside with the increase in the scale of animal production. The larger the herd of livestock, the better the value of the indicator.

The indicator for management and environmental practices was, on average, slightly above the mean value for the sample.

In all cases poor farms performed noticeably worse than farms considered as “good”.

DISCUSSION

Table 4. Partial FCPI for different areas of farm operations

Farm groups	Number of farms	Partial real FCPI (%)	Partial potential FCPI (%)	Difference
Crop production				
Total population	721	39,8	63,5	23,7
Poor farms	134,0	31,0	60,1	29,0
Good farms	587,0	41,8	64,2	22,4
Animal husbandry				
Total population	683	54,7	70,9	16,2
Poor farms	129	49,3	71,9	22,7
Good farms	554	59,7	75,5	15,8
Number of LU*				
0-10	202	50.8	61.4	10.6
11-20	262	57.4	74.2	16.8
21-40	153	62.8	76.3	13.5
over 40	66	68.5	78.5	10.1
Farm and environment management				
Total population	721	52,3	86,4	34,1
Poor farms	134	40,2	82,6	42,4
Good farms	587	55,1	87,3	32,2

**Livestock Units*

The analysis of the correctness indicator of farming practices in the selected population of commercial farms in Poland has shown that activities run by farmers in the area of farm organization are not consistent with the adopted theoretical model, constructed on the basis of Integrated Farming System guidelines. The distance between the reality and what may be considered as the ideal situation is relatively significant. An optimistic result of the survey is the "farmers model", from which the answer "how it should be" appears to be much closer to the ideal model.

The comparisons also indicate that a higher level of consistency of farming practice with the theoretical model is characteristic for farms described as „good" and farms run by farmers with a higher than the average education level. As the level of education rises, the convergence of the real and farmer models with the theoretical model markedly increases. In the case of the farmer model, described with the Potential FPCI, however, differences between groups of farmers, chosen according to their level of education, are considerably smaller.

Correctness of real farming practices applied in crop production is, just like the potential correctness indicator, at a lower level than the level of animal production. Among the analysed practices it is possible to find such practices that are characterised by a low level of consistency with the theoretical model.(e.g. frequency of seed renewal, soil testing, depth of ploughing). Similarly, in other areas of farming activities there are other practices not consistent with the ideal model related for instance to the use of paddocks for cattle in winter, the calculation of feed doses (animal husbandry), keeping accounts, manure storage and manure applications (farm and environment management). That points to specific training and advisory needs.

The analysis has pointed to the necessity for improving farm organization and applied agricultural practices, and at the same time it has shown that there is a considerable discrepancy between reality and farmer professional knowledge, which is characterised by the potential correctness indicator of farming practices. This means that, apart from incomplete farmer knowledge, there are also other factors limiting the processes of improving agricultural practice. Collected data does not make it possible to unambiguously specify reasons behind the state of

affairs. However, it could well be assumed that what strongly affects that situation is not only the financial barrier, but also traditionalism characterizing a considerable population of farmers and other personal traits. Yet, verification of this hypothesis would require much more thorough research with the use of other research methods.

The research clearly shows that farmer knowledge does not fully transform into action, which should be reflected by farming practice. This points to the need for changes in educational methods, which should be oriented not only towards transferring knowledge, but also convincing people of the rationality of agricultural sciences knowledge achievements and developing skills of applying the knowledge in practice.

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