

Influence of Institutional Forces on the Intention to Harvest Rainwater in Tanzania: Moderating Effect of Logic

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Abstract

The aim of this explanatory study was to examine the moderation effect of logic on the relationship between institutional forces and rainwater harvesting intention. Random sampling technique was applied to obtain a sample size of 390 community members from Nkasi District in Tanzania. In this study explanatory and cross-sectional designs, random sampling, questionnaire survey strategy were applied in selecting 390 respondents. In data analysis, IBM SPSS software was conducted using descriptive and moderated multiple linear regression techniques. The results of the study showed that logic had significant positive moderation effect on the relationship between coercive mechanism and rainwater harvesting intention as well as on the relationship between mimetic mechanism and rainwater harvesting intention. The findings also revealed that logic had significant negative moderation effect on the relationship between normative mechanism and rainwater harvesting intention. The study concludes that coercive and mimetic mechanisms predicts significantly the intention to harvest rainwater with interaction of logic; logic was a significant positive moderator on the predicted relationships. The study recommends that the government and policy makers to design policies that enhances harvesting rainwater in communities. This study offers broad knowledge to investors, policy and decision makers on rainwater harvesting concept for improving water projects and development of the communities.

Keywords: Rainwater harvesting, mimetic mechanism, normative mechanism, Logic

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1. Introduction

Water is life and the main source of water is rainfall; other sources are springs, streams, rivers, lakes, and oceans (Canavari *et al.*, 2021; Masifia & Sena, 2017). According to Luciani and Budimansyah (2022) rainwater harvesting is a technique for storing and collecting rainwater when it falls on buildings, onto the ground, and into the field during the rainy season. This water is used for outdoor and indoor activities. Rainwater harvesting increases water security in societies or areas with inadequate water supplies, lack of water resources, and places with poor water accessibility (Akroush *et al.*, 2017; Luciani & Budimansyah, 2022; Khatakho & Koju, 2017). In Tanzania areas such as the Nkasi district in particular, rains usually starts in the months of November and they extend up to the end of May.

Despite having rains, in real situation, the water scarcity problem is prevailing in the Nkasi District Rukwa region in Tanzania. The water demand in Nkasi is high due to the increasing population that has caused hardship in water accessibility thus resulting in water scarcity. The current status of water is becoming a big problem especially in the dry months of June to November each year. In the district, very few people harvest rainwater but the majority do not do so. Previous scholars argued that rainwater is an alternative solution for attaining their water demands. Despite the rains falling from November up to May each year, the community members in Nkasi have not been harvesting rainwater for their future use.

This problem has led to the establishing of locally dig pit holes for fetching water for use. But, these locally dug pit holes have side effects which are causing injuries, damage to properties and lames to humans and animals (Iqbal, 2023). In the months from June onwards, the rain season stops thus making the areas dry with scarce or no water. Consequently, the water sources such as rivers, streams and springs get dry and hence the water scarcity problem is intensified.

As the alternative way to this problem, the majority of people in Nkasi District, Rukwa region in Tanzania normally dig pit wells locally for fetching water. However, after few months the dug pit wells in the area dry up due to the increase in drought. The locally dug pit wells for fetching water have been leading to negative effects like causing lames to people, animals and damage to properties and unstable land (Iqbal, 2023; Luciani & Budimansyah, 2022; Khatako & Koju, 2017). This means that the locally dug pit holes make the land unstable making it fail to resist earthquakes and since that particular land is with buildings near these pit holes, these buildings get cracks which are likely to damage them (Iqbal, 2023).

In addition, these pit holes may cause deformity to people who pass near them knowingly or unknowingly and accidentally the dug holes break due to failure to resist the weight over them and when persons or animals get such accidents, they normally result into fractures and injuries thus leading to probable deformities (Iqbal, 2023). These factors, that is, scarcity of water in Nkasi and the attendant consequences motivated the researchers to

conduct this study aiming to suggest some means to eliminate the water scarcity problem facing many areas including Nkasi, Rukwa Tanzania. The need for researching on the influence of institutional forces was to introduce new knowledge regarding the effects of coercive, mimetic, and normative mechanisms on rainwater harvesting in Tanzania.

Literature Review

Scholars in previous studies recommended rainwater harvesting as an alternative means for accessing water (Luciani & Budimansyah, 2022; Khatakho & Koju, 2017), but despite such suggestions, the water challenge has not ended particularly in Nkasi and other areas. The majority of studies conducted in the field of rainwater harvesting were done in different contexts. These are such as the study by Akroush *et al.*, (2017), Campisano, (2017), Luciani and Budimansyah, (2022). However, such studies have been limited in Tanzania. Among the causes of water scarcity problem are population increase, climate change, drying up of rivers and streams, industrialisation and other human activities and negligence of considering and engaging in rainwater harvesting practices (Ahopelto *et al.*, 2019; Khatakho & Koju 2017; Masifia & Sena, 2017). Normally water scarcity motivates the intention of the community people towards harvesting rainwater to ease water accessibility (Luciani & Budimansyah, 2022; Campisano *et al.*, 2017; Masifia & Sena, 2017). Studies reviewed on rainwater harvesting did not consider institutional theory, employed other theories (Latif *et al.*, 2020). Some of those studies are Ahopelto *et al.*, (2019), Campisano *et al.*, (2017), Luciani and Budimansyah (2022), and Dismas *et al.*, (2018). This created a theoretical and knowledge gaps due to failure of those studies to employ the institutional theory of which this study used.

This study was guided by the institutional theory unlike the previous studies that were conducted without considering the institutional theory despite of the coercive, mimetic and normative mechanisms being rich in influencing power to the community (Latif *et al.*, 2020). The theoretical, contextual, and empirical gaps drove the researchers to conduct this study. The researchers introduced logic for moderating the relationships of the institutional forces constructs (coercive, mimetic and normative mechanisms) and rainwater harvesting intention for increasing the intention to harvest rainwater that was not used before this study. In this study the researchers proposed the institutional forces of the institutional theory that it could be employed to motivate the intention of the people to engage into rainwater harvesting in Tanzania. In addition, logic was proposed to increase the intention through moderation of the relationship of the institutional forces mechanisms and rainwater harvesting. These mechanisms are coercive mechanism that is a social order comprising of rules, laws, bylaws and standing orders concerning influencing and driving powers. The other is the mimetic mechanism that is the cognitive understandings or social exchange concerning learning and mimicking abilities, and normative mechanism is the repetitive social behaviour concerning with maintaining the acquired profession skills and put in application (Latif *et al.*, 2020; Wang, Lu, Hu & Wang, 2022).

Conceptual Framework

Conceptually, the study proposed that logic moderates the relationship between predictor variables and a response variable. The interactions of logic on the relationships of coercive, mimetic and normative mechanisms on one hand and rainwater harvesting intention on the other hand are shown in figure 1. In other words, when the institutional forces are applied in the presence of logic, it was anticipated that the community would be motivated to develop intention to harvest rainwater.

Conceptual Framework of the Study

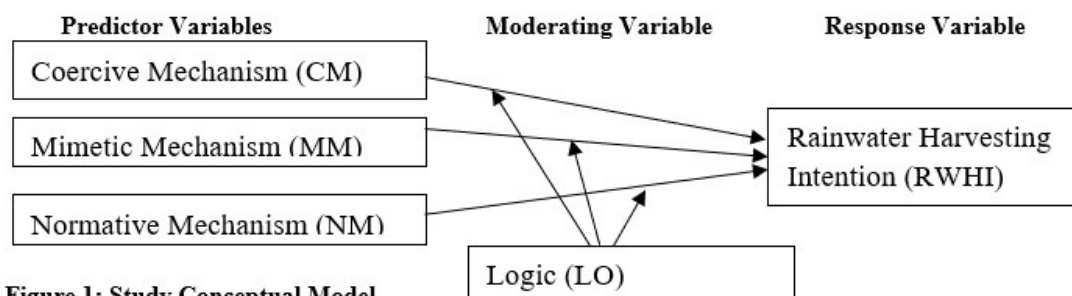


Figure 1: Study Conceptual Model

2. Methodology

The study used explanatory research design to establish the causal relationships between the variables (Johnson & Christensen, 2014; Saunders *et al.*, 2019). Explanatory research design aims at explaining what and why events happen, theory testing, and extends to a modified theory (Brough, 2019; Cohen *et al.*, 2018). Explanatory research

design was selected for the reason of using quantitative data, statistical data analysis and compilation to explain the cause and effect relationship of variables (Creswell & Clark, 2018; Saunders *et al.*, 2019). Random sampling design was used in selecting a sample for representing the whole targeted population based on time and cost limitations of the study, in this design each person is offered an equal chance of being selected (Creswell & Clark, 2018; Sekaran & Bougie, 2016). The study used numbered simple cards aimed to represent the respondents in order to avoid bias in picking the sample (Saunders *et al.*, 2019; Sekaran & Bougie, 2016).

This study considered 390 sample size which was calculated using Yamane's formula $n = N/(1+N(e)^2)$ originated in 1967. A total of 390 questionnaires were distributed to 348 rural and 42 urban individuals aged above 18 years. These questionnaires were administered by the researchers. The response rate was one hundred percent. A survey questionnaire with closed ended questions was used to collect primary data (Creswell & Clark, 2018; Sarstedt & Mooi, 2019; Saunders *et al.*, 2019). In collecting data, cross-sectional questionnaire design was applied since the study aimed to collect data despite the constrains of time and fund (Brough, 2019; Kumar, 2019). Questions which were generated by researchers focused on testing the study hypotheses and address the study objectives (Boncz, 2015; Saunders *et al.*, 2019).

In this study, regression analysis was conducted for determining the relationship among variables (Cohen *et al.*, 2018; Field, 2019). The researchers applied moderated multiple regression models in the form of $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \dots + \beta_nX_n + \epsilon$ (Field, 2019; George & Mallery, 2019; Hayes, 2018; Sarstedt & Mooi, 2019). The employed moderation regression model: $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_1X_4 + \beta_5X_2X_4 - \beta_6X_3X_4 + \epsilon$.

Therefore, $Y = RWHI$, $\beta =$ Coefficient of β , $X_1 =$ Coercive Mechanism, $X_2 =$ Mimetic Mechanism, $X_3 =$ Normative Mechanism, $X_4 =$ Logic, and $\epsilon =$ Error term.

This study employed variable measurement for measuring the variables. The variables as indicated in the conceptual framework (Figure 1) were measured using structured questionnaire developed based on Likert-like scale ranging from 1 to 5 points (Boncz, 2015). The rates of responses ranged from 1 = Strongly Disagree, 2 = Disagree, 3 = Not disagree nor agree, 4 = Agree, and 5 = Strongly Agree.

The collected data were analysed by employing descriptive and inferential statistical analysis. This study conducted moderated multiple linear regression analysis with support of IBM SPSS software version 26 to examine the nature and significance of the relationships (Cohen *et al.*, 2018; Creswell & Clark, 2018; George & Mallery, 2019; Saunders *et al.*, 2019). These analytical techniques were used due to employment of quantitative design with measurable data (Brough, 2019; Creswell & Clark, 2018). The results of the analysis were interpreted and presented using texts, tables and figures (Kumar, 2019).

3. Results and Discussions

More than a half of the respondents (54.9%) were females and males were (45.1%). The findings imply that more than a half of the respondents were females who were the most interested in rainwater harvesting since they were the most affected by the problem of water scarcity due to their domestic responsibilities. The distribution of the response to the questionnaires were: no PhD holders, 0.5 % master's degree holders, 7.4 % first degree holders, 5.6 % diploma holders, 14.1 % certificate holders, 62.8 % secondary school and 9.5 % primary school. The results imply that those with secondary school education level were the most interested in rainwater harvesting. The results of the response rate were found that 47.7% were aged 18-20 years, 21.5% were aged 21-25 years, 9.5% were aged 26-30 years, 7.2% were aged 31-35 years, 14.1% were aged 36 years and above. These findings imply that the youth were the active and most interested in rainwater harvesting than the rest. Therefore, it was easy to attain the study goal through their participation in rainwater harvesting.

The findings on the occupation of the respondents revealed that majority (72.6%) were farmers, 18.2% were employed and 9.2% engaged in business. The findings imply that most of the respondents were literate, understood and interpreted well the study questionnaire items. The study findings on location of the respondents revealed that majority (89.2%) were located in rural and the rest (10.8%) in urban places. This implies that the majority of the people in rural are most interested in rainwater harvesting because people living in rural areas lack other sources of water such as piped water compared to the urban and the demand for water consumption is higher in rural areas due to activities such as agriculture and livestock.

To ensure trustworthiness of the study, validity and reliability of the findings were quantitatively pursued. This study considered the validity of the survey instrument using factor analysis. The study used factor analysis in order to determine suitable study items for retaining or excluding in the regression analysis (Cohen *et al.*, 2018; Field, 2019; Ghoojdjani, 2022). The factor analysis aimed at excluding items of study instrument loaded below a threshold value of 0.5 on the factor loading extraction (Brough, 2019; Field, 2019). In the extraction, the study used principal component analysis method. Factor analysis included five variables namely coercive mechanism (CM), mimetic mechanism (MM), normative mechanism (NM), logic (LO) and rainwater harvesting intention (RWHI). The results of the exploratory factor analysis in Table 2 revealed that all the items attained the minimum requirement threshold point for content and divergent validity.

Table 1: Factor Loading Results for the Study Variables

	Component Matrix ^a					Remarks
	Component					
	1	2	3	4	5	
CM1	0.645					Valid
CM2	0.653					Valid
CM3	0.648					Valid
CM4	0.715					Valid
CM5	0.685					Valid
MM1					0.642	Valid
MM2					0.784	Valid
NM2			0.683			Valid
NM4			0.788			Valid
NM6			0.540			Valid
LO4				0.776		Valid
LO5				0.580		Valid
LO6				0.597		Valid
RWHI3					0.648	Valid
RWHI4					0.652	Valid
Kaiser-Meyer-Olkin = 0.908						
Bartlett's Test Sig. = 0.000						
a. Rotation Converged in 6 Iterations						

Source: The Researcher, 2023

In addition to the validity, the study considered reliability of the findings using Cronbach Coefficient Alpha. Table 1 present the findings of the reliability test. The findings indicate that the research instrument was reliable as revealed by the Cronbach's Coefficient Alpha values of 0.766, 0.600, 0.698, 0.677 and 0.693 for coercive mechanism, mimetic mechanism, normative mechanism, logic and rainwater harvesting intention respectively.

Table 2: Reliability Statistical Results of the Study Variables

S/N	Construct	Items Used	Items Deleted	Alpha Level (α)
1	Coercive Mechanism	5	1	0.766
2	Mimetic Mechanism	2	4	0.600
3	Normative Mechanism	3	3	0.698
4	Logic	3	3	0.677
5	Rainwater Harvesting Intention	2	4	0.693

Source: Researchers, 2023

The study also tested the multiple linear regression analysis assumptions before running the moderated multiple linear regression analysis to get the desired inferences (Brough, 2019; Field, 2019; Sarstedt & Mooi, 2019). The study tested normality, linearity, multicollinearity, autocorrelation, homoscedasticity, and outliers to pave way for multiple linear regression analysis as required in the data analysis (George & Mallery, 2019; Sarstedt & Mooi, 2019). In avoiding multicollinearity the researchers run the Variance Inflation Factor (VIF) to the four (independent and dependent) variables (Creswell & Clark, 2018; Field, 2019; Sarstedt & Mooi, 2019). The results were that coercive mechanism had VIF value of 1.561, the VIF value of mimetic mechanism was 1.495, the VIF value of normative mechanism was 1.645, and the VIF of logic was 1.747. The results of the VIF as shown were below 10 to all the tested variables to determine multicollinearity problem to meet the VIF assumption. Table 3 illustrates the tolerance and VIF values thus proving the absence of multicollinearity. According to Field (2019) and Sarstedt and Mooi (2019) tolerance statistics value < 0.1 or VIF of 10 or > 10 shows that there is a serious multicollinearity problem of the variables. The results showed tolerance values above 0.1 for all the tested variables namely coercive, mimetic, normative mechanisms and logic thus, indicating absence of multicollinearity.

Table 3: Variable Inflation Factor (VIF) and Tolerance Values

S/N	Independent Variables	Tolerance Value	VIF Value	Decision
1	Coercive Mechanism	0.641	1.561	Absence of multicollinearity
2	Mimetic Mechanism	0.669	1.495	Absence of multicollinearity
3	Normative Mechanism	0.608	1.645	Absence of multicollinearity
4	Logic	0.572	1.747	Absence of multicollinearity

Source: Researchers, 2023

This study tested the hypothesised relationships of variables H₁, H₂, and H₃. The moderation hypotheses H₁ found significant positive, H₂ found significant positive, and H₃ was found significantly negative as shown in Table 4. The statistical results of moderation for H₁ was $\beta = 0.051$ $\rho = 0.000$, H₂ was $\beta = 0.080$ $\rho = 0.009$, and H₃

was $\beta = -0.146$ $\rho = 0.018$.

Table 4: Summary of the Study Hypotheses and Relationships of Variables

Item Code	Hypothesis	Relationship	Variable Relationships	Results
Decision				
CM*LO Supported	H ₁ : Logic has a significant moderating effect on the relationship between coercive mechanism and rainwater harvesting intention	Moderation	CM→LO→RWHI	Significant
MM*LO Supported	H ₂ : Logic has a significant moderating effect on the relationship between mimetic mechanism and rainwater harvesting intention	Moderation	MM→LO→RWHI	Significant
NM*LO Rejected	H ₃ : Logic has a significant moderating effect on the relationship between normative mechanism and rainwater harvesting intention	Moderation	NM→LO→RWHI	Significant Negative

Source: Researchers, 2023

In response to the study hypothesized relationships, the first hypothesis of the study proposed that **H₁** was: Logic has significant positive moderating effect on the relationship between coercive mechanism and rainwater harvesting intention. The study findings established that logic had significant positive effect on the relationship between coercive mechanism and rainwater harvesting intention. This means that the moderating effect of logic increases the rainwater harvesting intention of the Nkasi dwellers. These results are consistent with the results of the study of Lutta *et al.*, (2020) who found that adoption of water harvesting techniques was significantly influenced by access to extension services, training, income, main source of livelihood, land tenure; membership in social groups and active farm labour. Again, these results are in line with the results of the study by Shanmugavel and Rajendran (2022) who found that there was significant moderation effect of the intention to acquire rainwater harvesting knowledge on the relationship between the impact of environmental responsibility and adoption of rainwater harvesting intention. Based on the moderation of logic in research, Yan *et al.*, (2021) found positive moderation of institutional logic through shareholder protection policy on the relationship between green investing and corporate environmental performance. This implies that logic can lead to significant results in rainwater harvesting as well despite the fact that the study of Yan *et al.*, (2021) indirectly dealt with water harvesting through the use of green investing which is among the dependents and is associated directly with rainfall that results into rainwater harvesting.

However, the results of this study are inconsistent with the study of Aghaloo and Chiu (2020) which showed that fuzzy logic reduces the effect of subjective evaluation of rainwater harvesting in Iran. Also, unrelated findings to the study at hand were found by Bessah *et al.*, (2022) in Ghana whose study resulted in negative association of limited access to extension services on the adoption of rainwater harvesting techniques which contradicts with the results of this study.

The study also hypothesised that **H₂**: Logic has a significant moderation effect on the relationship between mimetic mechanism and rainwater harvesting intention. The results of the findings determined significant positive moderation effect of logic on the relationship between mimetic mechanism and rainwater harvesting intention. The results reveal significant positive moderation effect of logic on the relationship between mimetic mechanism and rainwater harvesting intention. The results imply that the interaction of logic increases the intention of rainwater harvesting in the communities. These results are consistent with the results in the study of Campisano *et al.*, (2017) which found that the economic constraints and local regulations strongly influenced degree of rainwater harvesting systems implementation and technology selection. The supporting results of this study were found in the study by Mfinanga *et al.*, (2023) in Tanzania who found that water scarcity and high charges of water supply caused positive effect to come up with strategies of rainwater harvesting technologies. However, Matimolane *et al.*, (2023) who assessed the socio-economic characteristics and determinants of rainwater harvesting practices, found statistically negative effect of age on the adoption of rainwater harvesting. In addition, the results of this study contradict the results of Dismas *et al.*, (2018) whose study found that cost and knowledge for initiation hindered the adoption of rainwater harvesting.

Finally, the study hypothesised **H₃** that: Logic has a significant moderation effect on the relationship between normative mechanism and rainwater harvesting intention. The findings for the proposed hypothesis revealed that logic had significant negative moderation effect on the relationship between normative mechanism and rainwater harvesting intention. The result revealed significant negative interaction effect of logic on the relationship between normative mechanism and rainwater harvesting intention. The results suggest that significant negative moderation of logic on the relationship between normative mechanism and logic decreases in rainwater harvesting intention.

Based on these results, hypothesis **H₃** was rejected. The results of this study were consistent to the study of Shanmugavel and Rajendran (2022) that found there was moderation of intention to acquire rainwater harvesting knowledge existing between the impact of the environmental responsibility and adoption intention of rainwater harvesting in the study areas. In the study of Ahopelto *et al.*, (2019) from the analysis of water security management, the study found that drought management plans were not in place in Finland that cause water problem with water availability during severe drought. Based on the findings, the study suggested that drought management plans would be significant to improve water security in Finland.

However, the findings of this study are inconsistent with the findings of the study of Canavari *et al.*, (2021) whose results demonstrated moderation effect of the experience on the relationships between subjective norms, perceived usefulness and perceived ease of use and the intention to adopt irrigation technology. Contrary results were also found in the study by Castier and Barreto (2023) whose findings was that base case simulations discouraged installation of the domestic rainwater harvesting systems. These findings contrast with those by Donohue *et al.*, (2017) who found that outreach can effectively change perceptions on rainwater catchment. Based on the findings, the study concluded that there was a need of ongoing, professional, and evidence-based outreach programmes to serve rainwater catchment systems.

4. Conclusion and Recommendations

This study examined the moderation effect of logic on the relationship between institutional forces and intention to engage in rainwater harvesting activities. Specifically, the study aimed at examining the moderation effect of logic on the relationship between coercive mechanism and rainwater harvesting intention, mimetic mechanism and rainwater harvesting intention, and normative mechanism and rainwater harvesting intention. The study concluded that logic had significant positive moderation effect on the relationship between coercive mechanism and rainwater harvesting intention. The findings also concluded that logic had significant positive moderation effect on the relationship between mimetic mechanism and rainwater harvesting intention. On the other hand, based on the study findings, it is concluded that logic had significant negative moderation effect on the relationship between normative mechanism and rainwater harvesting intention. This study concludes that logic can fit to be a moderating variable that can give out positive results in rainwater harvesting since its interactions resulted in increasing the intention with coercive and normative mechanisms. But, logic cannot moderate the relationship between normative mechanism and rainwater harvesting intention.

In addition, logic which implies correct reasoning can be employed to decrease the intention of harvesting rainwater in the existence of normative mechanism. The decrease is due to the interaction that revealed significant negative moderation effect given that there is an extreme effect of normative mechanism and rainwater harvesting intention. The researchers recommend that policy makers and the government to consider correct reasoning (logic) for improving the intention to harvest rainwater on the relationship between coercive mechanism, mimetic mechanism and rainwater harvesting intention.

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References

- Aghaloo, K., & Chiu, Y. (2020). Identifying optimal sites for a rainwater-harvesting agricultural scheme in Iran using the best-worst method and fuzzy logic in a GIS-based decision support system. *Water*. 04 July 2020. Retrieved from <https://doi.org/10.3390/w12071913>
- Ahopelto, L., Veijalainen, N., Guillaume, J. H. A., Keskinen, M., Marttunen, M., & Varis, O. (2019). Can there be water scarcity with abundance of water? Analyzing water stress during a severe drought in Finland. *Sustainability*. 2019; 11(6):1548. <https://doi.org/10.3390/su11061548>. Retrieved from <https://www.mdpi.com/2071-1050/11/6/1548>
- Akroush, S., Dehehbi, B., Dessalegn, B., Al-Hadidi, O., & Abo-Roman, M. (2017). Factors affecting the adoption of water harvesting technologies: A case study of Jordanian Arid area. *Sustainable Agriculture Research*; 6(1),80-89. DOI: 10.5539/sar.v6n1p80. Retrieved from <https://www.ccsenet.org/journal/index.php/sar/article/view/65140>
- Bessah, E., Donkor, E., Raji, A. O., Taiwo, O. J., Ololade, O. O., Strapasson, A., Amponsah, S. K., & Agodzo, S. K. (2022). Factors affecting farmers' decision to harvest rainwater for maize production in Ghana. *Frontiers in water*. 28 September 2022. Retrieved from <https://doi.org/10.3389/frwa.2022.966966>
- Boncz, I. (Ed.). (2015). *Introduction to research methodology*. Pecs, Hungary: Hungarian Government.
- Brough, P. (Ed.). (2019). *Advanced research methods for applied psychology: Design, Analysis and reporting*.

- New York: Routledge.
- Campisano, A., Butler, D., Ward, S., Burns, M. J., Friedler, E., DeBusk, K., Fisher-Jeffes, L. N., Ghisi, E., Rahman, A., Furumai, H., & Han, M. (2017). Urban Rainwater harvesting systems: Research, implementation, and future perspectives. March 2017. DOI:10.1016/j.watres.2017.02.056. Retrieved from <https://pubmed.ncbi.nlm.nih.gov/28279940/>
- Canavari, M. Medici, M. Wongprawmas, R. Xhakollary, V., & Russo, S. (2021). A path model of the intention to adopt variable rate irrigation in Northeast Italy. *Sustainability*. DOI:org/10.3390/su13041879. Retrieved from <https://www.researchgate.net/publication/349186217>
- Castier, M., & Barreto, P. B. (2023). Economic attractiveness of domestic rainwater harvesting in Brazilian cities. *Discover Water*. 01 June 2023. Retrieved from <https://doi.org/10.1007/s43832-023-00033-1>
- Cohen, L., Monion, L., & Morrison, K. (2018). *Research methods in education* (8th Edition). New York, NY: Routledge.
- Creswell, J. W., & Clark, V. P. (2018). *Designing and conducting mixed methods research* (3th edition). California: Sage Publications, Inc.
- Dismas, J., Mulungu, D. M. M., & Mtaló, F. W. (2018). Advancing rainwater harvesting as a strategy to improve water access in Kinondoni municipality, Tanzania. *Water Science & Water Technology*, 18(3), 745–753. Retrieved from <https://www.researchgate.net/publication/322427855>
- Donohue, M. J., Macomber, P. S. H., Okimoto, D., & Lerner, D. T. (2017). Survey of rainwater catchment use and practices on Hawaii Island. *Journal of Contemporary Water Research and Education*. August 2017, (161) 33- 47. Retrieved from <https://seagrant.soest.hawaii.edu/wp-content/uploads/2018/05/JC-15-04.pdf>
- Field, A. (2019). *Discovering statistics using IBM SPSS statistics* (5th edition). New Delhi, Sage.
- George, D. & Mallery, P. (2019). *IBM SPSS statistics 25 step by step: A simple guide and Reference* (15th edition). New York, NY: Routledge.
- Ghoojdjani, A. (2022). *IBM SPSS statistics base 28 at home*. Retrieved from <https://www.researchgate.net/publication/361091495>
- Hayes, A. F., (2018). *Introduction to Mediation, Moderation, and conditional process analysis: A regression-based approach* (2nd edition). New York, NY: The Guilford Press.
- Iqbal, I. (2023). Assessing the environmental impact of water borehole drilling. *Environmental pollution and climate change*. 7(5), 353. Retrieved from <https://www.omicsonline.org/archive/epcc-volume-7-issue-5-year-2023.html>
- Johnson, R. B. & Christensen, L., (2014). *Educational research, quantitative, qualitative, and mixed approaches* (5th edition). California: Sage Publications, Inc. Khatakho, R., & Koju, N. (2017). Rainwater harvesting (RWH) technique: An alternative way to irrigation in arid and semi-arid regions (ASARs). August 2017. Retrieved from <http://www.researchgate.net/publication/324803601>
- Kumar, R. (2019). *Research methodology: A step by step for beginners* (5th edition). New Delhi: Sage Publications Asia-Pacific Pte Ltd.
- Latif, B., Mahmood, Z., San, O. T., Said, R. M., & Bakhsh, A. (2020). Coercive, normative, and mimetic pressures as drivers of environmental management accounting adoption. *Sustainability*, 12(11), 1-14. Retrieved from <https://www.mdpi.com/2071-1050/12/11/4506>
- Luciani, R., & Budimansyah, D. (2022). The effect of rainwater harvesting movement on social care of citizens (Case study at Harapan Jaya Kalidoni Housing in Palembang). *Advances in social science, education and humanities research, volume 636* (333-338). Retrieved from <https://www.atlantispress.com/proceedings/acec-21/125969011>
- Lutta, A., I., Wasonga, O., V., Nyangito, M., M., Sudan, F., K., & Robinson, L., W. (2020). Adoption of water harvesting technologies among agro-pastoralists in semi-arid rangelands of South Eastern Kenya. *Environmental Systems Research*. Retrieved from <https://doi.org/10.1186/s40068-020-00202-4>
- Masifia, Y. Y., & Sena, S. O., (2017). Factors influencing water resource governance among the pastoral community at Mkondoa sub-catchment, Morogoro region, Tanzania. *International Journal Of Scientific & Technology Research*, 6(6), 148-172. Retrieved from <https://www.ijstr.org/paper-references.php?ref=IJSTR-0617-17068>
- Matimolane, S., Strydom, S., Mathivha, F. I., & Chikoore, H. (2023). Determinants of rainwater harvesting practices in rural communities of Limpopo Province, South Africa. *Water Science*. 37(1), 276 – 289. Retrieved from <https://doi.org/10.1080/23570008.2023.2244784>
- Mfinanga, F. A., Msuya-Bengesi, & Madaha, R. M. (2023). Water use strategies for livestock by Pastoralists: The case of semi-arid areas in Monduli District, Arusha Region, Tanzania. *African Journal of Climate Change and Resource Sustainability* 2(1), 1-2. Retrieved from <https://doi.org/10.37284/ajccrs.2.1.1085>
- Sarstedt, M. & Mooi, E. (2019). *A concise guide to market research: The process, data, and methods using IBM SPSS statistics* (3rd edition). Berlin, Germany: Springer.
- Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research methods for business students* (8th edition). Italy:

- Pearson Education Limited.
- Sekaran, U. & Bougie, R. (2016). *Research Methods for Business: A skill-building Approach, 7th edition*. Chichester: John Wiley & Sons Ltd.
- Shanmugavel, N., & Rajendran, R. (2022). An investigation on the adoption of rainwater harvesting based on the theory of planned behaviour and norm activation model. *Research Square*. 08 March 2022. Retrieved from <https://doi.org/10.21203/rs.3.rs-864219/v1>
- Wang, H., Lu, X., Hu, C. & Wang, H. (2022). Institutional pressures and servitization paradox: The moderating effect of organizational identity orientations 13 June 2022. Retrieved from <https://doi.org/10.3389/fpsyg.2022.901732>
- Yan, S., Almandoz, J. J., & Ferraro, F. (2021). The impact of logic (In) compatibility: Green investing, state policy, and corporate environmental performance. *Administrative Science Quarterly* 66(4) 1-42. Retrieved from <https://doi.org/10.1177/00018392211005756>