

Research Application Summary

**Influence of demographic factors on training transfer of agricultural risk management in Uganda**

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**Abstract**

The decline in agriculture sector's contribution to sub-Saharan Africa economies is attributed to risks and uncertainties that are experienced at every node of the agricultural value chain. This has attracted both government and non-government institutions to place considerable effort on holistic agricultural risk management. Among the matched strategies of mitigating agricultural risk is to improve extension workers' knowledge, skills, abilities and attitudes through training in holistic agriculture risk management who in turn are expected to help out small holder farmers to mitigate agriculture related risks. As such, the the ministry of Agriculture animal industry and fisheries in partnership with Makerere University and the Platform for agriculture risk management (PARM) organized a training on holistic agricultural risk management for its extension staff across the country with a view that they will transfer the knowledge acquired in the training to enable small holder farmers manage production, market, institutional, personal and financial risks. One significant way of accessing success of any training is training transfer. The objective of this study was to determine the role of demographic factors (age, education level, job type, management responsibility) in influencing the transfer of agricultural risk management training skills among extension workers in Uganda. A study was conducted in Uganda involving 281 respondents using the Learning Transfer Systems Inventory (LTSI) as an instrument to predict training transfer. Multiple analysis of variances was used to answer the specific issues of the study. Level of education, job type and age were the main factors that influenced transfer of agricultural risk management training skills in Uganda. Respondents with lower level of education level, had higher performance outcome expectations from the training, performance coaching and learner readiness. Furthermore, environmental officers needed more performance coaching than the fisheries officers. As for age, irrespective of education level and job type, young agriculture extension workers (less than 5 years) perceived higher performance self-efficacy and personal outcomes negative than those outside the age bracket. Examination of the management responsibility trainees have over their subordinates indicated that trainees with managerial roles perceived more opportunity to use the risk management skills where as those with no managerial responsibility perceived content validity to have helped them to transfer the skills. Hence, improvement of the transfer of training within the agricultural sector will require prior attention given to the unique demographic differences among extension workers (trainees) that should inform transfer strategies.

Key words: Extension workers, LTSI, risks, transfer of training, trainees, Uganda

## Résumé

La baisse de la contribution du secteur agricole aux économies de l'Afrique subsaharienne est attribuée aux risques et aux incertitudes rencontrés à chaque nœud de la chaîne de valeur agricole. Ceci a incité les institutions gouvernementales et non gouvernementales à déployer des efforts considérables sur la gestion holistique des risques agricoles. Parmi les stratégies correspondantes d'atténuation des risques agricoles, il y a l'amélioration des connaissances, des compétences, des capacités et des attitudes des agents de vulgarisation par le biais d'une formation à la gestion holistique des risques agricoles qui, à leur tour, sont censés aider les petits exploitants agricoles à atténuer les risques liés à l'agriculture. A ce titre, le Ministère de l'Agriculture, de l'Industrie Animale et de la Pêche en partenariat avec l'Université de Makerere et la Plateforme de Gestion des Risques Agricoles (PARM) a organisé une formation sur la gestion holistique des risques agricoles pour son personnel de vulgarisation à travers le pays en vue de transférer les connaissances acquises lors de la formation pour permettre aux petits exploitants agricoles de gérer les risques de production, de marché, institutionnels, personnels et financiers. Un moyen important d'accéder au succès de toute formation est le transfert de formation. L'objectif de cette étude était de déterminer le rôle des facteurs démographiques (âge, niveau d'éducation, type d'emploi, responsabilité de gestion) dans l'influence du transfert des compétences de formation à la gestion des risques agricoles parmi les agents de vulgarisation en Ouganda. Une étude a été menée en Ouganda auprès de 281 répondants utilisant le Learning Transfer Systems Inventory (LTSI) comme instrument pour prédire le transfert de formation. L'analyse de variances multiples a été utilisée pour répondre aux enjeux spécifiques de l'étude. Le niveau d'éducation, le type d'emploi et l'âge étaient les principaux facteurs qui ont influencé le transfert des compétences de formation à la gestion des risques agricoles en Ouganda. Les répondants ayant un niveau d'éducation inférieur avaient des attentes plus élevées en matière de résultats de la formation, du coaching de performance et de la préparation de l'apprenant. De plus, les agents de l'environnement avaient besoin de plus d'encadrement en matière de performance que les agents des pêches. En ce qui concerne l'âge, quel que soit le niveau d'éducation et le type d'emploi, les jeunes agents de vulgarisation agricole (moins de 5 ans) ont perçu une efficacité personnelle plus élevée et des résultats personnels négatifs que ceux en dehors de la tranche d'âge. L'examen de la responsabilité de gestion que les stagiaires ont sur leurs subordonnés a indiqué que les stagiaires ayant des rôles de gestion percevaient plus d'opportunités d'utiliser les compétences de gestion des risques alors que ceux qui n'avaient pas de responsabilité de gestion percevaient que la validité du contenu les avait aidés à transférer les compétences. Par conséquent, l'amélioration du transfert de la formation au sein du secteur agricole nécessitera une attention préalable accordée aux différences démographiques uniques entre les agents de vulgarisation (stagiaires) qui devraient éclairer les stratégies de transfert.

Mots clés : Agents de vulgarisation, LTSI, risques, transfert de formation, stagiaires, Ouganda

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## Introduction

The contribution of the agricultural sector to the national economy in Uganda is declining due to risks and uncertainties that are linked at every node of the agricultural value chain (PARM, 2019) These risks ranges from a spectrum of biotic (pests, diseases and weeds) and abiotic (climate changes, market risks like low prices and production input risks) factors. This has attracted both government and non-government institutions to place considerable effort on agricultural risk management. However, this responsibility is shouldered by the agricultural extension advisory service providers,

who need to be competent in both skills and technical content to offer quality services to their clients. As a result of this, the Ministry of agriculture, Animal Industry and Fisheries (MAAIF) in collaboration with the Platform for Agriculture Risk management and Makerere university college of agriculture and environmental sciences trained district agricultural extension staff (trainees) in holistic agricultural risk management (HARM), with a focus on; risk assessment and prioritisation, market risk management, institutional and personal risk management, gender issues in agricultural risk management, agriculture insurance and agricultural risk policy. The main aim of this training was to transfer agricultural risk management trained skills to the smallholder farmers so as that they can ably mitigate a number of agricultural risks they constantly face. Since this is a training like any other training, it is also affected by training transfer factors and demographic factors. However, studies in the field of agriculture on transfer of training but not on risk management, have indicated that very little of what is trained is transferred (Ataei and Zamani, 2015, 2015; Muthoni and Miiro, 2017; Sseguya *et al.*, 2018). Transfer of training is the general application of skills, knowledge and attitudes acquired from training to their life or work. (Grossman and Salas, 2011). Studies have indicated that the factors that affect transfer of trained skills (training) work as a system and include; trainee characteristics, training design factors and work environment factors (performance outcome expectation, training design, performance coaching, transfer effort performance expectation, learner readiness, and personal outcomes negative). However, these may be affected by the way participants of different demographic factors (education level, age, experience, job type and sex) perceive them. Therefore, the perception that participants have on the transfer factors is the perceived level of transfer. Studies that have looked at the effect of demographics on transfer factors in other context but not in agricultural risk management include; Khasawneh *et al.* (2006), Velada *et al.* (2009) and Antunes *et al.* (2018) who indicated that more educated respondents had negative perceptions on transfer factors as compared to the less educated. However, Miiro *et al.* (2021), found that more educated rated themselves highly on transfer' compared to less educated farmers. Chen and Bates (2006), Attunes *et al.* (2018) and Miiro *et al.*, (2021), found that younger trainees perceived training transfer factors higher than those old. However, Cowman (2016) and Van der Klink *et al.* (2018), indicated that employees who had more years of experience in the organization were more prepared for training, believed content to be more relevant and experienced more opportunities to transfer. Differences in job type and functions of trainees could influence their perceptions about the transfer system factors (Chen and Bates, 2006; Watson *et al.*, 2010). Yamnill and Mclean (2005) transfer system characteristics differed between male and female respondents in the sense that Males rated themselves higher on transfer factors than did females. There a few studies in the field of agriculture that have looked at the influence of demographics to create a difference in the way trainees view the training transfer. The question is will the extension workers of varied, education, socioeconomic status, age, sex, and work experience view the transfer system of factors in a similar way, and if not what are the implications for training transfer strategizing for extension workers?

## Materials and methods

Quantitative cross sectional survey design was employed. The LTSI questionnaire (Bates *et al.*, 2012) was completed by 281 trainees. Data were collected in paper form, in an anonymous way from participants on the last day of their training. They represented five categories of trainees (extension workers, environmental offices, veterinary officers, and entomologist and fisheries officers). These attended a range of different training skill area and programs that varied in duration,

content, skill area facilitator and knowledge. Multivariate analysis of variance (MANOVA) was used since hypothesis involved multiple dependent and independent variables. The 16 transfer factors found in the LTSI were specified as the dependent variables of interest, these were measured using a five point Likert scale. They were subjected to principle component analysis to reduce the number of items. After which their average score was taken and this is, what was used in the subsequent analysis.

Demographic factors (education level, age, work experience, job type and gender) were treated as categorical independent variables. Multiple analysis of variances (MANOVA) results for each independent variable were described individually. Significant results of MANOVA were followed by analysis of variance (ANOVA) after which post hoc comparison followed. The assumptions of MANOVA were catered for (Hair *et al.*, 2017).

## Results

The hypothesis that there will be no difference in the perception of LTSI due to demographics (education level, age, experience, job type and gender) of the trainees of agricultural risk management has been rejected.

The Education level, indicated that Pillai's Trace ( $V = .785$ ,  $F(48, 780) = 1.38$ ,  $p < .05$ ). Partial  $\eta^2 = (.078)$ . ANOVA analysis (See Table 1) and Post-hoc comparisons (Table 2) provides

**Table 1. Univariate F-Tests Results for the 16 T-LTSI Factors across education level**

Dependent Variable	Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Performance outcome expectation	3.222	3	1.074	3.110	.027	.033
Training design,	1.681	3	.560	2.708	.046	.028
Performance coaching	5.310	3	1.770	5.483	.001	.056
Personal outcomes negative	3.955	3	1.318	2.699	.046	.028
Learner readiness	7.114	3	2.371	3.090	.028	.032
Transfer effort performance expectation	2.664	3	.888	2.664	.048	.028

**Table 2. Post Hoc Comparisons across education level**

Dependent Variable	(I) Education	(J) Education	Mean Difference(I-J)	Std. Error	Sig.
Performance outcome expectation	Masters	Diploma	-.3759*	.12990	.004
Performance coaching	Masters	Post graduate	-.4286*	.14405	.003
		Diploma			
	Masters	Diploma	-.4921*	.12560	.000
Learner readiness	Masters	Post graduate	-.6762*	.22209	.003
		Diploma			

Job type of the respondents. All these departments had distinct work environments.

The Pillai's Trace ( $V = .267$ ,  $F(64, 1056) = 1.179$ ,  $p < .164$ ) indicating that MANOVA yielded statistically non-significant differences across job types of the respondents, and partial  $\eta^2 = .987$ . ANOVA analysis showed that out of the 16 factors only Performance Coaching  $F=3.357$ ,  $P = 0.011$ . Showed significant results across the job types. Low partial  $\eta^2 = .046$ . Post hoc comparison indicated that, respondents who were working, as environmental officers rated Performance coaching higher than the fisheries officers.

Age comparison, MANOVA Wilk's  $\Lambda = .735$ ,  $F = (80, 1227) = 1.014$ ,  $P = .446$  partial  $\eta^2 = .006$ . ANOVA, showed a significant difference between the age groups on the factor of Personal outcomes negative  $F = 2.574$ ,  $P < 0.05$ . and Performance self-efficacy  $F = 2.228$ ,  $P = 0.05$ . The strength of association was very low partial  $\eta^2 = .046$  and  $\eta^2 = .040$  respectively. Post hoc Comparison across age groups, showed that respondents aged 20 to 30 rated Performance self-efficacy higher than did those aged between 36 and 40. In the same way, aged 20 to 30 rated Personal outcomes negative higher than did those aged 50 years and above.

Management responsibility exercised by the trainees. MANOVA, Pillai's Trace ( $V = 164$ ,  $F(32, 528) = 1.472$ ,  $p = .05$ ). (Partial  $\eta^2 = .082$ ). ANOVA analysis; trainees with managerial responsibility (managers) rated opportunity to use higher than with no managerial responsibility ( $F = 3.85$ ,  $P = 0.02$ . Partial  $\eta^2 = .027$ ), 3.7012 vs 3.5474, while non-managers rated content validity ( $F = 7.07$ ,  $P = 0.01$ . Partial  $\eta^2 = .048$ ) higher than managers.

Work Experience, total years of experience of the respondents in the extension was specified as an independent variable to determine whether significant differences were present in the perceptions regarding learning transfer system factors or not. In order to make reasonable comparisons among specified groups, and to adjust the ratio of group sizes as low as possible, work experience was grouped into six categories: 1-3 years, 4-7 years and 8-10 years, 11-13 years, 14-16 years and above. Box's M test was significant (Box's  $M = 1077.596$ ,  $F = 1.253$ ,  $p < .0001$ ). Peer support factor violated the equality of error variances assumption. The Pillai's Trace was not significant ( $V = .245$ ,  $F(80, 1320) = .849$ ,  $p = .825$ ) indicating that MANOVA yielded statistically non-significant differences across work experience. Strength of association partial  $\eta^2 = .049$ .

Followed univariate ANOVA analysis showed that non of the 16 factors differed significantly across respondents' years of work experience.

Sex of the respondent, sex was used to examine whether respondents' learning system perceptions, via LTSI, differed between females ( $n = 46$ ) and males ( $n = 235$ ). Box's M test was significant (Box's  $M = 204.504$ ,  $F = 1.305$ ,  $p < .05$ ). However, since the largest to the smallest group ratio was not departed much from the 1.5 (Hair *et al.*, 2006), and robustness of the Pillai's Trace to decreased group size, unequal group sizes, and violation of homogeneity of variance-covariance matrices assumption (Tabachnik and Fidell, 2006), MANOVA was interpreted through Pillai's Trace. In terms of equality of univariate error variances, all dependent variables satisfied this assumption except for the personal outcomes-negative, and manager opposition. No further alpha adjustment was made for these dependent variables. The Pillai's Trace was significant ( $V = .051$ ,  $F(16, 264) = .893$ ,  $p = .577$ ) indicating that MANOVA did not yield statistically significant

differences across gender. (Partial  $\eta^2 = .051$ ) explaining the 5 % of the variance (Cohen, 1992). Followed univariate ANOVA analysis showed that out of the 16 factors of the LTSI none differed significantly across sex, females rated these factors like their counterparts,

## Discussion

Focusing on determining whether specific demographic factors such education level, age, work experience, job type and sex of the trainee influence the perception of trainees' transfer of agricultural risk management training. Results of the MANOVA showed that respondents with lower level of Education perceived higher training transfer. This means that Education has not played an important role in the extension worker's understanding of the training preparing them to transfer the training. This means that extension workers with lower education levels understood agricultural risk management practices made more sense to them than those with masters. The findings are in line with Khasawneh *et al.* (2006), Velada *et al.* (2009) and Antunes *et al.* (2018), who indicated the more educated respondents had negative perceptions as compared to the less educated. However, Miirio *et al.* (2021), found that more educated rated themselves highly on transfer' compared to less educated farmers. This suggests that those with lower levels looked at agricultural risk management training as an opportunity to close the education gap. About the job type, environmental officers perceived more Performance coaching than the fisheries officer. These findings suggest that the training should be directly relevant to the job requirement to ensure more positive transfer system perception. Extension workers who are still in the youthful age bracket (youngsters) perceived higher transfer of agricultural risk management training than the elders. The findings are in agreement with those of Attunes *et al.* (2018) and Miirio *et al.* (2021), who found out that younger trainees perceived training transfer factors higher than their counterparts.

This could be because they are still energetic to take on the mantle and thus struggling for upward mobility, furthermore, since they have just joined extension service they still experience job insecurity and thus fear to be reprimanded by the supervisors. Relatedly implementation of risk management practices requires frequent interaction with the farmers which is indeed energy intensive and rigorous in nature, this explains why the young extension workers are more responsive compared to their older counterparts.

Examination of the management responsibility indicated that managers perceived more opportunity to use in their work environment than non-managers. This is because they can access resources needed to carry out the training. Another pattern observed was non-managers perceived that the content was more validity than managers, this means that the knowledge and skills taught in agricultural risk management training are consistent with their job requirements. However, work experience and sex of the respondents did not yield significant differences in the perceptions regarding learning transfer system factors. This means that the way participants perceive the training transfer factors during agricultural risk management training, is not affected by their sex and work experience. This could be because risk management was a new concept. Therefore, none of the participants had prior experience about it.

## Conclusion

Trainee perception on the transfer of agricultural risk management training is influenced by

demographic factors. Education level, age, job type and management responsibility showed varying perceptions of the transfer system factors among extension workers. It should be noted that work experience and sex, did not influence extension workers' perception on transfer factors during agricultural risk management training.

### Recommendations

To ensure transfer of training by professionals, designers /planners should consider the demographics that have been identified to affect perception of transfer factors.

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