

We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

5,600

Open access books available

137,000

International authors and editors

170M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?
Contact book.department@intechopen.com

Numbers displayed above are based on latest data collected.
For more information visit www.intechopen.com



Community Attachment and Environmental Stewardship: A Peri-Urban Perspective

Lazaro Eliyah Mngumi and Yonggui Chen

Abstract

This Chapter questions the negligence of attachment scholarship in the context of environmental stewardship with a specific focus in peri-urban areas. This Chapter has illuminated the imperatives of considering place attachment as an important factor in realizing environment stewardship in peri-urban areas. Three selected hamlets (*Nzasa, Kisarawe and Pugu-Kibaoni*) constitute the study area. A standard closed-ended questionnaire for assessing the extent of attachment of the community was deployed. Literature review on the other hand was used to map baseline information of the study area including the historical significance of the Pugu and Kazimzumbwi forest reserves. Three attachment attributes were explored; community knowlegiability levels of the area; level of thoughts and feelings of the area; and the extent of community connection to natural resources in the area. It was revealed that the extent of community connection to the forest reserves are relatively strong. The study revealed considerable contrast on forest knowlegiability levels among men and women in the Pugu and Kazimzumbwi forest reserves. Males are generally revealed to be more knowlegiable of the Pugu and Kazimzumbwi forest reserves as compared to their female counterparts. The study revealed that there was substantial relationship between residence status and the level of thoughts and feelings on the forest reserves. The study has shown that natives have more thoughts and feelings of the present and the future of the forest reserves as compared to those who migrated from other parts of the country. The findings suggest that community attachment is of considerable importance in influencing environmental behavior either positively or negatively. Whilst the empirical evidence are drawn from the peri-urban areas of Pugu and Kazimzumbwi forest reserves of Dar es Salaam city, the message thereof is representing a broad reality in the peri-urban areas of the Global South. The inclusion of community attachment perspective in negotiating environmental stewardship is advocated for as it might contribute in addressing the growing degradation of natural resources in peri-urban areas which has been increasingly declining.

Keywords: natural resource degradation, global south cities, extent of community connection, knowlegiability levels, thoughts and feelings

1. Introduction

There has been increasing encroachment of the Pugu and Kazimzumbwi forest reserves in recent years. The encroachment has been alarming to the point of threatening the depletion of the forest reserves in the near future. At the same time,

studies on land cover changes at the said forests have shown substantial decrease of land cover over the years [1]. This has led to the substantial decline of forest ecosystem goods and services including decrease of water volume on rivers such as nyeburu, decrease of water level on dams (Minaki), decrease of forest products such as honey, wild fruits; rainfall and temperature variability and decrease in crop yields (*Ibid*). Notably, increasing number of studies have recommended interventions geared at altering livelihood strategies of the forest adjacent community as part of the solution to the problem of forest encroachment and its associated ill-effects. While the issue of livelihood is crucial in addressing the problem in question there are other underlying behavior related concerns to be taken on board for realizing a more holistic solution. Place attachment is one of the behavior related concept linked to community attitudes and behavior which affects positively or negatively community actions towards their surrounding environment. Notably, place attachment concept has been increasingly applicable both theoretically and empirically in rural settings as opposed to urban and peri-urban contexts [2]. While the amount of time one has stayed in a given locale partly explains the limited attachment research in peri-urban areas, this is an area worth scholarly attention. The need for urgent attachment scholarship in peri-urban areas owes to the increasing degradation of natural resources especially in the Global South. Peri-urban being inhabited by a mixture of migrant populations and pressured by urban externalities poses unique attachment characteristic features in the context of environmental stewardship unlike the urban counterparts. This chapter therefore questions the negligence of attachment scholarship in the context of environmental stewardship in peri-urban areas. The chapter illuminates the imperatives of attachment scholarship in peri-urban areas by examining the community attachment to the Pugu and Kazimzumbwi forest reserves and so establish whether the increasing encroachment is partly attributed to the extent of attachment.

2. Theoretical perspectives

2.1 Place, place attachment and environmental stewardship

Place concept is an increasingly contested concept across disciplines including positivistic scholars, social constructivism and psychometrics. In a review of place literature Low and Altman [3], established that as space is an integrating concept, there is no systematic theory of place and scholars have increasingly echoed lack of conceptual coherence in place research. The concept of place broadly connotes to the subjective experience of embodied human experience in the material world [4]. Morgan argues further that place concept is paradoxical, with meaning that is not readily understood, but difficult to define. While understanding place is a step towards comprehending place attachment, this chapter is about place attachment and its implicative to environmental stewardship in peri-urban areas. The next paragraphs of this Section therefore narrow down to the conception of place attachment and its interlinkages to environmental stewardship behavior.

Place attachment is defined as an attitude of bonding (trust and belonging), mutual concerns and shared values with other members of one's group or locale' [5]. "... Place attachment may contribute to the formation, maintenance and preservation of the identity of a person, group, or culture. And it may also be that place attachment plays a role in fostering individual, group and cultural self-esteem, self-worth, and self-pride" [3]. Place attachment is also assumed to be of importance to the community since it facilitates engagement in local affairs [6]. Studies variously justify that place attachment motivates individuals to contribute

to civic activity on behalf of one's residential location, in the form of sustainable behavior [7, 8], ecological behaviors [9] or reactions to encroachment of one's territory [10, 11]. On this basis, place attachment serves both the individual and large community [6]. Place attachment has also been correlated to community resilience building processes [12] and fostering local friendship [13].

2.2 Peri-urban in the context of environmental stewardship

Situating the peri-urban concept is largely a daunting endeavor. This owes to its increasingly contested milieu by both academia and development practitioners [14, 15]. This Section reviews the conceptual contestation of peri-urban not in the sense of engaging in the debate of its contestations but for understanding its complex nature towards realizing environmental stewardship. The remainder of this Section therefore provide the contested environment and deployed discussion of the peri-urban concept, thereby its linkage to environmental stewardship and to the broad landscape planning discourse.

Broadly, the peri-urban concept is variously and increasingly viewed and conceptualized across both the geographical and disciplinary niches. Arguments behind the multiple conceptions of the peri-urban include lack of scientific definition (Forsyth [15]), diversity of engaged disciplinary orientations (Thuo [14]), the difficulties linked to the delimiting the spatial extent of this dynamic region (Brook [16]) and the equivocation of the concept itself. Notably, scholars increasingly argue that rural, peri-urban and urban environments operate as a system rather than independent entities [17, 18]. At the same time, peri-urban area is increasingly claimed to constitute the intersection point between urban and rural areas [19, 20]. In nutshell, there are growing yet converging understandings within academia on the lived reality of the diverse and context-laden definitions of the peri-urban concept [21]. Another converging understanding linked to peri-urban conception is the co-existence of urban and rural features within cities and beyond their limits [17, 21]. Notably, inspired by the aforementioned converging understandings, this chapter adopts the conception of peri-urban as defined by Mngumi [22], i.e. peri-urban is a city transitional zone, amalgamating both urban and rural landscape functions and features. In addition to the conceptual definition, the empirical materials discussed herein are drawn from the Pugu and Kazimzumbwi forest reserves at the peri-urban of Dar es Salaam city. Dar es Salaam is among the most rapidly growing cities in Africa and currently the business capital of Tanzania. Similar to other peri-urban areas in the Global South [23], natural resources and/ecosystem services in these peri-urban forest reserves are increasingly claimed to deteriorate [22].

Literature has increasingly established that the quantity and quality of natural resources are deteriorating in peri-urban areas, and particularly so in Sub-Saharan Africa [23, 24]. One explanation behind the decline of natural resources in peri-urban areas is the ongoing urbanization which has increasingly resulted in the expansion of the built environment on ecologically sensitive land, especially in peri-urban areas [25–27]. Another explanation of the growing degradation of natural resources in peri-urban areas in Sub-Saharan Africa is the rapid urbanization due to poverty [28, 29]. The poverty aspect which is largely prevalent in the Global South context renders it difficult for the community members to inculcate the environmental stewardship habit. This is due to the fact that their livelihoods are intricately connected to the resources in their vicinity and so despite having strong natural attachment to the environment, this is compromised by livelihood hardships and as a result leading to low stewardship to the environment. Notably, there is a host of other contributing factors to the decline of natural resources at the peri-urban areas of Pugu and Kazimzumbwi forest reserves. These include climate change, the

increase of anthropogenic activities and the expansion of the city's built area to the peri-urban areas [22].

3. Materials and methods

3.1 Case description

The Pugu and Kazimzumbwi Forest Reserves (PKFR), adjacent to the city of Dar es Salaam in Tanzania (**Figure 1**) forms the area where this study was carried

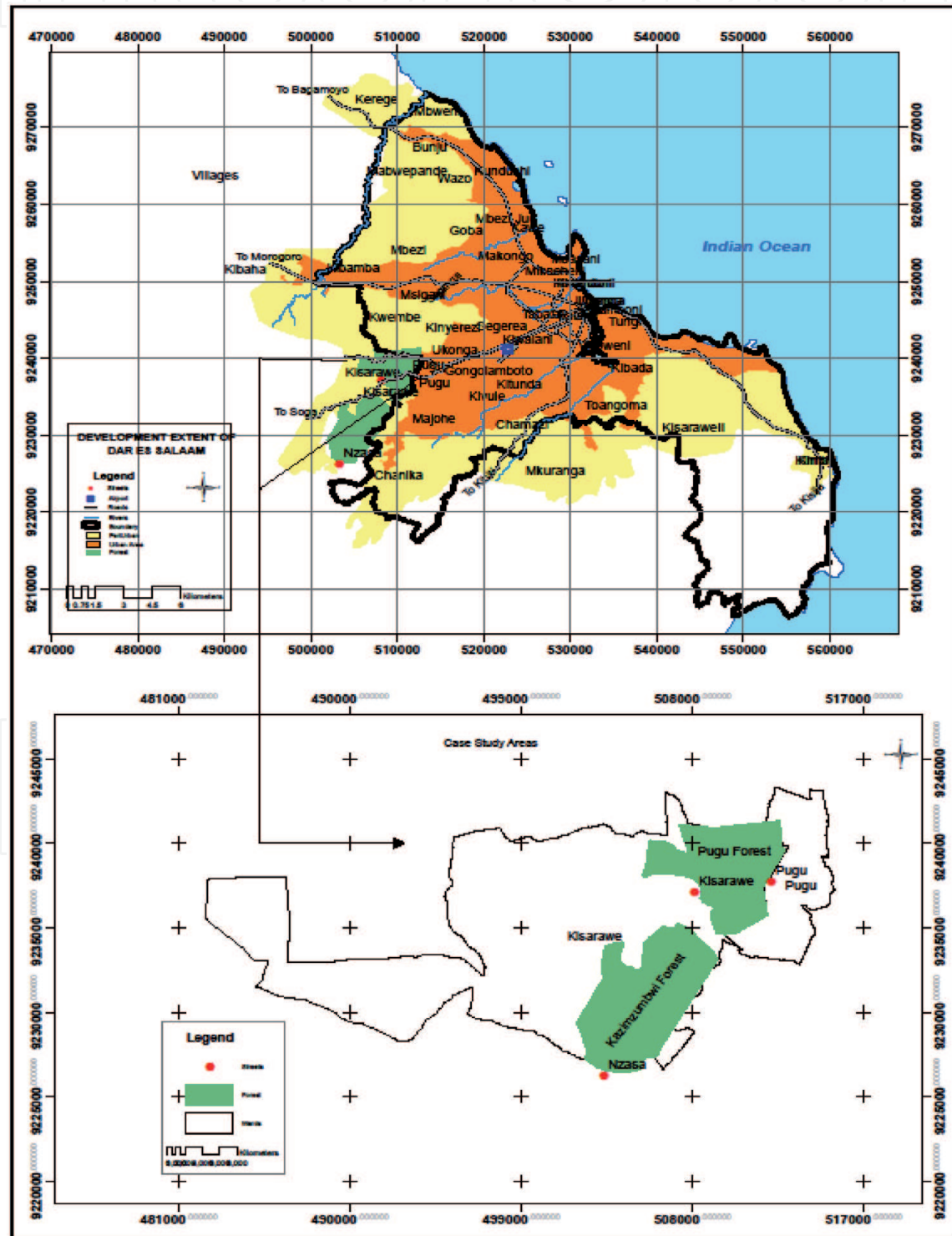


Figure 1. Pugu and Kazimzumbwi forest reserves, Tanzania. Source: Erimina Massawe, Ardhi university 2019.

out. Administratively, the PKFRs are under the jurisdiction of both districts i.e. Kisarawe district found in Coast region and Ilala district found in Dar es Salaam region; both regions are located along the coastal belt of Tanzania. Historically, the two forest reserves are of global importance as they provide habitats to 37 endemic vertebrate species and about 554 endemic plants [30]. These forests are remnants of few ancient forests in the world, and form the catchment sites for a good number of rivers namely; Msimbazi, Mambizi, Mzumbwi, Vikongoro, Kimani, Nzasa and Nyeburu [1, 31]. Pugu forest gazetted as a forest reserve in the year 1954 lies in the northeastern part of the Pugu Hills, about 25 km southwest of Dar es Salaam and 20 km from the Indian Ocean, and it is positioned adjacent to the Kazimzumbwi Forest Reserve gazetted in the year 1936 [32].

The Indian Ocean tropical monsoon climate is influencing the rainfall and temperature characteristics of both forests. The two forests are characterized by bimodal rainfall pattern i.e. long rains between late March and early June typically known as Masika and short rains between October and December typically known as Vuli. The rainfall in the area i.e. (Pugu and Kazimzumbwi forests) is averaging at approximately 1,100 mm per year whereas Temperature is ranging from 24 to 31° proportional to elevation [32, 33]. In terms of topography, the two forests (Pugu and reserves are positioned between 100 and 305 and 120–280 metres above the sea level respectively [31].

The survey was done in three sub-wards, two of them are located adjacent to the Pugu forest reserve i.e. Pugu-Kibaoni and Kisarawe and the third sub-ward namely; Nzasa is located adjacent to the Kazimzumbwi forest reserve (**Figure 1**). The selection of the three study sub-wards was purposively done so as to capture the possible diversity on attachment discourse in the Pugu and Kazimzumbwi forest reserves.

3.2 Methods

Case study, an imperative approach in characterizing local state of the art on ecosystem services [34] was deployed. Household survey comprise the technique deployed in collecting field data. This was realized through household questionnaire which served as a tool in collecting data on various attributes regarding community attachment to the Pugu and Kazimzumbwi forest reserves and its associated ecosystem services. A standard closed-ended questionnaire for assessing the extent of attachment of the community was deployed. The questionnaire contained 5 score likert scale questions. Literature review on the other hand was used to map baseline information of the study area including the historical significance of the Pugu and Kazimzumbwi forest reserves. A total of fifty (50) questionnaires were randomly administered in each of the study sub-ward amounting to a total of one hundred and fifty (150) in the entire study area.

Interview consent was requested to all participants from the three study sub-wards, this was done so as to be able to proceed with the interview smoothly. This was done so as to comply with ethical requirements. The household interview through structured (close-ended) questionnaire took place after three days training enumerators. The training was purposed at making sure that the main themes of the questionnaire and the specific questions and likely response from the interviewees/respondents are apparently clear among the enumerators. This procedure was crucial as enumerator's work involved asking questions to respondents, providing clarification in case the question (s) becomes not so clear to respondents and thereafter fill the questionnaire after capturing response from interviewees/respondents. This was again important since it ensured maximum response as some respondents could not read and right. Furthermore, at every

evening of the field work, a brief assessment with enumerators was held regarding the work of the day including cross checking the way questionnaires have been filled and planning for the day ahead. This was necessary to check the work progress and address the challenges if any for ensuring validity of the data collected. Data analysis was done through SPSS and excel software. The analysis was dominated by descriptive statistics whereby the findings in terms of barcharts and pie charts showing distribution of various attributes on attachment were produced.

4. Results and discussion

This section presents the findings on both respondents characteristics and the findings on community attachment on the Pugu and Kazimzumbwi forest reserves. The section starts by describing the demographic characteristics followed by attachments to the forests reserves of Pugu and Kazimzumbwi.

4.1 Selected participants' characteristics

Participants of this study included 150 randomly selected adults 18 through 82 of age with the mean age of 42.8 and (S.D = 17.9, 58 female); 83 were natives, 51 were migrants from the capital Dar es Salaam and 13 were migrants from upcountry. The participants were included from three sub-wards surrounding the Pugu and Kazimzumbwi forest reserve in order to capture hybrid and diverse attributes on attachment to the reserves. Each sub-ward had 50 participants in the survey. The main characteristics of participants are summarized in **Table 1**.

4.2 Community attachment to forest reserves in Pugu and Kazimzumbwi forest reserves

The aspect of community attachment to the forest reserve were assessed through household survey via a number of questions as detailed in the following section (s).

Respondent's characteristics		Male		Female		Total	
		N = 92	%	N = 58	%	N = 150	%
Education status	Primary or less	67	72.8	53	91.4	120	80
	Secondary	21	22.8	4	6.9	25	16.7
	High school	1	1.08	0	0	1	0.7
	Certificate and above	3	3.3	1	1.72	4	2.7
Residence status	Native	47	51.1	36	62.1	83	53.3
	Migrant from DSM	36	39.1	18	31.0	51	34
	Migrant from upcountry	9	9.7	4	6.8	13	8.6
Geographic location	Nzasa	22	23.9	28	50.9	50	33.3
	Pugu-Kibaoni	36	39	14	25.5	50	33.3
	Kisarawe	34	36.9	16	27.6	50	33.3

Source: Field work, 2018.

Table 1.
Selected characteristics of participants.

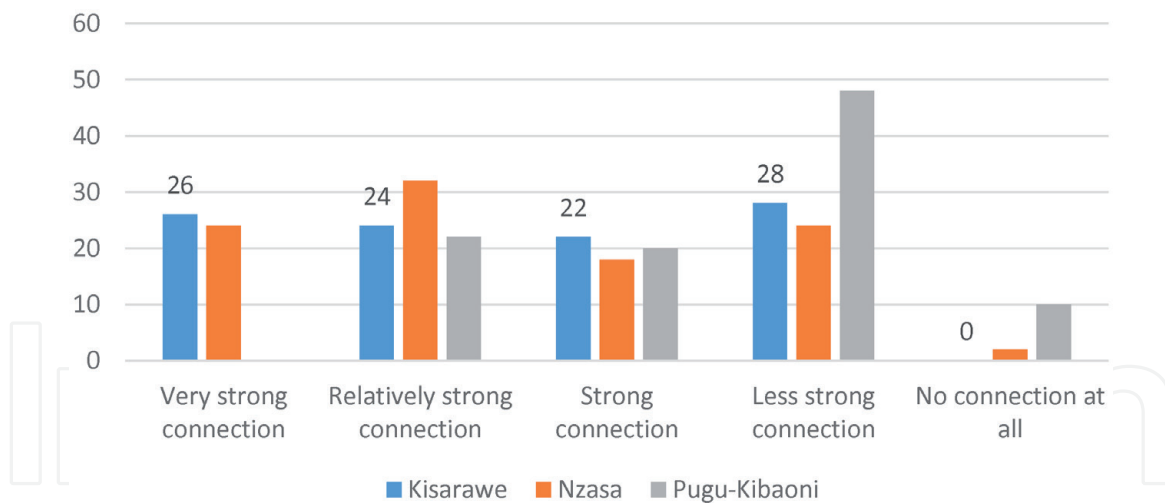


Figure 2.
 Extent of connection to the forest reserves (%; N = 150). Source: field work 2018.

4.2.1 Extent of connection to the forest reserves

Figure 2 presents findings on the extent of community connection to the Pugu and Kazimzumbwi forest reserves. Generally; the extent of connection to the forest reserves are more or less similar between Nzasa and Kisarawe sub-wards. About a quarter (1/4) of respondents in these two sub-wards had shown relatively strong connection to the Pugu and Kazimzumbwi forest reserves. At the same time, Pugu-kibaoni sub-ward has outweighed the two sub-wards by having high percentage scores on less strong connection to the reserves. At Pugu-Kibaoni sub-ward, about half (1/2) of the respondents casted their scores on less-strong connection and a tenth (1/10) had their scores on no-connection at all to the forest reserves. The reason for Pugu-Kibaoni having considerable low level of connection to the reserves is due to the fact that the area is located near to the city as compared to the other two sub-wards. This being the case the livelihoods of the majority of its dwellers are not directly linked to the forest reserves as they engage mostly in trade and small business activities. This is backed up by the correlation analysis between the extent of connection to the forest reserves and the extent of one's life attachment to the forest reserves. This had a correlation score of 0.5 testifying that there is a considerable linkage between one's connection to the forest reserves and the connection of an individual's life to the forest reserves.

On the other hand the factors behind community attachment to the forest reserves were gathered during focus group discussion (FGD) in all the three sub-wards. One of the autspoken reason for having strong connection to the Pugu and Kazimzumbwi forest reserve is the issue of livelihood connection with the forest reserves. During the FGDs it was underscored that a good proportion of the dwellers in areas at the vicinity of the forest reserves owes their living in the same. The activities in the forest reserves that derive a living to forest adjacent communities includes charcoal making and selling, timber business, fire wood fetching/cutting and selling, bee keeping and collecting other forest products such as medicene (herbs) and wild fruits. One participant in a FGD at Kisarawe had these to say ...

...I have been depending on the forest for earning a living for almost my entire life. This has made my life to be strongly connected to the forest reserves. This is the reason why I feel like I can not afford to live without these forest reserves. Nowadays there are some restrictions on how to access the reserves but I know how to find my way through the forest without ending up in the hands of those with authorities...

4.2.2 Knowledge of the Pugu and Kazimzumbwi forest reserves

The question of whether the community members were knowledgeable of the forest reserves was also asked in the course of establishing the level of community attachment. The findings on knowledgeability levels on Pugu and Kazimzumbwi forest reserves which partly tells on their attachment as summarized **Figure 3**. The levels of knowledgeability was analyzed against sex of respondents.

The study revealed considerable contrast on forest knowledgeability levels among men and women in the Pugu and Kazimzumbwi forest reserves. Accordingly; males are generally revealed to be more knowledgeable of the Pugu and Kazimzumbwi forest reserves as compared to their female counterparts (**Figure 3**). Whereas a third (1/3) of female respondents were deduced to be less knowledgeable of the Pugu and Kazimzumbwi forest reserves, about a third (1/3) of males claimed to have complete knowledge of the reserves. The sex difference on knowledgeability on forest reserves also featured during the FGDs. It was explained that most men could get along the forest reserves with easy as compared to men. In a FGD at Nzasa, one female participant in a FGD expressed herself this way...

...In this forest reserve (Kzimzumbwi forest resrve) although both male and female access the reserves for gendered distinguished interests, males are more familier with the forest reserve. This is partly because men spends more time in the forest extract-ing resources for the living as compared to women....

The variable of knowledgeability of the forest reserves was further correlated with the variable ' I know where all the paths leads to'. The correlation score for the two variables was 0.8 signifying that there were strong relationship between general knowledgeability of the forest reserves and the knowledge of where paths leads to in the forest reserve.

4.2.3 Thoughts about the present and the future of the forest reserves

Thoughts and feelings about the present and future of something tells the extent at which one is linked and/attached to the same. In this regard, the feelings and/thoughts about the present and the future of the Pugu and Kazimzumbwi forest reserves by the adjacent communities were examined. The findings on

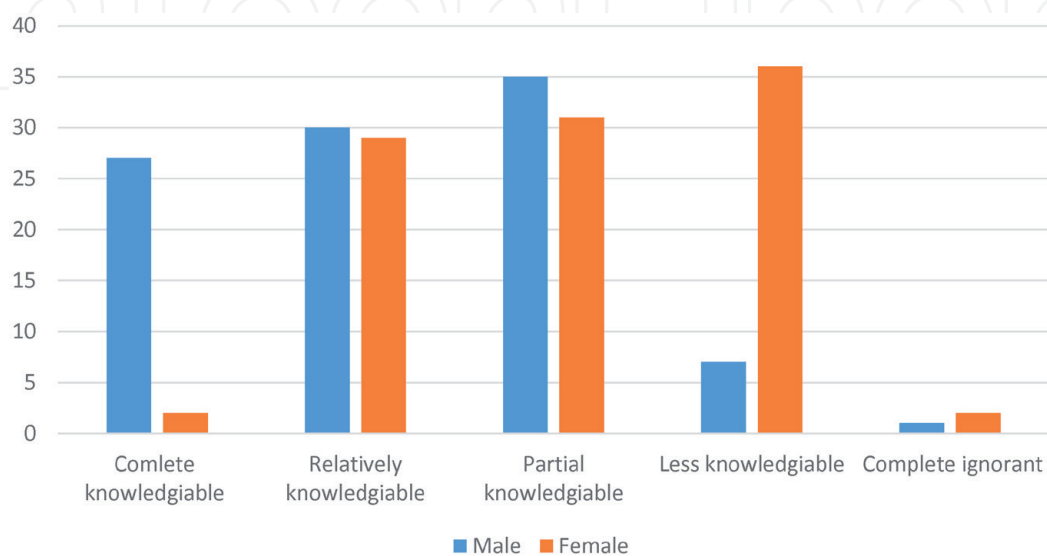


Figure 3. Knowledge of the forest reserves by the community (%: N = 150). Source: Field work 2018.

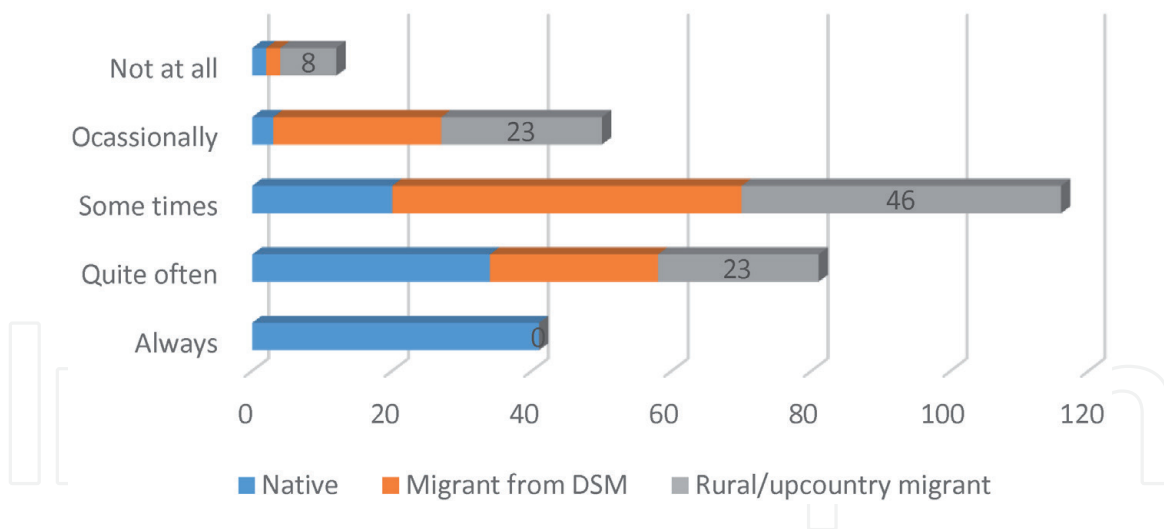


Figure 4. Present and future thoughts about the forest reserves (%: N = 150). Source: field work 2018.

Figure 4 summarizes the status-quo on thoughts and feelings about the present and the future of the forest reserves.

The analysis on community thoughts and feelings about the present and the future of the forest reserves were done against the residence status. The study revealed that there was substantial relationship between residence status and the level of thoughts and feelings on the forest reserves. In nutshell, the study has shown that natives have more thoughts and feelings of the present and the future of the forest reserves as compared to those who migrated from other parts of the country. More than a third (1/3) of the natives claimed to *always* think about the present and the future of the forest reserves and there was none of the migrants who always had a thought about the present or the future of the forest reserves. On the other hand about half of the migrants from Dar es Salaam and those from upcountry had *some times* thought regarding the present and the future of the Pugu and Kazimzumbwi forest reserves. These findings on thoughts of the present and the future of the Pugu and Kazimzumbwi forest reserves suggests that the more one stays with a natural resource the more one becomes with feelings and thoughts about their present and their future prospects. This in turn tells on the extent at which one is attached to the particular resource and in this case the Pugu and Kazimzumbwi forest reserves.

5. Conclusion

This chapter questions the negligence of attachment scholarship in the context of environmental stewardship with a specific focus in peri-urban areas. Peri-urban being inhabited by a mixture of migrant populations and pressured by urban externalities poses unique attachment characteristic features in the context of environmental stewardship unlike the urban counterparts. This chapter has illuminated the imperatives of considering place attachment as an important factor in realizing environment stewardship in peri-urban areas. Whilst the empirical evidence are drawn from the peri-urban areas of Pugu and Kazimzumbwi forest reserves of Dar es Salaam city, the message thereof is representing a broad reality in the peri-urban areas of the Global South. The inclusion of community attachment perspective in negotiating environmental stewardship is advocated for as it might contribute in addressing the growing degradation of natural resources in peri-urban areas which has been increasingly declining. Researchers and policy makers alike should take

this up by including a focus on community attachment in the course of forging environmental stewardship in these transitional spaces in the Global South. This will in turn contribute to increase environmental welfare and reduce the growing degradation of natural resources in peri-urban areas.

IntechOpen

Author details

Lazaro Eliyah Mngumi^{1,2*} and Yonggui Chen³

1 Institute of Human Settlements Studies (IHSS), Ardhi University, Dar es Salaam, Tanzania

2 Faculty of Natural Resources and Agricultural Sciences, Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden

3 College of Landscape and Arts, Northwest A&F University, Yangling, China

*Address all correspondence to: lazaromngumi@gmail.com

IntechOpen

© 2021 The Author(s). Licensee IntechOpen. This chapter is distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/3.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. 

References

- [1] Lupala, J.M., M.V. Mdemu, and S.P. Butungo, Effects of peri-urban land use changes on forest ecosystem services: the case of settlements surrounding Pugu and Kazimzumbwi Forest Reserves in Tanzania. *Journal of Geography and Geology*, 2014. 6(4): p. 231.
- [2] Raymond, C.M., G. Brown, and D. Weber, The measurement of place attachment: Personal, community, and environmental connections. *Journal of environmental psychology*, 2010. 30(4): p. 422-434.
- [3] Low, S.M. and I. Altman, Place attachment, in *Place attachment*. 1992, Springer. p. 1-12.
- [4] Morgan, P., Towards a developmental theory of place attachment. *Journal of environmental psychology*, 2010. 30(1): p. 11-22.
- [5] Perkins, D.D., J. Hughey, and P.W. Speer, Community psychology perspectives on social capital theory and community development practice. *Community Development*, 2002. 33(1): p. 33-52.
- [6] Lewicka, M., Ways to make people active: The role of place attachment, cultural capital, and neighborhood ties. *Journal of environmental psychology*, 2005. 25(4): p. 381-395.
- [7] Uzzell, D., E. Pol, and D. Badenas, Place identification, social cohesion, and environmental sustainability. *Environment and behavior*, 2002. 34(1): p. 26-53.
- [8] Guàrdia, J. and E. Pol, A critical study of theoretical models of sustainability through structural equation systems. *Environment and Behavior*, 2002. 34(1): p. 137-149.
- [9] Vorkinn, M. and H. Riese, Environmental concern in a local context: The significance of place attachment. *Environment and behavior*, 2001. 33(2): p. 249-263.
- [10] Kyle, G., et al., Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of environmental psychology*, 2004. 24(2): p. 213-225.
- [11] Warin, M., et al., The power of place: space and time in women's and community health centres in South Australia. *Social Science & Medicine*, 2000. 50(12): p. 1863-1875.
- [12] García, I., F. Giuliani, and E. Wiesenfeld, Community and sense of community: The case of an urban barrio in Caracas. *Journal of Community Psychology*, 1999. 27(6): p. 727-740.
- [13] Perkins, D.D., et al., Participation and the social and physical environment of residential blocks: Crime and community context. *American journal of community psychology*, 1990. 18(1): p. 83-115.
- [14] Thuo, A.D.M., Unsettled Settled Spaces: Searching for a Theoretical 'Home' for Rural-Urban Fringes. *International Journal of Scientific and Research Publications*, 2013. . 3(7).
- [15] Forsyth, A., Defining Suburbs. *Journal of Planning Literature*, 2012. 27(3): p. 270-281.
- [16] Brook, R.M., *The Peri-Urban Interface Hubli-Dharwad, India Changing Frontiers*. Books for Change. 2001, Bangalore, India.
- [17] Allen, A.D., and Hofmann P, *Governance of Water and Sanitation Services for the Peri-urban Poor; A Framework for Understanding and Action in Metropolitan Regions*, U. Development Planning Unit, United Kingdom, 2006

- [18] Wandl, A. and M. Magoni, Sustainable Planning of Peri-Urban Areas: Introduction to the Special Issue. *Planning Practice & Research*, 2016. 32(1): p. 1-3.
- [19] Olujimi, J. and K. Gbadamosi, Urbanisation of Peri-Urban Settlements: A Case Study of Aba-Oyo in Akure, Nigeria, *The Social Sciences*, 2007. 2(1): p. 60-69.
- [20] Birkmann, J., et al., Adaptive urban governance: new challenges for the second generation of urban adaptation strategies to climate change. *Sustainability Science*, 2010. 5(2): p. 185-206.
- [21] Salem, M., Peri-urban dynamics and land-use planning for the Greater Cairo Region in Egypt. *Sustainable Development*, 2015. 168: p. 1109.
- [22] Mngumi, L., Climate change resilience: exploring socio-ecological system resilience for livelihood effects of climate change in peri-urban areas. 2021.
- [23] Roy, M.K., et al., Climate change and declining levels of green structures: Life in informal settlements of Dar es Salaam, Tanzania. *Landscape and Urban Planning*, 2017.
- [24] MEA, Ecosystem and human well-being: biodiversity synthesis. World Resources Institute, Washington, DC, 2005.
- [25] Kombe, WJ., Land use dynamics in peri-urban areas and their implications on the urban growth and form: the case of Dar es Salaam, Tanzania, *Habitat International*, 2005. 29(1): p. 113-135.
- [26] Marshall, F., Waldman, L., MacGregor, H., Mehta, L. and Randhawa, P., On the Edge of Sustainability: Perspectives on Peri-urban Dynamics, STEPS,. 2009.
- [27] Radford, K.G. and P. James, Changes in the value of ecosystem services along a rural–urban gradient: A case study of Greater Manchester, UK, *Landscape and Urban Planning*, 2013. 109(1): p. 117-127.
- [28] Kestemont, B., L. Frendo, and E. Zaccari, Indicators of the impacts of development on environment: A comparison of Africa and Europe. *Ecological indicators*, 2011. 11(3): p. 848-856.
- [29] Niemelä, J., et al., Using the ecosystem services approach for better planning and conservation of urban green spaces: a Finland case study. *Biodiversity and Conservation*, 2010. 19(11): p. 3225-3243.
- [30] Burgess, N.D., Global importance and patterns in the distribution of coastal forest species, in *Coastal Forests of East Africa*. 2000. p. 235-248.
- [31] TFCG, Two surveys of the plants, birds and forest condition of Pugu and Kazimzumbwi Forest Reserves in 2011 and 2012, T.T.P. 36, 2013.
- [32] Clarke, G. and A. Dickinson, Status Reports for 11 Coastal Forests in Coast Region, Tanzania Frontier-Tanzania Technical Report No. 17. The Society for, 1995.
- [33] Lupala, J. and C. Maglan, Climate change and its effects on livelihood strategies of peri-urban coastal communities in Tanzania. 2015.
- [34] Lamarque, P., et al., Stakeholder perceptions of grassland ecosystem services in relation to knowledge on soil fertility and biodiversity. *Regional environmental change*, 2011. 11(4): p. 791-804.