

Factors Affecting Effectiveness Agricultural Of Tools And Machines In Sub-District Hamparan Perak, Deli Serdang District, Sumatera Utara

Yuliana Kansrini, Zulhadi Hasibuan

Abstract: These Agricultural tools and machines have a very complex meaning for agriculture in Indonesia because they provide many benefits including increasing production, reducing crop losses, reducing farming costs and expanding planting intensity. Research Objectives to determine the level of effectiveness of the use of agricultural machinery and equipment, and to find out the factors that influence the effectiveness of the use of agricultural tools and machinery in the district of Hamparan Perak, Deli Serdang district. This type of research is survey research. The research sample amounted to 38 respondents, Determination of Samples by Purposive Sampling method. The results of the study show that the level of effectiveness of the use of agricultural machinery and equipment is high at 71.57 percent. The results of the study showed that age had a significant and significant effect on the effectiveness of the use of agricultural equipment and machinery with $t_{count} (2.215) > t_{table} (2.04841)$, while education, farming environment, experience, motivation, socio-cultural, land conditions, expertise, and materials Oil Fuel Does Not Affect the Effectiveness of the Use of Agricultural Equipment and Machines. Simultaneously the variables of age, education, farming environment, experience, motivation, socio-culture, land conditions, expertise and fuel oil, did not have a significant and significant effect on the effectiveness of the use of agricultural tools and machines where the value of F ($1.54 < F_{table}=2, 22$).

Index Terms: Factors, Effectiveness, Experience, Motivation, Tools, Agricultural, Machinery.

1 INTRODUCTION

Indonesia is an agricultural country where the agricultural sector has a very important role for food providers. Modern agriculture is required to use agricultural mechanization in the form of tools and agricultural machinery that can accelerate the process of cultivation activities in the field so that it is more efficient and effective. According to [1], the role of agricultural mechanization in agricultural development in Indonesia is (a) enhancing labor efficiency, (b) increasing the degree and standard of living of farmers, (c) guaranteeing increases, (d) quality and quantity and capacity of agricultural production, (e) enabling the growth of farming types, namely from the type of agriculture for family needs (subsistence farming) to become the type of company agriculture (commercial farming), (f) accelerating the transition of the Indonesian economic form from agrarian to industrial characteristics. The purpose of this study is to determine the level of effectiveness of Alsintan's use and the factors that influence the effectiveness of Alsintan's use, namely age, education, farming environment, motivation, socio-cultural, land conditions, experience, expertise and fuel oil. This study focused on agricultural machinery and equipment (alsintan) for APBN assistance obtained from 2014-2017, namely hand tractors and small combine harvester. The indicators used to measure the effectiveness of Alsintan's work are as follows:

- 2 wheel tractor: 0.3 ha / day
- 4 wheel tractor: 2.0 ha / day
- Small combine harvester: 0.6 ha / day

II. RESEARCH METHODS

Study location of farmer groups that received alsintan assistance in Hamparan Perak sub-district, Deli Serdang district. The study was conducted in April to June 2018. This type of research is survey research, the source of data comes from primary data obtained through interviews and secondary data. The number of research samples is 38 people, data analysis is used Multiple Linear Regression.

III. RESULTS AND DISCUSSION

A. General Description of the Study Area

Hamparan Perak District is one of the sub-districts in Deli Serdang Regency, North Sumatra Province. Hamparan Perak District has an area of 263 Km² (26,300 Ha) or (9.21%) of the area of Deli Serdang Regency, consisting of 20 villages and 219 hamlets.

1. Characteristics of Respondents

a. Age of Respondents

The age of the respondent is the age of the respondent at the time the assessment was conducted. Data on respondents based on age are presented in Table 1.

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Table 1. Age

No	Criteria	Total (Individual)	Percentage(%)
1	< 31 years	3	7,89
2	31 – 40 years	14	36,84
3	41– 50 years	12	31,57
4	51 – 60 years	7	18,42
5	> 60 years	2	5,26
Total		38	100

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Based on Table 1, the age of respondents at the time of this study was at productive age of 36 people (84.2%), while respondents who were in the unproductive age amounted to 2 people (5.26%). According to [2] productive age is the age of 15-64 years while age sedangan 65 years is a non productive age category. The data also shows that the age of the respondent farmers in the dominant assessment area aged 31-40 years is 14 people (36.84%).

b. Level of education

The respondent's education level is the level of formal education that has been obtained. Respondent data based on education in full are presented in Table 2.

Table 2. Formal Education Levels

No	Criteria	Total (Individual)	Percent ages/%
1	Primary School/Equivalent School	8	21,05
2	Junior High School/Equivalent School	12	31,57
3	Senior High School/Equivalent School	18	47,36
Total		36	100

Based on Table 2. It can be seen that the education level of the respondents is dominant in high school, this is evident from the number of respondents who have an elementary school education level of only 8 people (21.05%), SMP (31.57%) and high schools totaling 18 people (47.36%). The level of education can affect one's thinking patterns, so that the longer a person has an education, the more rational the way of thinking. In general, it can be seen that higher educated farmers will be better and more rational in their thinking, including in managing farming.

c. Gender

The sex of the respondents was entirely male. This is because the members of the farmer group who are the overall research sample have male members.

1. Analysis of the Effectiveness of the Use of Agricultural Tools and Machines Based on Work Capacity

The measurement of the effectiveness of the use of agricultural tools and machines uses indicators, namely the working capacity of 2-wheeled tractors and small combine harvesters.

a. Wheel Tractor 2

Table 3. Effectiveness of Wheel Tractors 2

No	Criteria	Score	Total	Percentage (%)
1	Very effective (>0,3)	5	5	13,15
2	Effektive (0,3)	4	21	55,26
3	Moderately (0,2-0,3)	3	5	13,15
4	Ineffective (0,15-0,2)	2	7	18,42
5	Very ineffective (< 0,15)	1	0	0

From Table 3. it can be seen that the use of 2-wheel tractors in Hampanan Perak District is relatively effective (55.26%).

b. Small Combine Harvester

Table 4. Effectiveness of Small Combine Harvester

No	Criteria	Score	Total	Percentage (%)
1	Very effective (> 0,6)	5	1	2,63
2	Effective (0,6)	4	22	57,89
3	Moderately (0,5-0,6)	3	11	28,94
4	Ineffective (0,3-0,5)	2	4	10,52
5	Very ineffective (< 0,3)	1	0	0

From Table 4. it can be seen that the use of small combine harvester in Hampanan Perak District is classified as moderate with a value of 57.89%. The results of the analysis of the effectiveness of the use of agricultural tools and machinery in the Hampanan Perak District can be seen in Table 5.

Table 5. Level of Effectiveness of Use of Agricultural Equipment and Machines

No	Indicator	Value Obtained	Maximum Score	Percentage (%)	Effectivity level
1	Work Capacity of Alsintan	272	380	71,57	Higher

Sources: Primary Data Analysis (2018)

The effectiveness of the use of agricultural tools and machinery is high, one of the supporting factors is the area of land owned by farmers in the 3 villages which are broad, namely for the City of Rintang City 503.5 Ha, Flat City 833.3 Ha and Paluh Kurau 1,432 Ha. This is also supported by the age characteristics of farmers who are still in the productive age category reaching 84.2%. According to [2] state that the higher the age of farmers at the productive boundary, the ability to work will increase so that productivity will also increase.

2. Analysis of Factors Affecting the Effectiveness of the Use of Agricultural Equipment and Machines

Analysis of the factors that influence the effectiveness of the use of agricultural tools and machinery in this study include the variables of age, education, farming environment, experience, motivation, socio-cultural, land conditions, expertise and fuel oil. The results of the analysis can be seen in Table 6.

Table 6. Analysis of Factors Affecting the Effectiveness of Use of Agricultural Equipment and Machines

Model	R	R Squae	AdjustedR Square	Std. Error of the Estimate
1	,572 ^a	,327	,111	1,32478

Based on Table 6. R Square values obtained were 0.327. This shows that the variable X (age, education, farming environment, experience, motivation, socio-culture, state of land, expertise and fuel oil) has an influence on variable Y of 32.7%. The age of the respondent's farmers included in the productive age category and the education of the respondents' farmers was quite high, but when viewed from the factors of experience and expertise most of the respondents did not have sufficient experience and expertise, this was due to lack of work experience. According to [3] work experience is the level of mastery of knowledge and skills measured from the period of service and the level of knowledge and skills they have. Whereas if viewed from farming environmental factors and the condition of the land owned by the respondent's farmers, according to the conditions needed for the use of agricultural tools and machinery, starting from farming roads/production roads, soil texture and land topography, farmers assume that these factors do not become the main factor in the use of agricultural tools and machines. Furthermore, the results of surveys and interviews conducted with respondent farmers in the study area that there are other factors that influence the use of agricultural machinery and machinery such as the role of extension agents, procedures for borrowing tools and agricultural machinery, as well as the perceptions of farmers, especially the group leaders. private property. Then [4] argue that there are several factors that can affect a person's performance, including work morale and work discipline. In addition, the value of R which is a symbol of the correlation coefficient is obtained at 0.572a. To find out the factors that influence the effectiveness of the use of tools and agricultural machinery in Hamparan Perak Subdistrict, Deli Serdang Regency, t test and F. test were carried out.

a. Partial Effect Test (t Test)

This t test is conducted to find out whether the independent variable (X) has a partial effect on the dependent variable (Y). The results of the t test can be seen in Table 7.

Table 7. Partial Influence Test (T Test)

Model		Unstandardid Coefficients		Standa rdized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2,098	4,273		-.491	,627
	x1	,253	,114	,399	2,215	,035
	x2	-,107	,178	-,143	-,600	,554
	x3	,177	,203	,211	,872	,390
	x4	,121	,171	,136	,706	,486
	x5	-,067	,097	-,137	-,692	,495
	x6	,270	,135	,351	1,997	,056
	x7	,027	,119	,048	,225	,824
	x8	-,101	,130	-,177	-,778	,443
	x9	-,042	,095	-,079	-,445	,660

The effect of each variable on the effectiveness of using agricultural tools and machinery can be explained as follows:

1) Age

The results of statistical analysis show that the value of tcount (2.215) > t table (2.04841) with a significance level of 0.035 < 0.05. This states that age has a significant influence on the effectiveness of using agricultural tools and machinery. This is due to the age of the respondent farmers at the time of the assessment included in the productive age category of 32 people (84.2% of the total). According to Lenzun, G.D, et al. (2017) productive age is the age of 15-64 years while age umur 65 years is a non productive age category. According to [1] and [2] states that the higher the age of farmers at the productive boundaries, the ability to work will increase so that productivity will also increase. In addition, productive age can also affect one's responsibility for fulfilling family dependents. Family dependents according to [5] are interpreted as numbers that indicate the number of people in productive age (0-14 years and > 65 years) that must be borne by every 100 productive age population.

2) Education

The results of statistical analysis show that the value of tcount (-0.600) < t table (2.04841) with a significance level of 0.554 > 0.05. This shows that education does not have a significant effect on the effectiveness of using agricultural tools and machinery. Theoretically, formal education and training have a significant influence on performance, but in this study the results obtained that education factors (formal education and training) do not have a significant effect on the effectiveness of the use of agricultural tools and machinery, although the study found that farmer education respondents were classified as secondary education (47.36%), but this did not affect the effectiveness of the use of agricultural tools and machinery by the respondent's farmers. This is because knowledge for the use of agricultural tools and machinery is not obtained from the process of education in school. This is also supported by [6] who stated that although education has an influence on one's performance, there are other factors that have more influence, namely work discipline factors. This is also supported by [7] who stated that education and training may not necessarily affect performance and improve one's performance.

3) Farming Environment

The results of the statistical analysis showed that the value of tcount (0.872) < t table (2.04841) with a significance level of 0.390 > 0.05. This shows that the farming environment does not have a significant and significant effect on the effectiveness of the use of agricultural tools and machinery. The farming environment, such as farming roads owned by farmers in the study area, is already considered good, so farmers do not consider this to affect the use of agricultural tools and machinery used in farming activities. According to [8] states that the work environment has no influence on one's performance.

4) Experience

The results of statistical analysis show that the value of tcount (0.706) < t table (2.04841). Experience does not have a significant and significant effect on the effectiveness of using agricultural tools and machinery. This is in line with the opinion of [9] which states that work experience does not affect performance which in this case concerns performance in the use of agricultural tools and machinery. The experience of the

respondent farmers is still lacking. The age of the respondent farmers is dominated by young farmers, so the experience of using agricultural tools and machinery is still lacking. According to [3] work experience is the level of mastery of knowledge and skills measured from the period of service and the level of knowledge and skills they have.

5) Motivation

The results of statistical analysis show that the value of t_{count} (-0,692) < t_{table} (2,04841). Motivation factors do not have a significant and significant influence on the effectiveness of using agricultural tools and machinery. This is supported by [3] and [5] in his research that work motivation does not have a significant effect on performance. Motivation from others is needed by someone to arouse work spirit. A person can be motivated by giving what the person needs and wants. But according to [5] and [10] giving work motivation will be difficult to do by someone because what is considered important for someone is not necessarily important for others. Work motivation from group leaders and local extension agents has not been influential towards farmers in using Alsintan. According to [11] that work motivation is not a thing that determines the implementation of a program or activity.

6) Socio-Culture

The results of statistical analysis show that the value of t_{count} (1,997) < t_{table} (2,04841). Socio-cultural factors do not have a significant and significant influence on the effectiveness of using agricultural tools and machinery. In the opinion of [12] that culture does not have a dominant influence in influencing one's performance. This is also influenced by the existence of a different culture among farmers in the study area, such as a mutual cooperation culture that some farmers still use the culture in farming activities and some farmers do not use it. With these differences resulted in differences in the mindset of farmers towards the use of tools and agricultural machinery.

7) Land Conditions

The results of statistical analysis show that the value of t_{count} (0,225) < t_{table} (2,04841). The condition of land conditions does not have a real and significant effect on the effectiveness of using agricultural tools and machinery. This is due to the fact that land conditions such as soil texture and topography in the study area are suitable for the use of agricultural tools and machinery, so farmers consider that the condition of such land is classified as good and has no influence on the use of agricultural tools and machinery in the region. [12] and [13] states that the work environment does not have a significant effect on a person's performance, which in this case the work environment in question is the condition of the land owned by the farmer. This is also supported by [14] that the physical environment has a negative and not significant effect on one's performance.

8) Expertise

The results of statistical analysis show that the value of t_{count} (-0,778) < t_{table} (2,04841). Expertise does not have a significant and significant effect on the effectiveness of using agricultural tools and machinery. A person's expertise is influenced by the period of work and also the experience that is owned [3]. In this case, the respondent farmers were still in the category of young farmers, so the experience of using agricultural tools and machinery was still lacking, so there

were still many farmers who did not yet have the ability to use agricultural tools and machinery.

9. Oil Fuel

The results of statistical analysis show that the value of t_{count} (-0,445) < t_{table} (2,04841). Oil fuel does not have a significant and significant effect on the effectiveness of using agricultural tools and machinery. The need for fuel oil used for the use of agricultural tools and machinery has been balanced with the availability of fuel oil, so farmers do not feel this is an obstacle to the use of tools and agricultural machinery in conducting farming activities.

b. Simultaneous Influence Test (Test F)

This F test is conducted to find out whether the independent variable (X) has a simultaneous influence on the dependent variable (Y). The results of the F test can be seen in Table 8.

Table 8. Simultaneous Effect Test (Test F)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	23,912	9	2,657	1,514	,192 ^a
Residual	49,141	28	1,755		
Total	73,053	37			

a. Predictors: (Constant), x9, x3, x4, x6, x1, x5, x7, x8, x2

From these results it can be concluded that f_{count} (1.514) < f_{table} (2.22) and significance value 0.192 > 0.05. This shows that the variables of age, education, farming environment, experience, motivation, socio-cultural, land conditions, expertise and fuel oil, have no significant and significant effect on the effectiveness of the use of agricultural tools and machinery.

IV. CONCLUSION

1. The level of effectiveness in the use of agricultural tools and machinery in Hamparan Perak District in the high category, namely 71.57%
2. Partial age factor with a value of t_{count} (2,215) > t_{table} (2,04841) shows a significant effect on the effectiveness of the use of agricultural tools and machinery while education, farming environment, experience, motivation, socio-cultural, land conditions, expertise and fuel oil, does not have a significant and significant effect on the effectiveness of using agricultural tools and machinery.
3. Simultaneously the variables of age, education, farming environment, experience, motivation, socio-culture, condition of land, expertise and fuel oil, have no significant and significant effect on the effectiveness of the use of agricultural tools and machines where the value of F_{count} (1.54) < F_{table} (2.22).

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