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MASTERS DISSERTATION

**Women and biodiversity conservation: Analyzing involvement of women in
conservation work in Rwanda**

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A dissertation submitted in fulfillment of the Award of Masters degree in
Biodiversity Conservation and Natural Resources Management by the University
of Rwanda, College of Sciences and Technology.

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April, 2023

DECLARATION

I declare that this research work entitled: “**Women and biodiversity conservation: Analyzing involvement of women in conservation work in Rwanda**” contains my own work except where specifically acknowledged and has not been submitted for any degree at University of Rwanda or any other institution.

This dissertation has been submitted for the partial fulfillment for the award of a Masters of sciences degree with honors in Biodiversity Conservation and Natural Resources Management, University of Rwanda.

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DEDICATION

This dissertation is dedicated to my lovely husband Mr. NYANDWI Sylvere and my lovely sons: DUSHIME NGABO Preston, MUCYO NGABO Brian and MPANO NGABO Allen and CYUZUZU NGABO Daxon.

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ABSTRACT

The field of conservation biology, a relatively new field of science, is driven by conservation professionals and practitioners trained in both field work and theory. Although the importance of female scientists in science and technology has been established, and women have been encouraged to attend courses related to science and technology at universities, women remain underrepresented in science fields, including conservation biology. In many African countries women are underrepresented in the professional field of biodiversity conservation but the reasons for this remain undocumented. Rwanda is a country that has made tourism based on wildlife a priority for national development, and recently established its fourth national park. However, women remain underrepresented in conservation fields in this country. The aim of this study was to explore and identify factors inhibiting women from holding conservation positions in Rwanda and predict the benefits or added values of having women in conservation beyond simply obtaining gender balance in conservation. Interviews were used to collect data from conservation organizations and academic institutions in Rwanda. I identified the five most important factors influencing low participation of women in conservation: reproductive roles, household responsibilities, lack of selfconfidence to perform conservation work, difficulties of field work involved in some conservation positions, and the fear of loss of confidence by her community when a woman spends much time in the field. Participants in this study proposed solutions that included finding ways to allow married women, and those with children, to have their office based close to their families to ensure they can take care of their family; and ensuring that breastfeeding and pregnant women are based in the areas which have access to healthcare, schools for children and other needed social infrastructures. Women should be educated and empowered to perform conservation work and this should be done from an early age, and women already in the conservation domain should encourage others to enter the conservation biology profession. Society should be educated as well, to promote a shift in perceptions that empowers women to spend time in conservation field work. Increasing the number of women in the conservation discipline in Rwanda and elsewhere could bring benefits to biodiversity conservation projects such as ensuring the sustainable conservation of biodiversity and having women contributing to conservation education for the entire family and future generation.

KEY WORDS: biodiversity conservation, gender roles, Rwanda, women

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ACRONYMS AND ABBREVIATIONS

ARECO: Association Rwandaise des Ecologistes

BIOCOOP: Biodiversity Cooperative

BLI: Birdlife International

CDI: Center for Development Innovation

HQ: Head Quarter

HR: Human Resources

KCCEM: Kitabi College for Conservation and Environmental Management

KRC: Karisoke Research Center

NGOs: Non Government Organisations

NNP: Nyungwe National Park

RDB: Rwanda Development Board

SAWISE : South Africa in making “South African Women in Science and Engineering

SPSS: Statistical Package for Social Science

UR: University of Rwanda

VNP: Volcanoes National Park

WCS: Wildlife Conservation Society

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1. INTRODUCTION

1.1. Background

Across the world, gender is defined in different ways: some define gender as a social construct that refers to relations between and among the sexes, based on their different roles (CI, 2012). Gender refers also to the differences constructed socially and relations between men and women that may vary according to situation, place, time and context, and which influence structure and decision making within communities, institutions and families (González, 2007). Literature on gender can be loosely divided into three orientations: the first one focuses on woman as a target group of people who have been ignored or marginalized in development efforts compared to men; the second is concerned with women as productive contributors to development but with incentives or constraints distinct from their male counterparts. The third focus, perhaps more recent, aims to address women's requirements as the reproducers in society (Scherr, 1994).

It seems that in every society, gender is reflected in social relations, roles, responsibilities, economic activities, and self-perceptions. Similarly, gender differences are noted regarding the access and benefit from different resources, along with gender differentials in the contribution labour and the exploitation and management of natural resources (Juma, 2010). Many studies have shown the importance of considering gender in biodiversity conservation and climate change adaptation (Juma, 2010). The conservation of biological diversity and natural resources is an important field of research and management and contributes to achieving the Sustainable Development Goals, yet the effectiveness of this field is constrained by gender biases and limited number of women involved professionally in some regions of the world.

In this study, conservation work is defined as any work related to biodiversity conservation and management in or outside of protected areas. In relation to biodiversity and natural resources, taking a gender perspective involves understanding and integrating the relations and differences between men and women into conservation projects. This includes the different roles, rights and opportunities of men and women concerning access, knowledge, use, management and conservation of natural resources. It also involves considering the different ways in which environmental degradation affects men and women (González, 2007). Regarding local knowledge,

men and women often possess different knowledge in the use of plant species; for example some men may have more knowledge on use of plants as construction materials while some women have more knowledge of medicinal plants (Casas, 2007). Regarding the use of natural resources and interactions with the environment, men and women may play different roles as their needs and priorities are different (CI, 2012). A study found that rescuing wildlife was attributed more to women than men in some countries (Agarwal, 2009). However, women usually have low representation in science courses at university including biodiversity conservation (Handelsman, 2005).

Recent studies have developed explanations for the low representation of females in science courses, including personal, cultural and political reasons (Threse, 2011). Fewer females attending higher levels of education leads to low representation of women in science fields and professional work such as teaching sciences at university, or practicing other science-related work at high levels (Threse, 2011). Women generally have few opportunities to participate in making environmental decisions and sometimes their perceptions are either not considered or ignored when making environmental policies (González, 2007). This lack of opportunities might be explained by the lack of or low level of schooling for women, or fewer women studying science fields, although there are more females attending schools than previously and this trend may change (Eslera et al., 2005).

The low participation of women in conservation work in particular has been noted by some researchers, who have argued that the more complicated logistics for women when they are required to attend workshops or trainings and must find child care may hinder their ability to take on different opportunities, including conservation opportunities such as creating connections which may bring them job opportunities or new skills which may help them to be promoted to new positions (González, 2007). To address the lack of women in conservation practices, it was suggested that women and men need to equally participate in conservation as the loss of biodiversity affects both men and women in different locations, ages, and education levels (Bechtel, 2010).

Indeed, there is a relation between gender and biodiversity conservation, and this relationship remains almost undocumented in Rwanda, a biodiversity hotspot where there are critical conservation issues to be addressed. The importance of female scientists in science and technology disciplines has been identified (King, 2005), but in Rwanda it has been noted that women are less represented in conservation work as reported by a gender scan produced by the Center for Development Innovation (CDI) based in Wageningen University, The Netherlands in collaboration with former Kitabi College for Conservation and Environmental Management, Rwanda (Klaver, 2012). The report showed that in national parks female employees comprised only 4.6% of ranger staff and only 18.6% of the tourist guides. The report also showed that among seven community conservation wardens working in three national parks, all were male. Within conservation NGOs, the same was observed: the Wildlife Conservation Society, a conservation organization operating in Nyngwe National Park, had only two female staff out of seven senior staff, and all the field staff were male. This report produced by CDI did not explore factors which might be behind this low participation of women in conservation work in Rwanda.

Of great relevance is Rwanda's gender policy which aims to increase representation of women in in different domains such as political and administration positions in an effort to achieve gender balance (cite the gender policy here). For example in the Rwandan parliament, at least 30% of the seats must be held by women. This has given a chance to women to participate in decision making at a high level for different development programs in Rwanda. Women in Rwanda have been given equal opportunity as men to attend schools, and the country promotes and encourages females to attend sciences and technology courses. However, the number of girls has been lower than the number of boys in conservation training programs and short courses (Klaver, 2012). Despite these progressive policies, it is unclear why few women have positions in the conservation domain in a country like Rwanda. In some countries, women are very active in environmental sectors including biodiversity conservation and their activism in this domain is well represented (Tindall, 2003). This is in contrast to the level of female participation in Rwanda which remains low. It is thus relevant to understand the factors which may influence the low participation of women in conservation work in Rwanda.

Research has shown that inclusion of women in conservation and natural resource management work can have positive outcomes. For example, a mix of men and women was found to be crucial

in the management of forests, especially for forest managed by communities (Agarwal, 2009). This finding emphasizes the importance of exploring reasons why women are not well represented in forest conservation in Rwanda. Women play a great role in promoting forest conservation in some countries (Agarwal, 2009); given the low participation of women in conservation work in Rwanda, it is relevant to assess and understand the challenges or factors which influence such low participation of women in conservation, where forest restoration and conservation are important priorities for the countr (MINIRENA, 2014))

The results from this research help to identify possible factors and challenges which may limit the presence of women in biodiversity conservation. As part of the research, the updated figures on female enrollement in higher learning institutions with conservation courses was assessed, as well as female employment statistics in conservation-based organizations. Based on results of the study, solutions have been proposed. This study also presents benefits or added values of having more women in conservation beyond striving for gender balance in conservation.

1.2. Research objectives and questions

The main objective of this research was to understand the role of women in biodiversity conservation work in Rwanda.

1.2.1 Specific objectives:

1. Assess the factors driving the low involvement of women in conservation work in Rwanda.
2. Predict the benefits or added values to conservation of having more women involved in conservation work.

1.2.2. Research questions

1. What are the factors influencing the low participation of women in conservation work in Rwanda?
2. Would there be an added value to conservation outcomes when more women participate in conservation work?

2. METHODS

2.1 . Study design

The study was limited to biodiversity conservation professional work and did not cover the entire environmental field. Data on employment of women in conservation work were gathered from the main conservation organizations in Rwanda. Stratified and purposive sampling were used and only targeted groups of people, not the general community, were included in the study. To respond to the questions of this study, individuals from the targeted organizations were interviewed. The organizations included academic institutions, government institutions and non-government organizations working in the conservation field. The interviews targeted the staff from different classes: National Park rangers, guides, and wardens were represented in this survey, as well as different academic institutions to understand why few women are represented in field work and office work. This study targeted institutions which operate in the conservation area, and respondents were selected based on their positions in their respective institutions to obtain opinions from different perspectives. As the research is only related to biodiversity conservation not the whole environment, the chosen institutions were the ones whose mission is focused on aspects of biodiversity conservation.

2.2 . Sample size

I included 68 interviewees in my study selected from eight institutions which deal with biodiversity conservation in Rwanda. To select individuals, I used both stratified and random sampling; I first selected the group/category of workers to interview and within the group I did random selection keeping in mind the balance between males and females. The original plan was to interview an equal number of males and females, but due to the low number of females in conservation institutions, it was not possible to have such equality.

Table 1: Sample size distribution and institutions included in the study

#	Institution	Mission statement	No. inter-viewed	Targeted people
1	Association Rwandais des Ecologistes (ARECO)	ARECO RWANDANZIZA seeks to promote a sound and pleasant environment for a sustainable social and economic development.	1	senior staff
2	Biodiversity Cooperative (BIOCOOP)	Build a Nation, Environ-Socio - Economically stable through our skills and our Resources	1	senior staff
3	Birdlife International (BLI)	The Birdlife Partnership strives to conserve birds, their habitats and global biodiversity, working with people towards sustainability in the use of natural resources.	1	senior staff
4	Karisoke Research Center (KRC)	Protect, educate, develop, learn	5	staff and field assistants
5	Kitabi College of Conservation and Environmental Management (KCCEM)	To develop capacity in conservation, tourism and environmental management in Rwanda and the wider Albertine rift Region.	8	students and lectures from wildlife management
6	Rwanda Development Board/Tourism and conservation (RDB)	To ensure the conservation of biodiversity in protected areas and to promote sustainable tourism.	30	senior staff, tourists guides, wardens and rangers/trackers

7	University of Rwanda/Conservation biology option (UR)	A world class university empowering national economic and social transformation through active participation in the global knowledge economy.	17	lecturers and students from MSc, PhD and Bsc in Biology
8	Wildlife Conservation Society (WCS)	Saves wildlife and wild places worldwide through science, conservation action, and inspiring people to value nature.	5	staff and field assistants
	Total		68	

2.3. Data collection using interview

Interviews were used to collect gender balance data from institutions and gather information about the perceptions of involvement of women in conservation work in Rwanda. Both open-ended questions and closed questions were used to gather data. Interviews were conducted with individuals and in isolation to avoid external interferences or biases. English was used to draft the guiding questionnaire and the same language was used for interviews except when the informants were not able to answer in English, for such case the mother tongue was used.

During the interviews information was also collected on possession and use of a gender policy by the institutions and female participation in recruitment for conservation positions for each institution included in the study, provided by a competent authority such as the human resources officer, administration officer or any person who had the needed information. The interviews also sought to understand whether a gender policy was used in decision making and office functioning.

2.4. Data analysis

The data were analyzed using SPSS software. I analyzed the factors influencing the low involvement of women in conservation and explored relationships among the factors and the participation of women in conservation work. I developed a scale showing the severity of different factors that interviewees identified that may be reasons why women are less represented in

conservation work in Rwanda. I ranked the potential solutions proposed by respondents which could be adopted to address the identified challenges.

3. RESULTS

I interviewed 68 individuals, including 23 females and 45 males from different institutions including government institutions, academic institutions and non-governmental organizations (Table 1).

3.1. Enrollment of women in conservation courses

Two higher learning institutions were contacted to assess the female enrollment in conservation courses: Kitabi College of Conservation and Environmental Management (KCCEM) which is now called IPRC-Kitabi, focusing on the wildlife management diploma program, and University of Rwanda (UR), undergraduate programs (conservation options), MSc program (biodiversity conservation and natural resource management) and Phd students in Biology Department. Female participation was 37.6% (n=130) in conservation biology programs at University of Rwanda and 30% (n= 26) in wildlife management at KCCEM.

3.2. Female employment in conservation organizations

Regarding female employment in conservation organizations in Rwanda, 15% of staff were female in the eight organizations I studied (all departments combined). When I compared female employment in conservation departments with support departments, I found only 10% of females in conservation department staff while in support departments such as cleaners and security I recorded 18% of staff were female.

3.3. Recruitment processes and presence of gender policy

Regarding the recruitment conditions for conservation related positions, the following criteria in the hiring process were identified:

- Required conservation background or environment and natural resources qualifications such as diploma, BSc or MSc depending on the level of the positions.
- Experience in conservation work and evidence of motivation or commitment which is evaluated during interviews as part of the recruitment process.

Regarding the interest of women to apply for such conservation jobs, I found that roughly 25% of the applicants were female candidates. I found that 85% of the institutions interviewed had a gender policy but 0% of the institutions stated that they considered the policy in recruitment processes and every day office work.

3.4. Factors influencing low participation of women in conservation

In general, the following factors were identified as limitations to female involvement in conservation work in Rwanda: the difficulties of field terrain, reproductive roles, household roles, risk of loss of trust among society due to time spent in the field (only when the work included field work), lack of self confidence to perform conservation work and remoteness of conservation work. Table 2 summarizes the limiting factors and their frequencies based on informants' responses.

Table 2: Factors identified that constrain women's participation in biodiversity conservation work as reported by interviewees of biodiversity conservation organizations in Rwanda.

#	Factor	Frequency in %
1	Difficulties of conservation field work (e.g., rugged terrain, isolation)	80.9
2	Reproductive role (pregnancy, breastfeeding)	70.6
3	Household roles/responsibilities	60.3
4	Risk of loss of trust among society due to spending a lot of time in field locations, often with only other male colleagues	48.5
5	Lack of self-confidence to perform conservation work	41.2
6	Remoteness of conservation work (offices not located near health clinics or schools)	41.2
7	Field facilities/equipment not friendly to women	26.5
8	Lack of required qualifications	20.6
9	Lack of information about opportunities for women in this field in general	19.1
10	No interest from women due to the nature of work	19.1
11	Fear of conflicts that may be found in conservation work	16.2
12	No female candidates	7.4

During the interviews 12 factors were mentioned as constraints to women's participation in biodiversity conservation work (Figure 1). Interviewees were requested to rank the factors they identified that constrain women's participation in biodiversity conservation work from the most

important (1), very important (2) to important (3). The five most important factors identified by interviewees are shown in Figure 2.

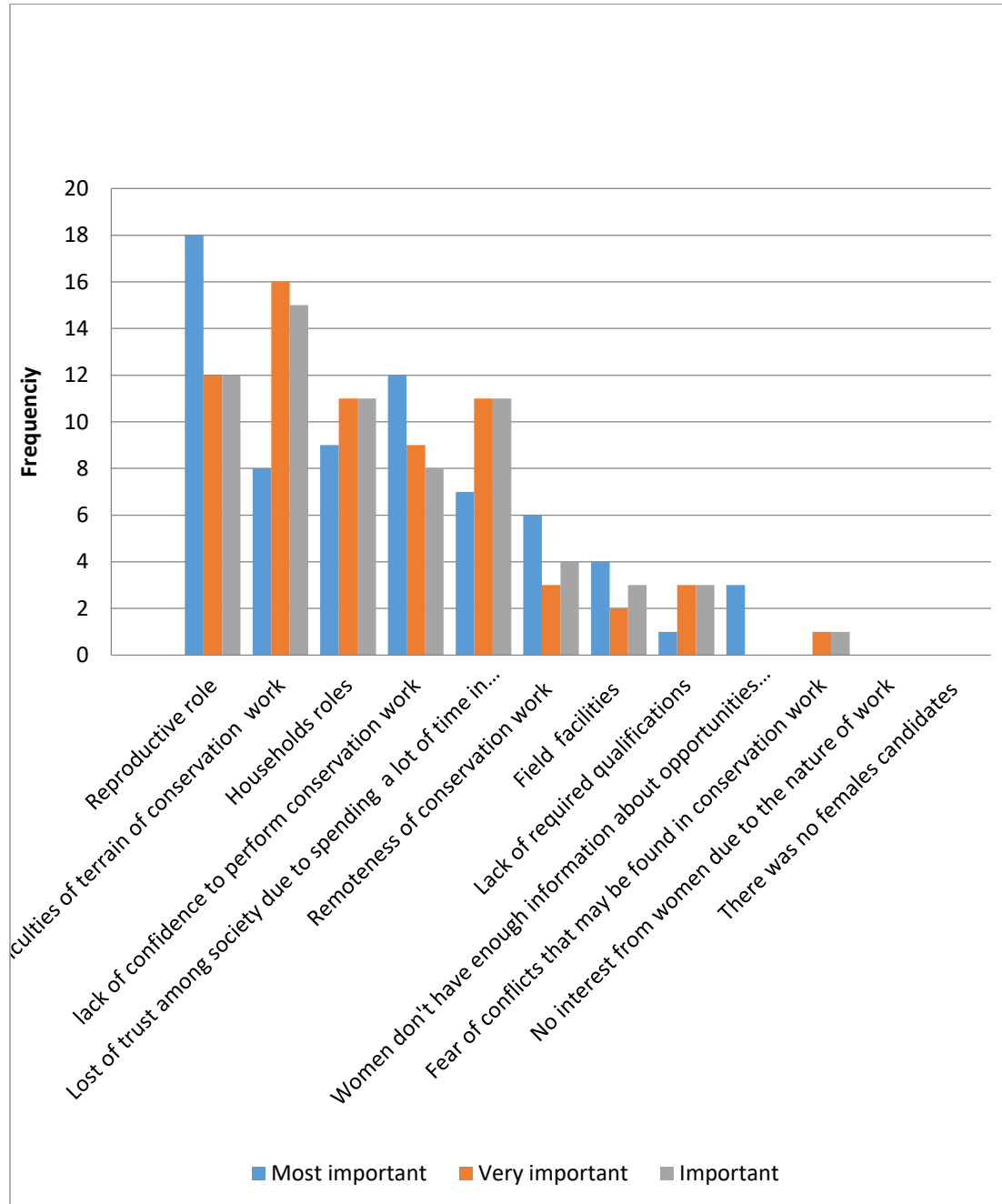


Figure 1: Ranked importance of 12 factors as constraints to women's involvement in conservation work in Rwanda from most important to important

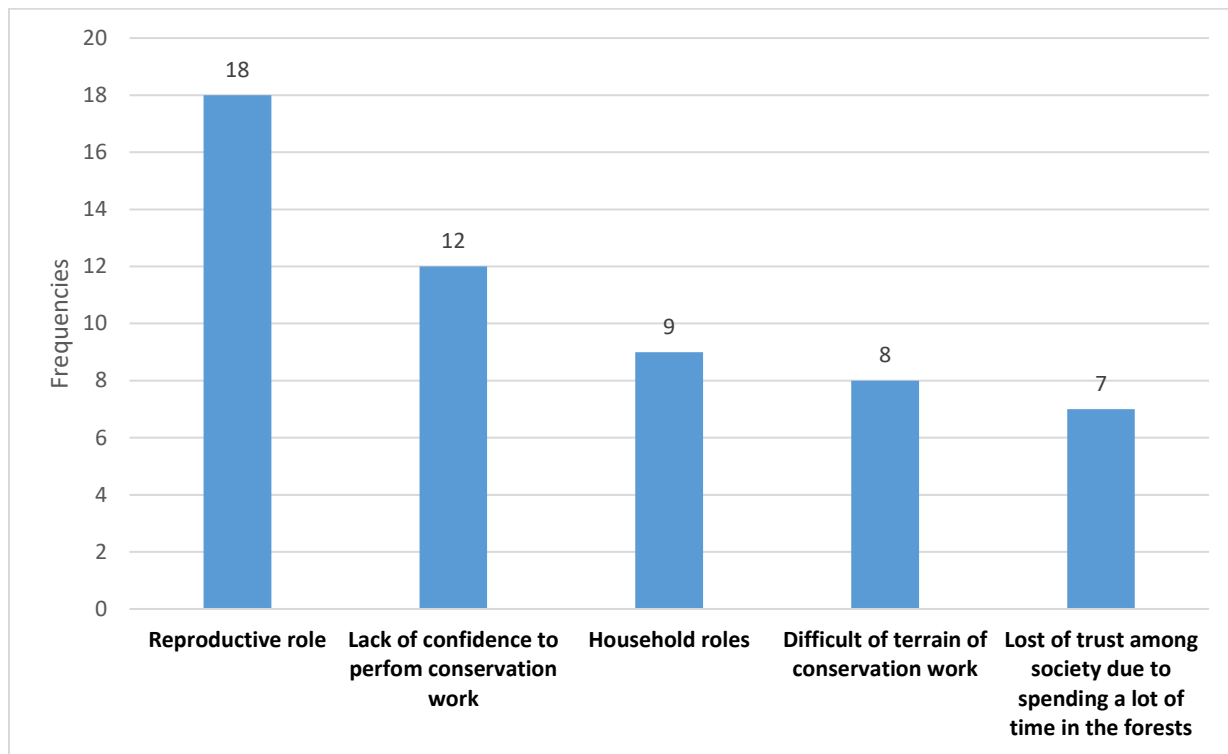


Figure 2: Five most important factors that constrain women's participation in biodiversity conservation work according to respondents in conservation organizations in Rwanda

3.5. Proposed solutions to identified factors that constrain women's involvement

For the above factors and barriers influencing the low participation of women in conservation, the respondents had a variety of solutions. To address the issue of lack of confidence, 42.6% suggested the need for education and empowerment of women. Regarding the risk of loss of society's trust in women doing field work, 41.2% suggested that society needs to be educated to change their mindset. For the remoteness of conservation work, 26.5% suggested that institutions should build hostels for the workers to get settled; for the difficulties of terrain 38.2% suggested that women should be given positions which don't require more field work while 30% suggested that women should get needed training to perform work in difficult terrain. Regarding households roles which are related to social and cultural norms, 45% suggested that a woman should work by living with

her family; however this would exclude her from some positions which may not allow the woman to stay regularly with her family (e.g., park rangers).

Table 3: Proposed solutions to the factors identified that constrain women’s participation in biodiversity conservation work as reported by respondents

Factor that constrain women’s participation in biodiversity conservation work	Proposed solutions	Frequency in %
Lack of required qualifications	Increase number of women in conservation departments at university	14.7
	Offer trainings for women to increase their capacities in conservation domain	4.9
Lack of confidence to perform conservation work	Education and empowerment training for women in different domains of conservation	42.6
	Encourage women to attend conservation courses at universities and build their capacity to perform conservation work	26.5
Remoteness of some conservation work	Build hostels for married workers to minimize daily or weekly travel	26.5
	Initiate and create diverse conservation organizations to increase work opportunities for females	13.2
Loss of trust among society due to spending a lot of time in the conservation work in the forest (when it is field based positions).	Educate the society to be aware of the nature of conservation work	41.2
	Facilitate women to take field positions in conservation by offering living quarters outside of the field	5.9
Difficulties of terrain for some field conservation work	Give women easier positions that do not demand much time in the field when they are in critical conditions such as pregnancy and breastfeeding	38.2

	Provide needed trainings for women to enable them to be confident to perform any kind of conservation work	30.9
Field facilities/equipment not appropriate to women	Provide adequate and appropriate equipment and facilities for women while in the field	14.7
	Women should be flexible to spend nights in forest camps when it comes to roles demanding long time in forest.	11.8
Household roles (Take care of the family)	Offer enough days off for the married women staff to take care of their families as needed while performing their job duties	5.8
	Facilitate positions that allow women to stay near families and enable them to be able to fulfill their household roles	45.6
	Offer accommodations for women at the work site	4.4
Women don't have enough information about opportunities	Encourage women to use social media to capture enough information circulating worldwide about job and training opportunities	7.4
	Improve position advertising methods to target and attract women to apply	2.9
Fear of social conflicts that may be found in conservation work	Improve field work security methods	4.4
	Offer trainings in security and safety methods	10.3
Non -interest from women	Educate women about job opportunities in the conservation field	20.6
Absence of female candidates	Apply gender policies	5.9

The respondents suggested that if possible married women who have field work as part of the requirements of their positions, they may choose to bring their families to live closer to their field sites

3.6. Benefits of having more women in conservation

The majority of the respondents agreed that more women in conservation would be beneficial (Figure 3).

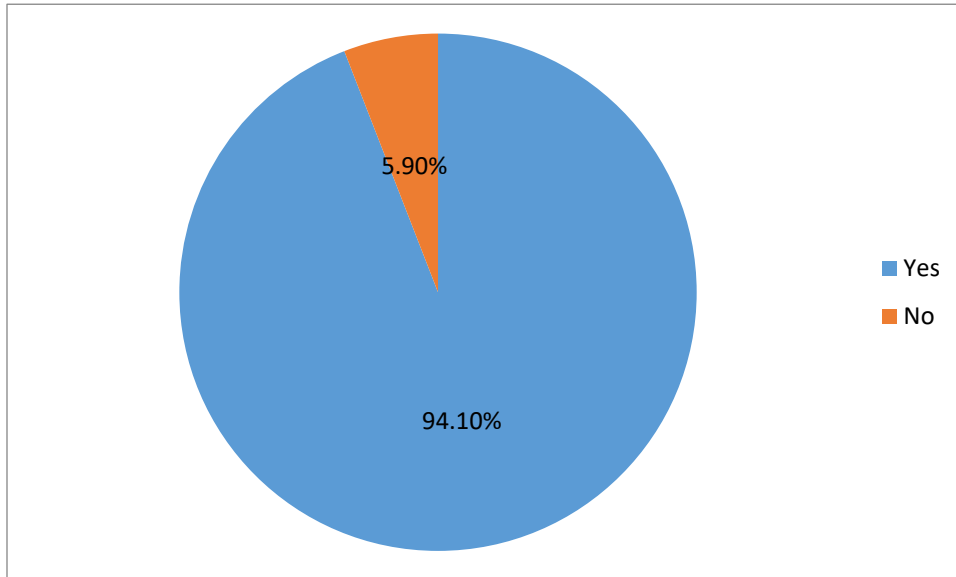


Figure 3: Perceptions of respondents about the benefits of having more women in conservation work

The interviewees who support the idea that women would be valuable assets in conservation work identified activities that they believe women could do once brought on board (Figure 4). Community conservation/outreach was the most frequently mentioned activity for female staff in conservation work (48.5%).

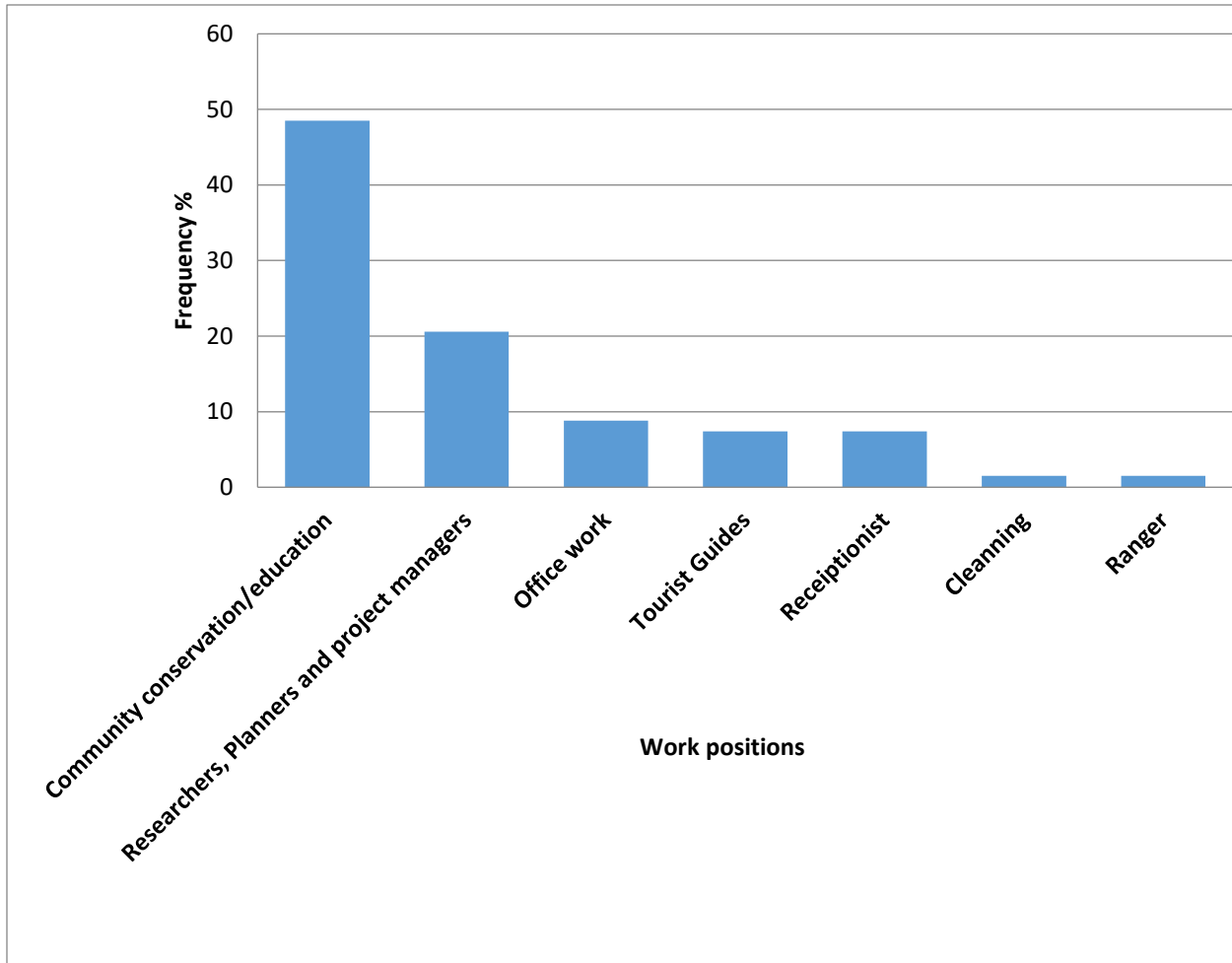


Figure 4: Proposed activities to be performed by women according to respondents feedback

The interviewees who did not agree that having more women involved in conservation work would have a positive impact reported that it is not an issue if there are few women in conservation; only the capacity of performance would matter instead of gender balance. These responses were only from four male respondents out of 64 respondents in the study.

4. DISCUSSION

4.1. Presence of women in conservation work in Rwanda

Different factors were identified that contribute in influencing the low participation of women in conservation in Rwanda. The same was recorded for academic institutions in the United Kingdom where there is lower enrollement of female students in conservation courses (King, 2005). Regarding the involvement of women in conservation work, I found that few women were involved with 15% of all staff and only 10% in conservation departments or conservation related work, similar to the findings of another study in Rwanda (Klaver, 2012). To improve the involvement of women in sciences, women have been creating associations and forums to ensure women are included in science programs. An example is the organization “South African Women in Science and Engineering” known as SAWISE with a mission to provide mentoring, career development, teacher training and scholar involvement (Eslera, 2006). I recommend creating associations of women in sciences and especially encourage female conservationists to put efforts together to promote women’s involvement in conservation and encouraging them to seek information about conservation work as a way to increase the number of women in conservation work, starting from young women.

4.2. Factors influencing low participation of women in conservation

Household responsibility and reproductive roles of women have been identified among the most important factors influencing the low participation of women in conservation. Reproductive role was mentioned as a challenge for women in conservation work by all female respondents in this study, while household roles were mentioned by nearly all (95.6 %). The study indicated that it is not easy for a woman to be based in the field, or with a position that requires frequent field work, when also fulfilling their household role. This is especially true for positions that involve frequent field work such as ranger or tracker positions; however for the positions which do not require field work, the responsibility of households roles was not an issue. All over the world women are typically more involved in household work than men and are usually responsible for the family care; this may prohibit them from spending a lot of time in the field.

The interviews indicated that when women have children of age to be in school they are compelled to move to city centers because many remote villages especially in field locations do not have adequate schools or other social infrastructure. This issue does not affect women who work in

conservation organizations based in cities or in areas with needed social infrastructures. Having children who need schooling influences women to move from around protected areas where there are positions in conservation and find other locations with social infrastructure such as schools.

Physical fitness of women to manage difficult field terrain was also mentioned in the explanations given by interviewees for why few women are in conservation work, and can play a role in hiring practices. However, this would not be applicable when the positions are based in urban areas or if the work expected is based in office, as office work was mentioned among the activities that a women can perform well in conservation work. There is a need to distinguish positions that are based in field and in offices or non remote areas; however, it seems that people who work in office positions are often in senior positions (e.g., project managers) and they generally started from junior positions in the field and were eventually promoted. This career pathway can exclude women as some of them are uncomfortable to join conservation work when they have to stay in the field for long periods as shown from the findings in this study, especially in male-dominated settings, and they thus miss good opportunities to occupy senior positions. Again, for the positions based in the field, female applicants were very few compared to male applicants (less than 30% of applicants were females with field jobs in conservation work as institutions interviewed stated that). Education is thus needed for men in conservation jobs to understand that women need to be offered opportunities to show their ability in the field of conservation work in order to gain more senior positions.

Regarding academic qualifications, few women enroll in natural science courses including biodiversity conservation according to the results of this study. Another study found that women staff were much less represented in faculties of sciences but this challenge can be overcome when universities invest in the promotion of women in sciences (Handelsman, 2005). In Rwanda it seems important to keep encouraging young women to attend science courses from secondary school, and this is an important responsibility of women already working in conservation: the champion women in conservation should mentor young women and encourage them to participate in conservation work as suggested in a previous study (Abiaz, 2015). In Rwanda, we need to build the capacity of young females to become future conservation leaders and this has to become a shared responsibility between male and female conservationists.

Regarding the presence of a gender policy, I found that most institutions included in this study have the policy but the policy does not appear to be considered in recruitment practices or every day activities, although leaves and benefits allocated to women during the maternity period as per Rwanda's Labor law do appear to be respected. Other flexibilities which might be given to women like deploying them in different conservation work from men is left to the judgment of the supervisors who are generally male. Potential options are, for example, to deploy female rangers around the edges of national parks where they can have easier access to healthcare for children and themselves when they are breastfeeding or pregnant. I also found that female rangers and trackers believe they may lose the trust or respect from their community and their families due to the time they spend in remote field conditions with male co-workers, often with no other females present. This factor might lead women to fear conservation work that involves field work unless they can work from office or non remote areas.

Regarding accessibility to needed information about conservation work and opportunities, it was found that women are often busy with household work and sometimes miss information or networking opportunities or opportunities to attend such events. They may not regularly attend public meetings and events about conservation for example, which correlates with the findings of Proud (2014) who found that this lack of information is coupled with limitations women experience in their ability to attend meetings and workshops and they then remain less informed about conservation projects. Proud (2014) found that women may not have the right to attend meetings if household work is not finished, which increases the limitation of women to participate in conservation work. Although lack of information was not identified as one of the main factors constraining women to enter conservation work in this study, encouraging women to use social media and read news papers to become updated about conservation opportunities can promote female involvement in conservation.

4.3. Proposed solutions to identified challenges

In this study, the interviewees were asked to propose possible solutions to identified challenges. Regarding the household roles which may hinder the participation of women in conservation field based work, it was suggested that women should be provided accommodations located near to their work and facilitate them to host their family; women with children should be facilitated to get

positions which don't demand long stays in field until children are older. Though not mentioned by this study, the family should support the female to perform the conservation work in the field, for example husbands should be supportive to their wives and take care of the family when the wife is absent; this would encourage women to enter conservation positions that require field work. The same needs to be done by work supervisors in order to support women when in critical conditions like pregnancy and breastfeeding by deploying them in the areas where they can access health care.

Regarding the fitness of females for difficult terrain and field work, women should be trained and get empowered to conduct field based work. In pregnancy or breastfeeding periods, women should be considered differently, but otherwise they can be as comfortable as their male counterparts with field work when given the opportunity and the adequate equipment to provide them a safe and healthy work space to perform field based positions.

Regarding academic qualifications, there is a need to encourage young women to consider science courses including biology and conservation science; this should start at an early age from primary school by encouraging pupils to join nature clubs and learn to love nature and become attracted to biodiversity conservation programs at higher learning institutions. Regarding the loss of trust in society for women who spend a lot of time in field locations, there should be awareness-raising within society to show people that conservation work is not only for men, and when women are in the field they should not be suspected of bad behaviors; hence society needs to understand the nature of conservation work and change their perceptions towards females spending nights in field camps.

4.4 . Predicting the benefits of increased involvement of women in conservation

Having more women in science faculties at universities may lead to faster development of the faculty (Duchan, 2001); the same author proposed that when recruiting academic personnel in science faculties, women should be considered with different criteria from their male counterparts. In this study I found that while there are some female lecturers in conservation biology at University of Rwanda, few female staff have academic positions at KCCEM; this difference might be explained by the location of those institutions and the remoteness of KCCEM which may lead

to fewer female lecturers interested or able to work at that campus. In this study, I found that having more women in conservation work should bring an added advantage or benefits such as new ideas which may lead to more efficient development of conservation projects. I suggest women can do more to encourage other women and become role models. Women once on board may achieve more to attract and encourage other women to embrace the conservation career, as suggested by Marton-Lefèvre (2018). Involving women in conservation should be taken into consideration by all conservation institutions in Rwanda as it was shown that involving women in conservation can promote the sustainable use of natural resources. Apart from a gender balance, a better integration of women in conservation practice could also increase the benefits to local communities from conservation projects as female workers in conservation will be increased and they will be supporting more their families (Westermann, 2005). It can also give a chance to women to participate in conservation education for their families and future generation in general.

5. CONCLUSION AND RECOMMENDATIONS

The study identified five important factors which lead to the low participation of women in conservation: reproductive roles, households responsibilities, lack of self confidence to perform conservation work (as perceived by both men respondents), difficulties of field terrain and risk of loss of trust or respect from society when in the field. The proposed solutions for these factors include: Finding a way of allowing married women and women with children to be able to work in proximity to their families to ensure they take care of the family; breastfeeding and pregnant women should be located in areas which allow access to healthcare, schooling for children and other needed social infrastructure for married women with children. Women should be educated and empowered to perform conservation work from an early age and women already in the conservation domain should encourage others and attract them to conservation work. Society should be educated to bring a change in mindset towards women who desire to work in field conditions.

Employers should be encouraged to explore ways to increase the number of women in their institutions and explore the benefits of involving women in the conservation domain. Further studies should be conducted to evaluate the success of institutions with more women versus institutions with less women. There is also a need of exploring the extent of involvement of local women in the use of natural resources in different parts of the country. Results show that men in conservation work need to be sensitised about the importance of having women as colleagues, and that women can do conservation work. Also gender policy implementation in recruitment needs to happen to help change the current trend of few women in conservation work.

I recommend further studies to explore more deeply the involvement of women in biodiversity conservation with a focus on comparing the achievements or institutional development of institutions with more women versus ones with few women.

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APPENDIX

Appendix1: Interview guide

My name is Claudine Tuyishime, I am a Msc student at University of Rwanda, in Biodiversity Conservation and Natural Resources Management program. I am now conducting a research project to fulfill the academic requirements in this master’s program. It is under this context I am conducting a study entitled “**Women and biodiversity conservation: Analyzing involvement of women in conservation work in Rwanda**”, and to achieve its objectives I need your assistance. I have a series of questions which will help me to achieve the objectives of this study, and I am kindly requesting your time to assist me with getting data. However, I’d like to ensure you that this information will be confidential and only used for the purpose of this research/study. We will not put your names to ensure the anonymity is respected.

QUESTIONNAIRE FOR INSTITUTIONS

NB: Identification of the institution (to be given by senior staff or HR department)

Name of the institution.....

Components/departments

.....
.....
.....
.....
.....

Number of female staff?..... Number of male staff?.....

How many female do you have in real conservation components..... Out oftotal staff in conservation department

How many females do you have in support department (finance,logistics,...)..... out of

Generally what are the recruitment conditions for conservation related positions

.....
.....
.....
.....
.....

What percentages of females do you normally get in job applications (average)

How can you explain those percentages?

.....
.....
.....
.....

Do you have gender policy in your institution?

If yes, is that policy followed during recruitment and everyday work?

Additional questions to academic institutions

How many students do you have in conservation department?

How many male and female ?

How can you explain the difference between number of male and female?

.....
.....
.....

INTERVIEWS

1. Identification of interviewees

a. Identification of the interviewee (for workers)

Employer:

Position.....

Sex

Are you single or married?.....

Age category 18-25, 25-40, 40-55, 55-above

What kind of education background do you have?.... (Eg. Bsc Accounting, S6 MPG, Msc economics,...)

When did you join this institution..... how did you ge the job? TICK ONE

A) appointment,

B) recruitment

How long have you had this current position? Years ormonths

Out of work,where do you live/your family live?.....

If you are married, do you live with your family?

If you do not live with your family; why?.....

How far is your home from your duty station? not far (less than 100km) far (100-200km) very far(200-above km)

b. Identification of the interviewee (for students)

Name:

Faculty:

Department:

Grade:

Age:

Sex:

2. Factors driving low participation of women in conservation

Different reports have shown that women are less represented in conservation work in Rwanda:

a. what factors do you think influence that low participation of females?

NB. Check responses, don't give the respondent the options

No	Possible Factors	check
1	Lack of required qualifications/education level in conservation work	
2	Lack of confidence to perform conservation work	
3	Remoteness of conservation work (far from the residential areas)	
4	Lost of trust among society due to spending a lot of time in forests	
5	Difficulties of terrain of conservation work/poor physical fitness of women and equipment not friendly to women	
6	Field facilities/equipment are not friendly for women	
7	Households roles(responsibilities and duties of women in family)	
8	Women don't have enough information about opportunities in general	
9	Reproductive role (breast feeding/pregnancy)	
10	Fear of conflicts that may be found in conservation work	
11	No interest from women due to the nature of work (put the question somewhere)	

12	There was no females candidates	
13	...	
14	...	

b. Can you please rank the factors you identified by their importance in influencing the low participation of women in conservation(rank them from 1 as the most important factor up to n depending on the number of identified factors)

No	Possible Factors(rank only what the interviewee identified)	Put 1,2,3,4,5,6....respectively (1 for the most important factor)
1	Lack of required qualifications/education level in conservation work	
2	Lack of confidence to perform conservation work	
3	Remoteness of conservation work (far from the residential areas)	
4	Lost of trust among society due to spending a lot of time in forests	
5	Difficulties of terrain of conservation work/poor physical fitness of women and equipment not friendly to women	
6	Field facilities/equipment are not friendly for women	
7	Households roles(responsibilities and duties of women in family)	

8	Women don't have enough information about opportunities in general	
9	Reproductive role (breast feeding/pregnancy)	
10	Fear of conflicts that may be found in conservation work	
11	No interest from women due to the nature of work (put the question somewhere)	
12	There was no females candidates	
13	...	
14	...	

c. Can you give a brief explanation of the factors you gave, and how this influence the low involvement of women in conservation work?

.....

3. Proposed solutions

Can you please propose solutions that can help to address those factors you identified, and finally increase the number of women in conservation?

No	Possible Factors (solutions only to what the interviewee identified)	Proposed solutions by interviewee
1	Lack of required qualifications/education level in conservation work	
2	Lack of confidence to perform conservation work	

3	Remoteness of conservation work (far from the residential areas)	
4	Loss of trust among society due to spending a lot of time in forests	
5	Difficulties of terrain of conservation work/poor physical fitness of women and equipment not friendly to women	
6	Field facilities/equipment are not friendly for women	
7	Households roles(responsibilities and duties of women in family)	
8	Women don't have enough information about opportunities in general	
9	Reproductive role (breast feeding/pregnancy)	
10	Fear of conflicts that may be found in conservation work	
11	No interest from women due to the nature of work (put the question somewhere)	
12	There was no females candidates	
13	...	
14	...	

4. Prediction of added value to conservation for having women on board

Note to interviewers: This question is only for the senior staff, so rangers/trackers, guides and Bsc students and trackers are not eligible for this question

a. Do you think having more women in conservation can have a positive influence on conservation work in Rwanda ? Yes No

b. If Yes, what are the key activities that a woman can perform in conservation sector that could improve conservation work in Rwanda?

1.....

2.....

3.....

4.....

5.....

c. If No, is it because c1) you think women are not appropriate or not needed to work in conservation? Or c2) because it's not an issue if there are few women?

d. If c1) why do you think women are not needed in conservation work?

.....
.....

e. If c2) why do you think it is not a problem to have few women in conservation work in Rwanda?

.....
.....

5. Do you have any other comment or additional information relevant to this study?

.....
.....

Thank you for your time, I would like to ensure you that the information you provided is confidential and will remain anonymous. It will be used only for this research.