



## Research Article

# Model for Improving the Competence of Livestock Extension Workers in the Indonesia-Timor Leste Border Region

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**Abstract** | The aim of the current research is to develop a model that will help improve the competence of livestock extension agents in the Indonesia–Timor Leste border region with 120 respondents. Results reveal that majority of the extension workers had moderate to high extent of attitude, motivation, social media use, competence and performance. Nevertheless, independence is low as support from others continue to be needed and there is little self-management ability. The paper identifies significant features of extension impact. Competence, but not performance is strongly determined by worker variables. At the same time motivation also correlates positively with both competence and performance. However, independence presents a negative impact on competence and no significant effect on performance, which means MyToc could provide a higher level of autonomy support. SNS usage has an effect on competence, but does not directly affect performance. Competence of its own turns out to be the most important productive factor, which highlights that central focus for improving extension results. In general, the study asserts that motivation, competence and social media usage are pivotal for empowering extension workers but independence is still a problem. Chester is among those who emphasize that building the capacity of extension workers would remain crucial to improving performance – “These things make sense only under a backdrop where you have qualified, high-performing folk” he said. Abdi and Chester say that strengthening competence (in general, by increasing levels of education/training) has been identified as ‘the main mechanism for improving performance’ so that agriculture development agents could better contribute towards sustainable livestock production in eastern Indonesia and Timor Leste borderland.

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## Introduction

Timor Tengah Utara (TTU) regency is one of the regencies in Nusa Tenggara Timur (NTT)

Province which has a border with Timor Leste. The area is hosting a lot of livestock (Ngongo *et al.*, 2022). And up till now the region has been a great supplier of meat and live cattle from NTT to Java's island,

especially DKI Jakarta. Furthermore, the livestock industry in TTU is also the most stable income-source for its people (Simamora *et al.*, 2024). This comment is quite reasonable since the climate in TTU has a long dry period, which could last about 6–7 months each year (Hilmiati *et al.*, 2024). The relatively long dry season makes possible only one cropping in a year (Perdinan *et al.*, 2024). Meanwhile, livestock farming can still be done all year round since the indigenous Timor Island cattle are high in adaptation to dry season and unmanned feed supply (Ratnawaty *et al.*, 2021), it just fill with innovation and technology formed silage and hay.

The average share of smallholder raised livestock in the TTU is about 90 percent (Simamora *et al.*, 2025). Live-stock productions run by communities are being still controlled on traditional lines (Alary *et al.*, 2022). Although farming technology applied is still simple hence low productivity of the livestock enterprises and, consequently on incomes generated from agricultural activities (Habte *et al.*, 2022). The productivity of livestock enterprises in NTT has been targeted for improvement through several interventions, including the support of livestock germplasm, prohibiting slaughter of productive animals, facilitating access to credit for livestock-keeping, and assistance with production equipment such as grass choppers (Parker *et al.*, 2022). These attempts to build up ranching have, however, not entirely succeeded and even the hydrodynamic aid has for the most part failed.

This implies that livestock extension workers, are required to realign the the way business is done for livestock, enhance farmers' knowledge, attitudes and skills and facilitate faster adoption of technological innovations by farmers (Alotaibi *et al.*, 2021). Additionally, development of infrastructure as a solution to intensify the productivity of smallholder livestock businesses in TTU is not guaranteed that it will be the key to success even though there are also involvement from livestock extension agencies (Pousga *et al.*, 2022). Livestock extension officers play a role as intermediaries between the research and government sectors but also between the business sector and farmers' businesses (Thornado *et al.*, 2024). The competence is the sum total of knowledge, skills and attitudes affecting their performance effectiveness. Competency in extension refers to technical, communication, managerial and socio-cultural. Livestock extension officers are amongst

the key players in encouraging and even coaching smallholder farmers to maintain a sustainable dryland livestock enterprises on TTU (Hilmiati *et al.*, 2024). For sure, the dryland farming need high capacity of extension workers to justify the increased productivity of livestock enterprises. Extension competence including technical, communication, managerial and sociocultural competencies represent a bundle of knowledge, skill and attitude that would help extension staff to efficiently teach, promote and empower farmers. These competencies, which determine directly extension performance through behavior change, adoption of innovation, institutional strengthening and increase in farmer productivity should therefore be assessed for sustainable livestock development.

Improved productivity of animal enterprises needs extension agents who are ready to work actively in order to make the farmer develop and manage subsequent business based on unused potentials using local resources (Afzal *et al.*, 2016). The introduction of livestock extension workers is supposed to induce changes in farmers' behaviour with regard to managing business so that they can effectively and efficiently operate their activities for higher income (Yan *et al.*, 2023). In dryland livestock systems, extension worker effectiveness is required in order to offer support for the fast adoption of livestock innovations and technologies (Džermeikaitė *et al.*, 2023). Technologies and Innovations in the livestock sector The innovations and technologies, viz., feed processing technology and artificial insemination technologies, have been critical to support sustainable business of live-stock (Dahya *et al.*, 2023). The skills of livestock extension agents are very crucial for the sustainability of livestock enterprises in TTU. The research question is, what are the effects of extension worker's competence on livestock extension performance? This study also aimed to analyse whether the skilledness of extension workers does not contribute to their performance and the effectiveness of livestock extension services as well as to analyze what type of development model is needed in developing or improving the competence and performance of live stock extension workers in border area Indonesia – Timor Leste border. What are suitable development models for improving the capability and professionalism of livestock extension workers in the Indonesia-Timor Leste border area? Research hypothesis The study hypothesises that there is a positive and significant relationship

between competency of extension workers and the work performance of livestock extension workers in Indonesia-Timor Leste border region. What kind of development model is appropriate for improving the competence and performance of livestock extension workers in the Indonesia-Timor Leste border region? The research hypothesis is that there is a strong relationship between extension worker competence and the performance of livestock extension workers in the Indonesia-Timor Leste border region.

## Materials and Methods

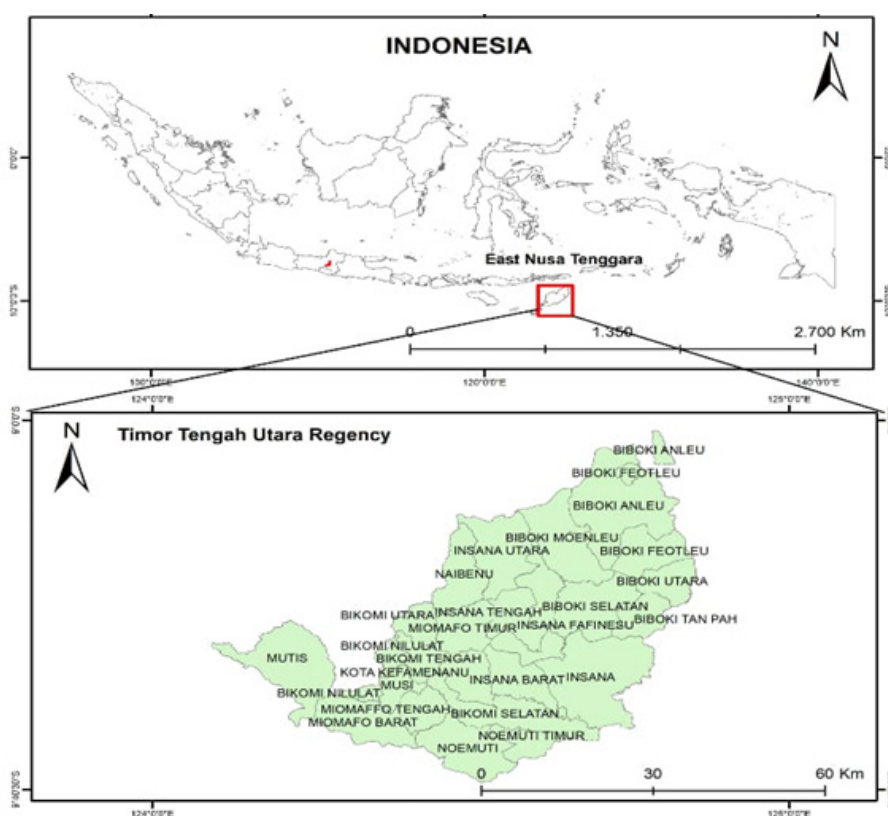
This study is being conducted in the TTU Regency. The regency was purposively selected as it is the working area for livestock extension workers in NTT. The field sampling of research is scheduled to be carried out in May July, 2024. The study population for this work are all registered livestock extension workers serving in the Livestock Service Office and Agriculture Service Office of which their main role is to provide extension services to farmers in the TTU. In this study, the quantitative method with a survey technique was adopted. A census based sampling was carried out on the distribution of the extension workers in each sub-district. The overall number of extension workers issue was 120 for the purpose of this research. The method of data collection used

in this study was the primary and secondary data collection. Relevant institutions or organizations as the Livestock Service Office provided secondary data. Data for primary data collection was gathered directly from livestock extension workers using a pre-tested questionnaire with a list of questions. Beyond the research questionnaires, FGD session were held among extension workers and other stakeholders to further delve into issues so as to find a model for enhancing the competency of livestock extension workers. Quantitative data collected is analysed descriptively and inferentially (Hair *et al.*, 2017). For the statistical research method: Inferential statistics that were applied in this study involved the actualized through a structural equation model of partial least square (PLS, structurale) analysis.

## Results and Discussion

### *SEM Analysis Competence of Livestock Extension Workers*

The results show that different factors play different roles in the characteristics. Formal education (X1.1) presents a major negative effect with a loading value of -0.66, thus describing an inverse relationship with the extension worker characteristics. This means that the higher the level of formal education



**Figure 1:** *Geographic location of the study*

attained by an extension worker, the weaker are the actual characteristics manifested. Possible reasons may include more theoretical foci offered by formal education, curriculum mismatches with practical needs in the field, and individual expectation mismatches with reality in extension work ([Adlih et al., 2024](#)). Non-formal education (X1.2) takes a positive share with a loading value of 0.441, though less than the other factors. Training, workshops, and seminars do provide non-formal education that generally improves technical and interpersonal skills better tuned to the requirements of the area. The reason for its weaker influence, however, may lie in quality or scope limitations of training received by extension workers ([Afzal et al., 2016](#)).

Work experience (X1.3) had the most dominant contribution with a loading value of 0.557. This confirms that practical experience in the field is crucial in shaping the characteristics of effective extension workers. Experience enables extension workers to better understand farmers' needs, tailor extension approaches, and develop essential interpersonal skills to build trust and rapport with the community ([Asrika et al., 2023](#)). Availability of infrastructure (X1. 4) has employed the structure of facilities in enhancing the role of extension workers (loading value = 0.541). Extension workers are provided with convenient means of reaching farmers, transferring knowledge and improved work performance because they operate under favourable enabling conditions such as transportation, technological aids, supportive infrastructure among others ([Thornado et al., 2024](#)).

The findings imply that work experience exerts the greatest influence in determining the characteristics of extension workers over and above infrastructure availability, non-formal education, and formal education ([Berhanu et al., 2024](#)). This result suggests the need for practical training to improve the capacity and performance of extension agents. To enhance the quality of extension work, much attention should be given on promoting practical experiences in learning such as fieldwork, attachments and mentorship programs ([Asrika et al., 2023](#)). Furthermore, non-formal training such as in-service trainings, technical sessions and in house professional development journeys can enhance the competences of extension workers ([Pousga et al., 2022](#)). Making available the necessary support facilities, such as transport and technology communication tools is also important

to allowing extension workers' work more optimally ([Basyar, 2021](#)). At the same time, they highlight the necessity for a reevaluation of formal education in order to bring it more closely into line with practical demands. While not all post-secondary educational practices prepare extension workers to have hands-on experience, it is essential to integrate more applied components into formal education. This may involve designing more field-based learning, problem-solving tasks and complex cases to connect theory to practice. The process of adequately interlinking practical involvement, non-formal education and reformed formal education system will greatly enhance extension services which would result in increased impact of the effectiveness of community development ([Sumo et al., 2022](#)).

According to the analysis all factors of extension workers motivation make interesting and positive contribution but with different intensity. Self-potential development (X2. 1) became the major contributor (loading=0.829). And this shows how is the power of development workers continually enhancing their competence, capacity and confidence that affects work motivation ([Salam et al., 2024](#)). Chances to maximise one's potential, e.g. training, further education or simply new experiences are not only perquisites for technical skills but add to the self-confidence and job satisfaction of extension workers. This need for self-actualization is one of the most powerful intrinsic incentives. Recognition from farmers (X2. 2) with loadings value of 0.762 also had a significant effect on increasing the motivation of extension workers.

Farmers' acknowledgement, or respect and trust on the performance of extension providers establishes a good union between extension providers and client communities. This creates a sense of worth in extension workers and encourages them to continue working optimally ([Olorunfemi et al., 2020](#)). This aspect demonstrates the significance of the social and emotional dimensions in establishing motivation, which are often attitudes that reinforce motivation based on career or financial need. Income (X2. 3) with a loading of 0.6 showed that financial reward was still one of the contributing factors to extension workers' motivation; nonetheless, it is less important than personal growth potential and farmer appreciation. Sufficient income secures the livelihoods of extension workers and builds fairness, which in turn leads to the improvement of job satisfaction ([Pousga et al., 2022](#)).

Nevertheless, the effect of income is extrinsic motivation and the effect size would be not as strong as intrinsic one. The final factor is the achievement striving (X2.4) was loaded with the same loading value of 0.621. This shows that counsellors who have need for achievement like working at their best or achieve some specific goal are more motivated (Managanta, 2020). While it is not nearly as strong of a factor as the self-potential development or recognition from breeder, I also believe that striving to succeed serves a role in having an effective and innovative work culture. Results of the analysis indicate that self-potential development is the strongest motivator among extension workers while recognition from farmers, need to achieve and income are next. The results underscore the need to take a more integrated perspective on enhancing the motivation of extension staff, which involves prioritizing capacity building programs, cultivating good relationships with farmers and shaping a work context that meets professional and personal concerns (Asrika *et al.*, 2023). These findings suggest that it is important to enhance extension workers' ability through raising work motivation of the staffs, which can be increased through measures such as paying more salaries and welfare. Training on enhancing information media use is crucial. This is in light of the fact that the coverage areas for the extension workers are extensive with the need to rely on information technology media to ensure dissemination is done conveniently and expeditiously. The improvement of the optimization of extension personnel attributes also should be made. The extension workers' attributes have a significant role in enhancing competency. Border extension workers are usually already experienced and have been trained in different skills. Findings show that competence is significantly related to the performance of livestock extension workers. The findings also confirm once more the earlier contention that performance is largely dependent on the capability of extension personnel.

## Conclusions and Recommendations

Based on the results of the model analysis, it can be concluded that the performance of livestock extension workers can be significantly improved through strengthening their competencies, increasing their work motivation, and optimising the use of social media as a means of supporting extension activities. These findings indicate that the success of extension activities is not only determined by the technical

capabilities of extension workers but also by internal factors (motivation and competencies) and the ability to leverage modern communication technologies to reach farmers more broadly, quickly, and effectively.

The recommendation of this study is that the competence and performance of extension workers must be improved in order to enhance livestock development in the Indonesia-Timor Leste border region. The performance of livestock extension officers needs to be improved through increased competency via continuous training, strengthened work motivation with fair incentives and rewards, optimisation of social media as a means of communication and education for farmers, and institutional support and cross-sector collaboration to create a sustainable extension ecosystem.

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## Novelty Statement

The pivotal innovation of the research model lies in its integration of motivational strengthening with digital extension strategies, particularly the utilisation of social media, to enhance the competence of livestock extension workers. This approach engenders a hybrid extension system that combines traditional face-to-face methods with digital communication, rendering livestock extension more adaptive and effective in the Indonesia-Timor Leste border region.

## Authors' Contribution

**Ture Simamor:** Conceptualization, editing, original draft

**Ody Wolfrid Matoneng:** Formal analysis, data curation, resources

**Brigida Antonia Correia:** writing - review

**Ligia Tomas Correia:** writing - review

*Generative AI or AI assisted technology statement*

The authors declare that no generative AI or AI-as-

sisted technology was used in the writing or editing of this manuscript.

### Conflict of interest

The authors have declared that there is no conflict of interest.

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