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Analysis of the Effect of the Oil Palm Harvest Bonus System on Employee Performance and Job Satisfaction

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Abstract: Productivity and labor quality are fundamental outcomes of applied science implementation in agribusiness systems, particularly within plantation-based vocational and contextual learning environments. In applied science education, real-world work settings function as living laboratories where scientific principles, management practices, and human resource strategies are directly translated into measurable performance outcomes. The oil palm plantation sector provides a highly relevant context for such learning, as it integrates biological production systems, operational management, and incentive-based decision-making that are central to vocational science education and workforce competency development. Within this context, remuneration mechanisms especially harvest bonus systems serve not only as managerial instruments but also as applied learning models that shape workers' understanding of productivity targets, performance standards, and economic accountability in practical field conditions. Using a proportionate stratified random sampling method, 38 respondents were selected to represent different work tenure levels. Data were collected through questionnaires and analyzed using descriptive and simple linear regression techniques. The results show that the task-based bonus system significantly affects both employee performance and job satisfaction, with positive regression coefficients indicating that higher bonuses lead to improved productivity, attendance, and work quality. Furthermore, employees perceived the reward system as fair and motivating, contributing to higher morale and engagement. Overall, the study concludes that a well-structured and transparent reward mechanism strengthens employee motivation and enhances organizational performance in oil palm plantations.

Keywords: Harvest bonus; Incentive system; Job satisfaction; Performance palm oil

Introduction

Productivity and labor quality are key determinants of competitiveness in agribusiness, including the palm oil industry. In the modern agricultural sector, remuneration packages comprising fixed salaries and variable incentives are designed to enhance employee motivation, productivity, and retention. Cross sectoral studies indicate that employee benefits and financial incentives positively affect job satisfaction and performance, as they promote work autonomy, social support, and work life balance components that are essential to workers' well-being and productivity in the agricultural sector (Heřmanová et al., 2024). This is in line with Abiri et al., (2023) the advancement of Digital Agriculture (DA), which has ushered in a new era of agribusiness management that focuses not only on crop yields but also on the efficiency and productivity of the workforce as a key component of a sustainable production system. The integration of technologies such as artificial intelligence (AI), field automation, digital sensors, and the Internet

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of Things (IoT) has begun to be applied to monitor harvesting activities, analyze work achievements, and evaluate the accuracy of harvest premium distribution more objectively. This approach enables a transition from traditional incentive systems based on manual reporting to data-driven mechanisms that are more transparent and accountable.

In Indonesia's palm oil industry, one of the most common incentive schemes is the harvest premium an additional payment granted to harvesters based on quantity (kg/ha), harvesting quality, or target achievement. The premium system is intended to stimulate work intensity and harvesting accuracy, thereby improving yield and fruit quality. Several case studies from state-owned plantations (PTPN) and private palm oil companies in Indonesia have reported that the harvest premium positively influences performance dimensions such as quantity, quality, and attendance, as well as employees' job satisfaction. For instance, site-level studies revealed that harvest premiums significantly affect both performance and satisfaction among harvesting workers in several PTPN estates and private plantations (Lubis, 2020). The results of various recent studies, including those that form the basis of this study, show that the implementation of an objective and structured harvest bonus system has a significant positive effect on employee performance and job satisfaction. Quantitatively, the level of fairness and accuracy in bonus calculations has a direct effect on work motivation, which in turn increases productivity and reduces absenteeism (Hanisah et al., 2023).

Nevertheless, empirical findings in plantation contexts show heterogeneous results and several methodological limitations that require attention. Some studies report that although harvest premiums have a significant effect, the proportion of variance in performance and satisfaction explained by the premium remains relatively low (e.g., $R^2 \approx 0.38$), indicating the presence of other influential variables such as perceptions of procedural fairness, land topography and task basis, quality of supervision, workplace facilities, workers' health, and contractual arrangements. Furthermore, most prior research has been cross-sectional and case-specific (limited to a single plantation), thus limiting generalization and weakening causal understanding of the underlying mechanisms (Adinanta, 2024). Such factors may include perceptions of procedural fairness, task difficulty due to terrain conditions, supervisor support, or worker health and well-being (Krumbiegel et al., 2018). Additionally, most existing research relies on cross-sectional survey data and focuses on single plantation units, which restricts generalizability and fails to capture causal relationships between reward systems, job satisfaction, and performance outcomes.

Despite the growing body of literature, there remain critical research gaps regarding how harvest premium systems operate in research-based plantations, which differ structurally and administratively from commercial estates. Previous studies have yet to explore the mediating role of job satisfaction in linking incentive systems and performance outcomes, nor have they compared different premium designs (e.g., quantity-based vs. quality-based schemes). Furthermore, few studies have examined plantations under institutional management such as the Palm Oil Research Center (PPKS), which offers a unique context characterized by formalized supervision, experimental management, and performance documentation. Addressing these gaps is crucial to understanding not only whether but also how and under what conditions the harvest premium system effectively enhances performance and satisfaction among palm oil harvesters (Lubis et al., 2021; Adinanta, 2024).

From a science education perspective, this study contributes to vocational and applied science learning by positioning the oil palm plantation as a contextual learning environment where scientific, managerial, and economic principles are enacted simultaneously. Harvest activities involve applied competencies in measurement, productivity analysis, quality control, and decision-making under real production constraints, which are core components of applied agricultural science education. The harvest bonus system examined in this research reflects an authentic assessment mechanism that links scientific performance indicators such as yield targets, work efficiency, and quality standards with behavioral and motivational outcomes. By analyzing how incentive systems influence performance and job satisfaction in a real plantation setting, this study provides empirical evidence that supports contextual learning models in agricultural science and vocational education, where learning outcomes are directly shaped by work-based performance systems rather than simulated classroom conditions.

This study aims to analyze the influence of the harvest premium system on employee performance and job satisfaction at Kebun Aek Pancur. Palm Oil Research Center (PPKS), Deli Serdang Regency. The novelty of this research lies in its integrated analytical approach, which combines objective production data with employees' perceptual measures, allowing for the examination of job satisfaction as a mediating variable. The study also evaluates different premium design structures and identifies the most effective model in improving both productivity and morale. By

incorporating insights from fairness theory and motivational models, this research provides empirical evidence that enriches the Indonesian literature on human resource management in the palm oil sector. Moreover, the findings are expected to inform evidence-based policy recommendations for designing fair, transparent, and efficient premium systems in research and commercial plantations alike.

Method

This research was conducted in June 2024 at the Aek Pancur Oil Palm Estate, owned by the Palm Oil Research Center (Pusat Penelitian Kelapa Sawit/PPKS). The research site was selected purposively, based on specific considerations. According to Sugiyono, (2018) ,purposive sampling refers to a technique determined by certain criteria. The plantation was chosen because oil palm is the most widely cultivated commodity in North Sumatra, and PPKS represents one of the leading state-owned plantations with significant productivity levels after the smallholder plantations (Simanjuntak et al., 2023).

The sampling technique employed in this study was Proportionate Stratified Random Sampling, which, as defined by Sugiyono, (2018), is appropriate for populations with heterogeneous and stratified characteristics. The sample consisted of harvest workers at the Aek Pancur Estate, proportionally drawn from eight work tenure strata. A total of 30% from each tenure group was selected, resulting in 38 respondents. The distribution of samples based on tenure and division is summarized in Table 1 (Fadhiela & Putri, 2023).

Data for this study were obtained from both primary and secondary sources. Primary data were collected through questionnaires and direct interviews with harvest employees of PPKS Aek Pancur, while secondary data were gathered from institutional records such as the PPKS management office, relevant departments, and supporting literature. Table 2 presents the detailed specification of data collection methods, including variable types, data sources, and instruments used (Damai et al., 2023).

Prior to analysis, the questionnaire instrument was tested for validity and reliability. Validity testing aimed to ensure that each item accurately measured the intended variable, using correlation analysis between each item score and total score (Situmorang, 2012). Items were considered valid if the calculated correlation value exceeded the table value (r count > r table). Reliability testing, performed using Cronbach's Alpha in SPSS, determined the internal consistency of the questionnaire. A variable was considered reliable when the alpha coefficient exceeded 0.60, indicating dependable measurement consistency (Hair JF et al., 2017).

Data analysis involved two main approaches: descriptive analysis and simple linear regression analysis. The descriptive method was used to summarize and interpret the characteristics of respondents and the distribution of responses, providing a clear overview of the research variables. Meanwhile, the regression analysis was applied to examine the effect of the harvest bonus system (independent variable) on two dependent variables: employee performance and job satisfaction. The relationship was modeled using the following equations (Ginting et al., 2022):

$Y_1 = a + bX$ (1) for performance, and
$Y_2 = a + bX$ (2) for job satisfaction.

To ensure the accuracy of the model, hypothesis testing was performed using the coefficient of determination (R^2) and partial significance test (t-test) as suggested by (Ghozali, 2018). The coefficient of determination measured how much variance in the dependent variable could be explained by the independent variable, while the t-test assessed the individual influence of the harvest bonus system on employee performance and satisfaction. A p-value of less than 0.05 was considered statistically significant (Simanjuntak et al., 2023).

Operational definitions were established to clarify key research variables. The harvest bonus (premium system) refers to financial rewards given to workers who exceed the production base determined by the company. Employee performance denotes measurable outcomes in terms of quantity, quality, and attendance. Job satisfaction reflects the workers' psychological and financial attitudes toward their job environment. Other variables such as tenure, supervision, working conditions, and opportunities for advancement were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), as described by (Sugiyono, 2018).

From the perspective of applied science education, the findings of this study indicate that the harvest bonus system functions not only as a managerial incentive but also as a mechanism that reinforces applied competencies through work-based learning. The significant improvement in employee performance reflects the development of applied competencies such as productivity measurement, task efficiency, compliance with technical standards, and accuracy in operational execution. These competencies are acquired and strengthened through continuous engagement in real work situations, where learning outcomes are directly shaped by performance targets and feedback

embedded in the incentive system. Similarly, the positive effect on job satisfaction suggests that work-based learning environments that emphasize fairness, transparency, and performance-based rewards enhance learners' motivation and engagement, which are critical affective components of vocational and applied science learning. Thus, the harvest bonus system represents a contextual learning structure in which applied competencies are cultivated through authentic work processes rather than isolated instructional settings.

Overall, the operationalization of performance and job satisfaction in this study enables the assessment of applied science learning outcomes, particularly work-based competencies related to productivity measurement, technical accuracy, and performance accountability in plantation operations. Thus, the methodological approach supports the evaluation of vocational and applied science learning outcomes as reflected in real-world work performance and behavioral responses.

Result and Discussion

The results of this study provide a comprehensive analysis of the harvest bonus system implemented at the Aek Pancur Estate under the Palm Oil Research Center (PPKS). The findings show that while the harvest bonus mechanism is widely applicable across oil-palm plantations, it must be adjusted based on local field conditions, productivity potential, and socio-economic variations among estates. These variations influence the determination of task bases, bonus rates, and penalty systems applied to harvest workers (Hanisah et al., 2023).

Determination of Task Base and Bonus Structure

The task base (basis tugas) was determined by considering topography and annual production potential (RKAP). For Aek Pancur Estate, with a productivity level of 18 tons ha^{-1} yr^{-1}, the base standard was set at 850 kg day^{-1}, calculated from 292 effective working days per year. The tiered structure of the harvest bonus rates was derived from a constant value of Rp 57 854 and divided into three levels (P_1, P_2, P_3) depending on performance above the base target. The progressive system rewards higher productivity with greater multipliers, while penalties are applied for non-compliance such as improper collection, uncut ripe fruit, or poor handling at collection points (TPH) (Sari et al., 2020).

Table 1. Summary of Task-Base and Bonus Determination

Parameter	Value / Description
Productivity level	18 t ha^{-1} yr^{-1}
Daily base task	850 kg day^{-1} ($worker^{-1}$)
Effective workdays (annual)	292 days
Bonus constant (C)	Rp 57 854
Bonus levels	P_1 = C × 50 %; P_2 = P_1 + Rp 5; P_3 = P_2 + Rp 5
Penalty scheme	Applied for quality and discipline violations

Employee Perception of the Bonus System

The results indicate that the bonus system effectively incentivized workers. As shown in Table 2, 57.9 % of respondents perceived the system as good and 42.1 % as very good. This suggests that most employees view the current scheme positively, recognizing a clear link between effort and reward (Fadhiela & Putri, 2023).

Table 2. Perception of the Harvest Bonus System

Category	Frequency (n = 38)	Percentage (%)
Very Good	16	42.1
Good	22	57.9
Fair / Poor	0	0
Total	38	100

Statistical Relationship Analysis
Effect on Employee Performance

Regression analysis revealed a significant relationship between the harvest bonus (X) and employee performance (Y_1). The regression model obtained was $Y_1 = 21.337 + 0.501X$, with $p = 0.000$ (< 0.05) and $t = 4.915 > 1.68$. The coefficient of determination ($R^2 = 0.402$) indicates that 40.2 % of performance variation was explained by the harvest bonus, while 59.8 % may be influenced by other factors such as supervision, training, or environmental conditions (Ginting et al., 2022).

Effect on Job Satisfaction

The regression equation for job satisfaction (Y_2) was $Y_2 = 60.944 + 0.854X$, with $t = 4.398 > 1.68$ and $p = 0.000$ (< 0.05). The coefficient of determination ($R^2 = 0.350$) shows that 35 % of satisfaction variance was explained by the harvest bonus, indicating that transparent and fair incentives significantly affect psychological satisfaction and motivation (Wicaksono et al., 2023).

Table 3. Summary of Simple Linear Regression Results

Dependent Variable	Equation	R^2	t	p (< 0.05)
Y_1 (Performance)	$Y_1 = 21.337 + 0.501X$	0.402	4.915	0.000
Y_2 (Job Satisfaction)	$Y_2 = 60.944 + 0.854X$	0.350	4.398	0.000

Reliability, Validity, and Interpretation

Reliability and validity tests confirmed that the questionnaire instrument was both valid and reliable, with a Cronbach's Alpha of 0.757 (> 0.6). This indicates consistency in measuring constructs such as motivation, performance, and satisfaction. The discussion highlights that the harvest bonus system contributes significantly to performance improvement and job satisfaction. Workers expect transparent, merit-based rewards, ongoing training, and recognition for excellence—factors that reinforce intrinsic motivation and organizational commitment (Damai et al., 2023). These results align with Fachreza (2014), who found that structured harvest bonus systems in oil-palm plantations yield good-to-very-good performance and satisfaction outcomes. In summary, the implementation of a fair and measurable harvest bonus system positively influences both the quantitative (output and attendance) and qualitative (discipline and accuracy) aspects of performance, while enhancing satisfaction through fairness, recognition, and professional development within the plantation structure (Ario Buntaran et al., 2019).

These findings imply that incentive systems in plantation operations have educational value beyond their economic function, particularly in supporting applied science learning and workplace-based learning. By embedding scientific performance indicators, feedback mechanisms, and accountability standards into daily work processes, the harvest bonus system facilitates the development of applied scientific competencies in authentic contexts. Therefore, the implications of this study extend to vocational and technical education, suggesting that industry-based incentive structures can be deliberately integrated into curriculum design and training models to strengthen science-related skills, performance awareness, and learning outcomes aligned with real-world work environments.

The educational implications of this study can be further explained through established theories of work-based learning and experiential learning. According to work-based learning theory, meaningful learning occurs when individuals acquire knowledge and skills through authentic work activities that integrate task performance, feedback, and reflection (Billett, 2013). In this context, the harvest bonus system functions as a structured learning stimulus that aligns performance expectations with measurable outcomes, enabling workers to develop applied scientific competencies through continuous engagement in real production processes. Similarly, from an experiential learning perspective, as proposed by Kolb, (1984), learning is generated through a cyclical process of concrete experience, reflective observation, conceptual understanding, and active experimentation. The incentive mechanism reinforces this cycle by encouraging workers to evaluate their work results, adjust harvesting strategies, and improve efficiency and quality over time. Therefore, incentive systems in plantation operations can be understood as informal pedagogical tools that support experiential and work-based learning, contributing to the development of science-related skills in vocational and applied science education contexts.

From an educational science perspective, the findings of this study demonstrate that incentive systems can function as contextual learning mechanisms that support applied science learning and the development of science-related skills in workplace settings. Widodo & Kardawati, (2013) emphasize that contextual problem-based learning enhances higher order thinking skills by engaging learners in real-world situations that require analysis, evaluation, and decision-making. In this study, the harvest bonus system places workers in authentic problem-solving contexts, where they must continuously evaluate productivity targets, assess work efficiency, and adjust harvesting strategies to meet quality and quantity standards. This process mirrors contextual problem-solving in science learning, thereby fostering applied cognitive skills aligned with higher order thinking.

Conclusion

This study confirms that a well structured harvest bonus system significantly enhances employee performance and job satisfaction in oil palm plantation operations. Beyond its managerial implications, the findings demonstrate that incentive systems possess substantial educational value when interpreted from an applied science and vocational education perspective. The integration of performance targets, productivity measurement, and quality standards within daily work activities enables the development of applied scientific competencies, such as data-based decision-making, operational accuracy, and efficiency evaluation. These outcomes align with workplace-based and contextual learning principles, in which learning emerges from authentic work tasks rather than isolated classroom instruction.

From an educational standpoint, this study suggests that agribusiness workplaces can function as effective learning environments for applied science education. Incentive-based performance systems may be deliberately incorporated into vocational training programs and applied science curricula to strengthen science-related skills, performance awareness, and problem-solving abilities relevant to real production contexts. Therefore, the results provide practical guidance for educators, curriculum developers, and training institutions in designing agribusiness education models that integrate scientific learning with industry-based performance systems.

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Author Contributions
K.N.: Developing ideas, analyzing, writing, reviewing, responding to reviewers' comments; S.D., D.H.: analyzing data, overseeing data collection, reviewing scripts, and writing.

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Conflicts of Interest
The authors declare no conflict of interest

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