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## **A Study of Farmers' Information towards the Importance of Using Organic Fertilizers in the Lubertsky-Poland District**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Present study was aimed to assessing the level of farmers' information towards the importance of using organic fertilizers in Lubartowski County, to assessing the level of farmers' information in each statement towards importance of using organic fertilizers and identifying correlation between the farmers' information and independent variables (age, education level, size of farm, contact degree with information sources, average production) in the research.

Questionnaire was designed to obtain data from farmers (respondents). It included personal variables related to farmers' socioeconomic characteristics: (age, education level, size of farm, contact degree with information sources, average production) and also included of 20 statement

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about using of organic fertilizers. The total number of farmers in the sample were 70 farmer. The dependent variables were measured through the scale for farmers' information in the use of organic fertilizers, it was consisted of 20 statements with 4 alternatives/options against each statement: 'I use it significantly, I use it moderate, I use it slightly and I do not use at all'.

The data was collected during the period of 2016. Data was analyzed through Pearson correlation coefficient and Equation of Spearman-Brown.

Results explained that level of farmers' information towards the importance of using organic fertilizers is medium. The results also showed that the statements which took first three ranks according to the centennial weight of statements and respectively are (use the organic fertilizers for increase the humus content in the soil, Use the organic fertilizers for comprehensively supply plants with slowly mobilized, use the organic fertilizers in the surface and rapidly covered with soil for reduce odor and ammonia'. Also, the results found there were a positive correlation between the level of farmers' information towards the importance of using organic fertilizers and the independent variables (Education level, contact degree with sources information. The results didn't showed significant correlation between the level of farmers' information towards the importance of using organic fertilizers and the independent variables (age, size of farm, average production).

**Keywords:** *Agricultural extension; towards; organic fertilizers; information.*

## 1. INTRODUCTION

Organic fertilizers are natural materials (plant or animal origin) including livestock manure, green manures, crop residues, household waste, compost, and woodland litter. Fertilizer is consider one of the factors to increase of agricultural production as well as other factors such as irrigation and improved seeds and plant protection measures [1-4].

Organic fertilizers is any organic material added to the ground for increase of organic matter and the formation of humic substances in the soil as a result of the decomposition of the fertilizers into the ground by microorganisms. Organic fertilizers contain lower proportion of elements compared with mineral fertilizers due to which they are used in large quantities to get the elements and similar results compared with mineral fertilizers, but it is considered to solve for the problem of waste [5-8]. Organic manures are a natural resource for conserving and sustaining soil productivity. They are main factor for replenishment of soil organic matter and supply essential of plant nutrients. Also, organic fertilizers can improve the soil physical and biological conditions and prevent soil degradation [9-12].

The agricultural extension has important role in this topic by the transfer of new knowledge about the use of organic fertilizers to farmers and development of information and the capacity of farmers in the fields of agriculture, and in educating farmers about scientific methods in using of organic fertilizers [13-15]. Due to the

importance of organic fertilizers in increasing of crop production, it is necessary to assess the farmers' information towards the importance of using organic fertilizers to develop the reality of the use of organic fertilizers in Poland and to know the shortfalls in the use of organic fertilizer by farmers.

The aims of present study in Lubartowski County in Poland were, to assessing the level of farmers' information towards the importance of using organic fertilizers in Lubartowski County, to assessing the level of farmers' information in each statement towards importance of using organic fertilizers and identifying correlation between the farmers' information towards the importance of using organic fertilizers and independent variables (age, education level, size of farm, contact degree with information sources, average production) in the research.

## 2. RESEARCH METHODS

The study community was consisted of farmers in Lubartowski County and sampling was performed by simple random sampling. The total number of sample was 70 farmers. In order to obtain the data for research, questionnaire was designed and tested, it was consisted of two parts:

The first part included personal variables related to farmers' socioeconomic characteristics (age, education level, size of farm, contact degree with information sources, average production). The second part included the scale for level of farmers' information towards the importance of

using organic fertilizers. This scale was consisted of 20 statements which were related to the use of organic fertilizers.

The dependent variable was measured through the scale of farmers' information towards the importance of using organic fertilizers, it was consisted of 20 statements and was put in front of each Statement (4 alternatives/options), and it has been given the following numeric values, namely:

1. 'I use it significantly', it has been given 4 degrees,
2. 'I use it moderately', it has been given 3 degrees,
3. 'I use it slightly', it has been given 2 degree,
4. 'I don't use at all', it has been given 1 degree.

Afterwards, the categories of the dependent variable "the level of farmers' information towards the importance of using organic fertilizers" were divided by the "theoretical range" of Statements values, also through using the "range and category length" with rounded the results to the nearest integer as following:

- Highest score for answer about each statement is (4) x numbers of Statements = the result represent "highest value".
- Lowest score for answer about each Statement is (1) x numbers of Statements = the result represent "lowest value".

The highest value minus (-) the lowest value, and then divided the result on 3 "numbers of categories" with rounded the results to the nearest integer.

The data were collected during the period of 2016 and were analyzed through Pearson correlation coefficient and Equation of Spearman-Brown to find if there was a correlation between farmer's knowledge level towards the use of organic fertilizers and independent variables. Through the collected answers of farmers about the statements of importance of using organic fertilizers, in end, the authors identified the final degree for the level of farmers' information towards the importance of using organic fertilizers.

### 3. RESULTS AND DISCUSSION

#### 3.1 Assessing the Level of Farmers' Information towards the Importance of Using Organic Fertilizers in Lubartowski County

The results showed that the highest values obtained by farmers that represented the level of farmers' information towards the importance of using organic fertilizers is 80 and lowest numeric value is 20. Farmers were distributed into three categories according to the farmers' information towards the importance of using organic fertilizers, as shown in Table 1.

**Table 1. Distribution of farmers according to their information towards the importance of using organic fertilizers**

Age categories (years)	Frequency	Percentage (%)
Low (20 – 40)	17	24.28
Medium (41 – 61)	30	42.86
High (62 – 82)	23	32.86
Total	70	100

*Mean of knowledge farmers (45 year)*

The Table 1 described that the highest proportion of farmers is in the medium category, which accounted 42.86%. It means that the farmers' information towards the importance of using organic fertilizers is medium. This may be because the farmers have medium information towards the importance of using organic fertilizers. Especially the information that related to the benefit of use organic fertilizers in increase of agricultural production.

#### 3.2 Assessing the Level of Farmers' Information in Each Statement of Importance of Using Organic Fertilizers

The level of farmers' information towards the importance of using organic fertilizers in each statement was assessed and statements have been ranked in descending order based on centennial weight of statements, as shown in Table 2.

The Table 2 showed that the statements which came in the first three ranks according to the centennial weight of statements and respectively, are (use the organic fertilizers for increase the humus content in the soil, Use the organic

fertilizers for comprehensively supply plants with slowly mobilized, Use the organic fertilizers in the surface and rapidly covered with soil in order to reduce odor and ammonia). This mean that farmers have the knowledge in the use of organic fertilizers, especially in the benefits of using the organic fertilizers.

The statements that came in the last three ranks according to the centennial weight of Statements

and respectively, are (Avoid the use of slurry on pastures for prevent the spread of animal diseases, Avoid the use of organic fertilizers because it is the source of GHG (ammonia, nitrous oxide, carbon dioxide, methane)., Don't keep ruminants in the field because it is a source of methane. This mean that farmers have low information in these topics, especially in the use of slurry on pastures.

**Table 2. Rank the statements of the use of organic fertilizers according to the centennial weight of statement**

No.	Statements	Centennial weight of statement
1	Use the organic fertilizers for increase the humus content in the soil.	89.66
2	Use the organic fertilizers for comprehensively supply plants with slowly mobilized.	88.56
3	Use the organic fertilizers in the surface and rapidly covered with soil in order to reduce odor and ammonia.	88.10
4	Use the organic fertilizers for increase resistance of chemical degradation of soils.	85.78
5	Use the organic fertilizers for reduce production cost in agriculture.	84.98
6	Use the organic fertilizers for increase the buffering capacity of the soil.	83.54
7	Use the compost in temperature (75 °C) for harmful microbes and eliminate weeds.	80.34
8	Use the slurry together with cereal straw for reduce the C: N ratio in the soil.	78.12
9	Use the organic fertilizers for offset the balance of carbon in the soil.	75.55
10	Use the organic fertilizers for increase soil carbon sequestration.	73.78
11	Use the organic fertilizers during and cold windless weather.	71.87
12	Use the organic fertilizers before sowing plants in the autumn.	65.22
13	Use the slurry on pasture, but with grace period 3-week.	62.17
14	Use the straw as a fertilizers soon after harvesting of cereals with additional dose of nitrogen to reduce the value of the C: N ratio.	59.24
15	Don't use organic fertilizers during the hot and windy weather.	58.90
16	Avoid emptying the containers with liquid manure because it lead to sulfide with hydrogen poisoning.	55.44
17	Avoid handling slurry over long distances because it is expensive due to high water content.	52.65
18	Don't keep ruminants in the field because it is a source of methane.	50.12
19	Avoid the use of organic fertilizers because it is the source of GHG (ammonia, nitrous oxide, carbon dioxide, methane).	49.88
20	Avoid the use of slurry on pastures for prevent the spread of animal diseases.	44.23

### 3.3 Identifying Correlation between the Farmers' Information towards the Importance of Using Organic Fertilizers and Independent Variables (Age, Education Level, Size of Farm, Contact Degree with Information Sources, Average Production) in the Research

#### 3.3.1 The age

The results showed that the highest age of farmers was 70 year, and the lowest age was 38 year, and the mean of 55 year. The farmers were distributed to categories according to the age. The results showing that the medium category has higher percentage of 57.14%. Also, the results found that there is no correlation between the level of farmers' information towards the importance of using organic fertilizers and the age of farmers. The value of Pearson correlation coefficient was 0.3112 and was not significant p-value = 0.1769. Whereas, Table 3 is explaining this finding, which means that the farmers' information towards the importance of using organic fertilizers not depend on age of farmer.

#### 3.3.2 Education level

The farmers were distributed to categories according to the education level. The result from

these findings showing that the category of secondary school has got the higher percentage of 42.85%. Also, the results found a positive correlation between the farmers' information towards the importance of using organic fertilizers and education level. The value of spearman correlation coefficient was 0.3421 and was significant (p-value = 0.0022\*\*). Table 4 is explaining this finding, which means that farmers' information towards the importance of using organic fertilizers depend on education of farmer.

#### 3.3.3 Size of farm

The results regarding farm size showed that the maximum size of farms was 30 ha, and the lowest size was 4 ha, with a mean value of 16 ha. The farmers were distributed to categories according to the size of farm. The results also showing that the medium category has higher percentage (64.29%). Also, the results found that there is no correlation between the level of farmers' information towards the importance of using organic fertilizers and the size of farm. The value of Pearson correlation coefficient was 0.3041 and was not significant p-value = 0.2423. Table 5 is explaining this finding. It means that the farmers' information towards the importance of using organic fertilizers do not depend on size of farm, but may depend on other variables.

**Table 3. The distribution of farmers and its correlation with age**

Age (year)	Frequency	Percentage %	Person correlation	p-value
38-48	20	28.57	0.3112	0.1769
49-59	40	57.14		
60-70	10	14.29		
Sum	70	100%		

**Table 4. The distribution of farmers and its correlation with education level**

Education level	Frequency	Percentage %	Spearman correlation coefficient	p-value
Primary School	20	28.58	0.3421	0.0022**
Secondary School	30	42.85		
Higher School and university	20	28.57		
Sum	70	100%		

(\*\*) Significant at the level (0.01)

**Table 5. The distribution of farmers to categories and its correlation with Size of farm**

Age (year)	Frequency	Percentage %	Person correlation	p-value
4-12 Low	14	20	0.3041	0.2423
13-21 Medium	45	64.29		
22-30 High	11	15.71		
Sum	70	100%		

**Table 6. The distribution of farmers to categories and its correlation with contact degree with sources information**

Contact degree with sources information (numeric values)	Frequency	Percentage %	Pearson correlation coefficient	p-value
3-11 Low	23	32.86	0.3041	0.0042**
12-20 Medium	27	38.57		
21-29 High	20	28.57		
Sum	70	100%		

(\*\*)Significant at the level (0.01)

**Table 7. The distribution of farmers to categories and its correlation with average production**

Average production	Frequency	Percentage %	Pearson correlation coefficient	p-value
2-3 Low	22	31.42	0.4131	0.0012
4-5 Medium	31	44.29		
6-7 High	17	24.29		
Sum	70	100%		

**3.3.4 Contact degree with information sources**

The results for this parameter showed that highest numeric value for sources of agricultural information was 29 and the lowest was 3, with the mean of 14. The farmers were distributed to categories according to the sources of agricultural information. The results showing that the medium category has higher percentage of 38.57%. Also, the results found a positive correlation between the level of farmers' information towards the importance of using organic fertilizers and contact degree with sources information. The value of Pearson correlation coefficient was 0.3041 and it was significant p-value = 0.0042\*\*. Table 6 is explaining this finding. Therefore, farmers' information towards the importance of using organic fertilizers depends on sources of agricultural information. It means, if the farmers use more sources of information about the use of organic fertilizers. These will lead to increase their information in the use of organic fertilizers.

**3.3.5 Average production**

The farmers were distributed to the categories according to the average production. The results showing that the medium category has got the higher percentage of 44.29%. Also, the results found that there is no correlation between the level of farmers' information towards the importance of using organic fertilizers and the average production. The value of Pearson

correlation coefficient significant was 0.4131 and was not significant p-value = 0.0012. Table 7 explaining this finding. It means that the farmers' information do not depend on the average production of farm but may depend on other variables.

**4. CONCLUSIONS**

According to the results of article. The authors conclude the following facts:

- Farmers in Lubartowski County have information towards the importance of using organic fertilizers.
- Farmers have high information towards the importance of using organic fertilizers in topic (use the organic fertilizers for increase the humus content in the soil).
- These independent variables (Education level, contact degree with sources information) have important role in the development of farmers' information towards the use of organic fertilizers.

**COMPETING INTERESTS**

Authors have declared that no competing interests exist.

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