

The Effects of Fatigue, Role Overload and Stress on Farmer's Work Safety

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Keywords: Fatigue, Role Overload, Stress, Work Safety.

Abstract: This study aims to examine the effect of fatigue, role overload and stress on the work safety of farmers on the plantation. Respondents in this study were cassava farmers who worked on Way Kanan Lampung plantations. The sampling technique used convenience sampling. The number of respondents is 200 people. The data analysis tool used is Structural Equation Modeling (SEM). This research is different from previous studies that analyzed occupational safety in manufacturing companies, in this study the research settings were farmers who worked on plantations. The results of the study indicate that the work safety model is acceptable. Fatigue and role overload have a positive effect on stress, and stress has a positive effect on farmer's work safety.

1 INTRODUCTION

1.1 Background

The agricultural sector in Indonesia plays an important role, considering that more than 40% of its workforce depend on this sector. Based on data from the International Labor Organization (ILO), around 1.3 million people work in agriculture throughout the world. From these data, 60% of them work in developing countries (Forastieri, 2001). The passion for farming, despite all the hassles, requires farmers to do something right in managing their stress. Stress that is not recognized and not managed properly can lead to the risk of accidents faced by farm families and on agricultural land. When stress levels are high, farmers tend to make poor agricultural decisions, resulting in frequent accidents on agricultural land (Mamady et al., 2014). The agricultural sector is one of the main priorities of development in Indonesia as well as the Way Kanan District. The agricultural sector has a strategic role in efforts to fulfill the basic needs of the community. Support for the potential of adequate natural resources causes nearly 80% of the population of Way Kanan to make a living in agriculture, plantations, forestry, and fisheries.

Way Kanan Regency has the potential of paddy field area of \pm 21,754 hectares. Haerani (2010) states that agricultural failure rates in developing countries are four times greater than in industrialized countries

(Haerani, 2010). Agriculture is one of the most stressful jobs, but most farmers say they will not exchange it for other jobs.

Simpson et al., (2004) and Sugandini et al., (2018) state that stress has a direct relationship with the potential for injury at work. Walker and Walker (1987) also found that chronic stress caused cognitive, social and physical symptoms. For example, losing patience, back pain, behavior problems, frequent illness, and marital problems. Stallones (1996) notes that stress related to health problems has not been widely discussed in the agricultural sector. Stallones (1996) concludes that many studies are needed to understand the effect of stress on health and safety in the agricultural sector. This study aims to analyze the stress experienced by farmers with antecedents of fatigue and role overload. The consequences of the stress of farmers on work safety were also analyzed in this study.

1.2 Originality/Value

This research has originality / value as follows: (1) This study examines how the psychological variables impact on farmer work safety are different from previous studies. Previous research has looked at work safety in the manufacturing industry (Vanishree, 2014 and Bakker, 2017). In fact, many researchers have tested the effect of fatigue, role overload and safety stress analyzed from the medical side (Mohanavelu et al., 2017). (2) This research is

based on the theory of organizational behavior and psychological factors. The psychological factors analyzed in this study are fatigue, role overload and stress. Many researchers observe the influence of these psychological factors individually on safety farms, but this study analyzes these three factors together in a model. This research can show that stress is the biggest factor affecting farm safety. This study could also show that fatigue can have an impact on stress, although in other studies it shows the opposite, that stress has an impact on fatigue (Bennett, 2016).

2 LITERATURE REVIEW

2.1 Fatigue and Stress

Most people think that the way of life of a farmer is generally peaceful, relaxed and healthy. However, in reality, farmers have high stress and risky lifestyle (Kearney, Rafferty, Hendricks, Allen & Tutor-Marcom, 2014). The pace of the agricultural industry, increasing health and safety regulations, weather that cannot be predicted due to climate change, causes farmers to experience increased stress, both physical and mental (Seanad, 2015).

Stress experienced by farmers can cause negative consequences, such as mental and physical fatigue, health problems, decreased job satisfaction, decreased performance, and serious consequences related to accidents at work (Bin, 2008). Fatigue is a serious problem that often occurs in plantation cultivators (Lilley et al., 2012). Fatigue can occur unexpectedly and generally takes longer to affect human performance (Lubeck, 2014). Fatigue arises from long working hours and a long time to work without sleep (Flin, O'Connor & Crichton, 2008).

If this condition occurs continuously, it can cause problems for farmers while doing daily work. There are two dominant types of human fatigue, namely: (1) psychological fatigue (subjective) and (2) physiological (objective) fatigue. Psychological fatigue (subjective) is fatigue due to constant cognitive activity, while physiological fatigue (objective) occurs because of the chemical response that makes muscles tired. Both types of fatigue can negatively affect agricultural work performance, causing errors and accidents while doing farming activities (Hockey, 2013). So that the first hypothesis proposed in this study is:

H1: Fatigue has a positive influence on stress

2.2 Role Overload and Stress

Overload role reflects the conditions felt by workers that their role in the job exceeds their job description (Jensen, Pankaj, Patel, & Messersmith, 2013). A person will feel an excess role when job expectations exceed the available time, resources, or personal abilities (Jensen et al., 2013). Someone who experiences role overload will usually have feelings that deviate from his normal function. This condition triggers stress in the workplace as a result of obstacles or demands that arise related to role overload (Bakker, 2017).

H2: Role overload has a positive effect on stress.

2.3 Stress and Farmer's Work Safety

Work safety is a state of avoiding danger while doing work. Use of machinery and heavy equipment in agriculture such as tractors, permanent machines, planting tools and so on are sources of danger that can lead to fatal injuries and work accidents (Mamady et al., 2014). The use of pesticides can also cause serious poisoning or disease. Dust of animals and plants can cause allergies and respiratory diseases. Another factor that triggers work accidents in the agricultural sector is the limited time available to complete a work caused by climate constraints, so farmers tend to work in a hurry without regard to their safety (Haerani, 2010).

Simpson et al., 2004 stated that there was a direct relationship between farmer stress and agricultural security. Elkind and Salter (1994) suggest that stress can also cause farmers to forget about their safety at work. The findings in the latest meta-analysis show that there is a statistically significant relationship between stress and accidents in farming. The majority of findings imply that stress increases the likelihood of accidents (Mamady et al., 2014). Thu et al., (1997) stated that farmers who admit to having a high level of stress experience three times the possibility of injury in farming.

H3: Stress has a positive influence on the farmer's work safety.

3 RESEARCH METHODS

This research is a survey research. Respondents in this study were cassava farmers who worked on cassava plantations in Way Kanan Lampung, Indonesia. This study uses a questionnaire for

collecting data. The questionnaire in this study amounted to 13 consisting of 4 questions related to fatigue, three questions related to role overload and three questions related to stress adopted from Bennett (2016). Three safety-related questions were adopted from Nyatuame and Ampiauw (2015). Respondents' answers refer to a 5-point Likert scale, ranging from strongly disagree to strongly agree. The population in this study were all farmers who worked on cassava plantations. The sampling technique uses non-random sampling, namely convenience sampling. The number of respondents is 200. This study uses Structural Equation Modeling (SEM) to analyze data. Direct influence (path coefficient) is observed from standardized regression weights, with significance testing using CR (Critical Ratio) value whose function is equal to t count value. The results of the AMOS program can be observed causal relationships between variables by looking at the direct effects and indirect effects and their total effects. Assessment of significance is based on the probability value (p); the significance limit used is the p-value ≤ 0.05 . Tests for models developed using various Goodness of Fit criteria adopted from Hair et al., (1998) namely: CMIN/DF (the minimum sample discrepancy function/degree of freedom), probability, RMSEA (root mean square error of approximation), GFI (Goodness of fit index), CFI (Comparative fit index), and TLI (Tucker Lewis Index).

4 RESULT

4.1 The Characteristic of the Respondent

The characteristics of the respondents in this study were all men, the average age was 50 years. The last education of farmers is junior and senior high schools with the same proportion.

4.2 The Results of Testing Validity and Reliability

The results of testing Validity and Reliability indicate that all items in question are valid and reliable. This is indicated by the results of the confirmatory factor analysis explaining that the four constructs (fatigue, role overload, stress and work safety) consisting of 13 questions have standardized factor loadings ≥ 0.4 .

Table 1: Results of testing validity.

Item	Standardize Factor Loading (SFL)
Fatigue 1	0.432
Fatigue 2	0.659
Fatigue 3	0.783
Fatigue 4	0.811
Role overload1	0.774
Role overload2	0.901
Role overload3	0.924
Stress 1	0.585
Stress 2	0.770
Stress 3	0.775
Work safety 1	0.850
Work safety 1	0.947
Work safety 1	0.800

Table 2: Results of testing reliability.

Construct	Construct Reliability	Variance Extracted
Fatigue	0.922	0.862
Role Overload	0.956	0.930
Stress	0.483	0.679
Safety	0.973	0.973

Reliability is shown by the calculation of construct reliability above 0.7 and variance extracted ≥ 0.50 . Limitation of these values refers to the opinion of Hair et al. (1998). The results of testing validity and reliability can be seen in table 1 and 2.

4.3 The Results of the Work Safety Model Testing using SEM

Test results Structural Equation Modeling about work safety using AMOS can be seen in Figure 1. Evaluation of the results of testing the model can be seen in table 3.

The results of the data analysis presented in Table 3 indicate that the model is acceptable because it has a good value of Goodness of Fit Indices. Next, to test the hypothesis of the causal relationship between fatigue, role overload, stress and work safety is done by observing the path coefficient. This path coefficient shows the causal relationship between these variables. The relationship between variables in this study is shown in Table 4

Table 3: Results of Evaluation Criteria for Goodness of Fit Indices.

Criteria	Results	Critical Value*)	Model Evaluation
Cmin/DF	4.074	$1 \leq$ Cmin/DF $\leq 5,00$	Good
Probability	0.782	$\geq 0,05$	Good
RMSEA	0.824	$\leq 0,08$	Good
GFI	0.942	$\geq 0,90$	Good
TLI	0.941	$\geq 0,95$	Good
CFI	0.976	$\geq 0,94$	Good

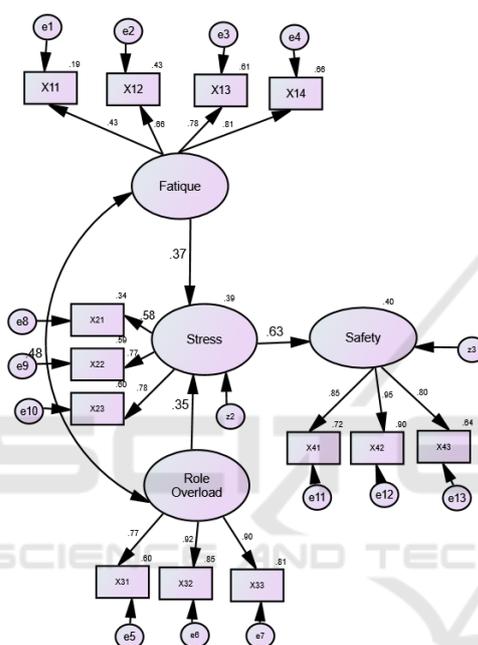


Figure 1: Structural Model of Work Safety.

Table 4: Path coefficient (Standardize Regression Weight) between Variables.

Path	Estimate	SE	C.R.	Result
Fatigue → Stress	0.370	0.097	3.964	Supported
Role overload → Stress	0.350	0.070	4.043	Supported
Stress → Work Safety	0.630	0.094	7.188	Supported

5 DISCUSSION

The results of this study explain that the structural model of work safety is acceptable. This can be seen

from the value of the goodness of fit index which shows good results. Work safety can be explained by fatigue, role overload, and stress. The results of this study indicate that there is an effect of fatigue on stress is 37%. This result can explain that the first hypothesis proposed in this study is supported. The results of this study support the findings of the research conducted by Lilley et al., (2012); Lubeck, (2014). Lilley, et al., (2012) and Lubeck, (2014) state that farmers who are constantly fatigued and accumulated over time will cause stress. If this stress occurs continuously, it can cause difficulties for farmers when doing daily activities. Hockey, (2013) also states that there are two forms of fatigue, namely psychological fatigue and physical fatigue. The fatigue that is most often felt by farmers in this cassava plantation is psychological fatigue. Psychological fatigue arises because there is a pressure that the expected results are sometimes not as predicted.

The effect of role overload on stress is 35% (the second hypothesis supported). Role overload felt by farmers causes stress that is felt to increase. Farmers who feel overloaded with their role as farmers and other roles in people's lives and their families cause mental stress in themselves. According to Jensen, et al., (2013), a person who feels an excess role occurs when expectations for work exceed the available time, resources, or personal abilities. Besides that, farmers whose overload role will usually feel that opportunities, constraints, or demands related to work deviate from what they predict (Bakker, 2017).

The effect of stress on safety by 63% (the third hypothesis supported). This shows that stressed farmers usually do not care about their safety at work. The higher the level of stress felt by farmers, the more likely the farmer will experience a work accident. This supports the findings of research conducted by Simpson et al., (2004) and Mamady et al., (2014) which state that stress causes farmers to forget about security.

6 CONCLUSIONS

This study only explores work safety models seen from the internal aspects of farmers only. It is recommended that the perception of safety be observed from plantation leaders who employ farmers on their plantations. The variables observed in this study also have not discussed the plantation manager's side and the influence of the farmer's family factors. According to Kreitner & Kinicki, (2007) and Bennett, (2016), in addition to the variable

fatigue, stress and role overload, which were examined in this study, there are several variables that can be used to predict work safety, namely managerial behavior, management style, lack of cohesiveness, workplace violence and family.

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