



The University of Cape Town

**National Gender Policy for Rwanda: A Case Study of Institutional
Response to Policy Recommendations on Women in Science and
Technology.**

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DECLARATION

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.....

Signature

.....

Date

DEDICATION

This dissertation is dedicated to my mother (1923-2003). Her integrity, love and compassion for all people paired with her way of facing realities of life left an indelible impression on my life. I will be eternally grateful for her example.

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ABSTRACT

The purpose of this study was to explore the question of poor representation of women in science and technology in two academic institutions of Rwanda. Those are the National University of Rwanda (UNR) and Kigali Institute of Science and Technology (KIST). By exploring institutional factors underlying the said question, the study has complemented previous works on the same subject, which placed an emphasis on social, economic and cultural factors.

Data were collected through archival exploration, in-depth face-to-face interviews and focus groups discussions. Exploration of archives was mainly based on gender policies existing within the concerned institutions, and their compliance with Rwanda national gender policy. Access of women to science and technology, and their participation in these areas were the key elements that guided the exploration of relevant policies and various discussions with participants. In-depth interviews were conducted with men and women teachers at the concerned academic institutions and high government officials from the Ministry of Gender and Family Promotion, and Rwanda Parliament. Focus group interviews targeted men and women students from the third year level of study and above from the concerned areas. Discussed questions were given in an open-ended form.

Through the exploration of existing policies and thematic analysis of qualitative data, the study revealed three main areas of gender inequalities. Those are decision making, infrastructure and academic cultures. It was found that the poor representation of women in decision-making affects the rest of these areas and their interconnectedness proved to be the key explaining the under-representation of women in science and technology. The study concludes that in the current form, the concerned institutions are embedded with forces that contribute to women's discrimination, especially in the areas of science and technology, which remain the preserve of men. It gives recommendations on how to address gender inequalities in the highlighted areas.

TABLE OF CONTENTS

DECLARATION.....	I
DEDICATION.....	II
ACKNOWLEDGEMENTS	III
ABSTRACT.....	IV
 CHAPTER I	 1
INTRODUCTION.....	1
1.0 BACKGROUND INFORMATION	1
1.1 TRADITIONAL EDUCATION	1
1.1.1 <i>Sexual division of labor</i>	4
1.1.2 <i>Traditional school</i>	6
1.1.2.1 Games	7
1.1.2.2 Sexuality	7
1.2 COLONIAL INFLUENCE	9
1.3 POST COLONIAL INFLUENCE	11
1.4 GENDER POLICIES	12
1.4.1 <i>Context</i>	13
1.4.1.1 Vision 2020.....	14
1.4.1.2 Education sector gender policy	14
1.4.1.3 National gender policy	19
1.4.2 <i>Statement of the problem</i>	20
1.4.2.1 Research questions	21
1.4.2.2 Objectives	21
1.4.3 <i>Significance of the study</i>	22
 CHAPTER II.....	 24
LITERATURE REVIEW	24
AFRICAN OVERVIEW	24
2.0 INTRODUCTION	24
2.1 PRE-MODERN HIGHER EDUCATION IN AFRICA	24
2.2 COLONIAL EDUCATION	29
2.2.1 <i>Modern Institutions of Higher Education</i>	30
2.3 STRATEGIZING FOR EQUALITY IN HIGHER EDUCATION.....	31
2.4 WOMEN IN SCIENCE AND TECHNOLOGY	35
2.5 EMERGING PATTERNS, CONCEPTS AND THEORIES IN AFRICA ...	38
2.5.1 <i>Societal factors</i>	38
2.5.1.1 Institutional factors--Policy Issues.....	39
2.5.1.2 Family factors	41
2.5.2 <i>The Rwandan Context</i>	42

2.6	HIGHER EDUCATION IN RWANDA.....	45
2.6.1	<i>Historical Background</i>	45
2.6.2	<i>The Impact of Genocide on Higher Education</i>	46
2.6.3	<i>Rwandan Higher Education Today</i>	47
2.6.4	<i>Women in Higher Education</i>	48
2.6.5	<i>Women in Science and Technology</i>	49
CHAPTER III		51
METHODOLOGY.....		51
3.0	INTRODUCTION.....	51
3.1	EPISTEMOLOGICAL ORIENTATION.....	52
3.2	CONCEPTUAL FRAMEWORK.....	54
3.2.1	<i>Standpoint and situated knowledge</i>	54
3.2.2	<i>Gender and Positionality</i>	55
3.3	METHODS OF RESEARCH.....	62
3.3.1	<i>Introduction</i>	62
3.3.2	<i>Choice of methods</i>	62
3.3.3	<i>Scope of the study</i>	63
3.3.4	<i>The Case Study</i>	64
3.3.4.1	Documentary sources.....	65
3.3.4.1.1	Unpublished materials.....	66
3.3.4.2	Focus Group Interviews.....	66
3.3.4.2.1	Recruitment of participants.....	67
3.3.4.3	Individual Interviews.....	70
3.3.4.4	Thematic analysis.....	75
CHAPTER IV.....		76
DATA ANALYSIS		76
4.0	PRESENTATION AND ANALYSIS OF FINDINGS.....	76
4.1	INTRODUCTION.....	76
4.2	PRESENTATION AND INTERPRETATION OF ARCHIVAL DATA.....	77
4.2.1	<i>Gender Inequalities in decision making</i>	77
4.2.1.1	The Kigali Institute of Science, Technology and.....	78
	Management (KIST).....	78
4.2.1.2	The National University of Rwanda (UNR).....	80
4.2.2	<i>Gender inequalities at policy level: women in science and technology</i> <i>at UNR</i>	82
4.2.3	<i>Gender inequalities at policy level: women in science and technology</i> <i>at KIST</i>	85
4.2.4	<i>Gender inequalities: infrastructural aspect</i>	87
4.2.5	<i>Gender inequalities: women's profile in academics</i>	88
4.2.6	<i>Discussion</i>	94
4.3	QUALITATIVE ANALYSIS OF EMERGING THEMES.....	96
4.3.1	<i>Gender inequalities in decision making</i>	96
4.3.1.1	Engendering decision making.....	98
4.3.2	<i>Infrastructural gender inequalities</i>	99
4.3.3	<i>Gender inequalities in Academics</i>	101

4.3.3.1	Women's access to science and technology	101
4.3.3.2	Maternity policy	102
4.3.3.3	Academic programs.....	103
4.3.3.4	Classroom cultures	104
4.3.4	<i>Conclusion</i>	105
CHAPTER V		108
SUMMARY AND CONCLUSION.....		108
5.0	INTRODUCTION	108
5.1	RESEARCH QUESTIONS	108
5.1.1	<i>What have been the mechanisms put in place by the concerned academic institutions for a successful implementation of national gender policy?</i> 108	
5.1.2	<i>What are the strategies that targeted higher learning institutions have adopted to sustain further participation of women in science and technology?</i> 111	
5.1.3	<i>What are the existing gender dynamics within concerned institutions and how are they impacting on women's participation in science and technology?</i>	112
5.1.3.1	Decision making.....	112
5.1.3.2	Infrastructures	113
5.1.3.3	Academics.....	115
5.1.4	<i>What are the future prospects for gender equality in science and technology?</i>	115
5.2	RECOMMENDATIONS	117
5.2.1	<i>Rwanda Government</i>	117
5.2.2	<i>Academic Institutions</i>	118
5.2.3	<i>Teachers</i>	120
5.3	DIRECTIONS FOR FUTURE RESEARCH.....	120
REFERENCES.....		122

CHAPTER I

INTRODUCTION

1.0 BACKGROUND INFORMATION

This chapter looks at various educational policies and their connection with gender inequalities that Rwandan women have been experiencing especially at higher education level. It portrays a journey that starts from the traditional context through the colonial period and post-colonial period, and examines the extent to which the past informs the present. Besides, it looks at the current gender policy provisions as reflected in some of the key documents of Rwandan government. Those are the Vision 2020, education sector policy and national gender policy. A special emphasis is placed on gender inequalities facing women in the area of science and technology.

1.1 TRADITIONAL EDUCATION

Like in most African traditional societies, Rwanda did not have written policies. Rules and regulations were transmitted orally from generations to generations. Traditional education depicted different scenarios depending on the sex of the child and this started from birth and follows the person till death. Boys and girls were (to date still) treated differently and more value was given to boys than girls. The value given to the child was due to the roles that he/she was suppose to play in his/her family and his/her society. This was translated at birth for example through names that were given to the newly born child, which indicated actually his or her gender. Most of Rwandan names for women have the prefix “Nyira-”, and “Muka-” that literally signify “wife of ”. Men’s names usually start with “Nyiri-”, “Se-”, “Ga-”, “Ru- and “Ka-” indicating qualifiers referring to power, social origin, physical and moral characteristics, goals, possession, etc. Some men’s names hinted the kind of relationship that was conceptually between men and women: men being the custodians of power and authority and women living under the authority of their husbands.

Not only was this relationship reflected in their names but it was also observed through the activities men and women were supposed to do including the games that were meant for each gender.

The value attached to the child was shown through various practices, beliefs, prohibitions and rites that accompanied his/her birth, marriage and death. For example ceremonies surrounding the naming of the child carried important messages that differed depending on the sex of the child. The following was revealed in a report combined by Rwandan government in conjunction with United Nations Population Fund (UNFPA) on “beliefs, attitudes and socio-cultural practices related to gender in Rwanda”.

At the birth of a boy, the mother had a 7 day leave while in same family when it was a girl, the maternity leave was 4 days. During this rest material used for making fire were different: wood for the mother of a boy and grass for the mother having given birth to a girl. At the moment of giving a name to the child, they put to the hands of boy a small spear, a bow and a shield wishing him to become a good warrior; and in the hands of a daughter basketry materials as well as materials for cleanliness, wishing her to become a good housewife. At the same occasion a boy born in the family of cattle breeders, could receive gifts in cows, while a girl was shown cows grazing on a hill and belonging to another person. This meant that she was not the true owner of those cows and that they ignore the source of her richness.¹

These are some of the indications revealing, at their early age, how boys and girls were treated differently and how this difference was mainly based on the roles and responsibilities that society was preparing them for. Boys were meant to become defenders of their families and nation. Besides, they were supposed to become breadwinners for their future families. Concerning girls, their roles were to be housewives who know how to keep things in order and clean the house. From this point of view it appears already that from the very beginning of their lives boys and girls' space and destiny were conceived and shaped differently. Boys were to occupy the public space while girls were to stay at home and get involved in the house chores for the comfort of the family. The rite of putting war weapons in the hands of the boy, and giving him gifts in cows served as symbols of power that society conferred to him.

¹ A Study on beliefs, attitudes and socio-cultural practices related to gender in Rwanda, (2000). Conducted by the Ministry of Gender and Women in Development in conjunction with United Nations Population Fund, Kigali, UNIFEM.

The gift in cow alluded to access and control of resources that were given to the boy. This gave much power to the boy that was outspokenly expressed through the wish they had for him of becoming a good warrior. On the contrary, the girl's life was seen as uncertain with no clear idea of which type of person she will be as they ignored the source of her richness. Was not the fact of telling her that she was not the owner of the cows she was shown grazing on a hill, a way of refusing her co-management of family resources with her husband in the future? In any case this practice did not augur well for the baby girl.

This difference in terms of power (and value) that was more given to boys than girls could be observed through the preferred sex at first birth, a practice that tends to disappear today. The report cited above reveals some of the reasons underlying the choice of a boy at first birth.

Traditionally and currently parents are pleased to bear boys, as they ensure continuity of their clan while a girl ensures prosperity of the clan of her family-in-law. When a girl becomes unmarried mother, her children are chargeable to her parents. Moreover, a boy manages somehow to get a job everywhere without his parents inquiring about².

This role of perpetuating his family name gives to the boy/man a very high value as this is what defines the ultimate goal of life in the Rwandan philosophy. The latter places emphasis on procreation as it is through that process that life keeps its meaning. Thus, having a boy at first birth was an indication that perpetuation of the clan was assured. However, what mattered really was not having a boy at first birth; the worse situation that one would experience in life would be that of not having a son at all. Kagame (1956: 372). So, what mattered was to have a son. On the contrary, a girl was not even counted as a child or family member in some contexts. For example, it was not surprising to hear a man responding that he had no child, when asked how many children he had at the moment he had only daughters. In the same line of thought a man could easily say that he had no longer children if his sons were killed say in battlefield and was remained only with daughters. This was a way of alluding to boys as the ones with the powers of perpetuating the name of the family.

² Ibid p...

This gender imbalance of power was highlighted in cases of birth with disabilities. Kagame (1956: 378) argues that boys born with sexual infirmities and who could not get married were kept alive with the hope for them to get married and have adoptive children to maintain the name of the family. It is commonly said that under such circumstances the wife whose husband was sexually disabled could have children with her father-in-law or brother-in-law to cover the disability of the husband. Kagame (1956: 378) goes on to say that girls born with similar abnormalities were killed as they were considered as source of terrible plagues that could plunge the country into a tragedy.

The scenarios described above reveal the higher value that the traditional Rwandan society placed on boys. Men were given more power than women which excluded the idea of equal partnership between the two genders. Their lives were governed by a binary relationship based on inequalities as observed through the sexual division of labor described below.

1.1.1 Sexual division of labor

There was a sharing of tasks based on sex within the traditional family as it is the case in the current society. However, this sharing shaped spaces where these tasks were to be carried out for each category. Girls were involved in domestic activities while boys were trained for those activities exposing them to the public space. Thus, girls (and women) were in charge of cooking, serving meals, keeping order and cleanliness of the house and its surroundings, taking care of the children, carrying out agricultural works such as sowing, weeding, harvesting and conservation of agricultural products, to name but a few.

Men were involved in the works like construction of houses and fences, care taking of cattle and milking cows, clearing of spaces for farming, deforestation, cutting wood, maintaining banana plantations, etcetera. There were however some particularities depending on regions. For example, in the regions of *Ndorwa* and *Bugoyi*, men were rarely involved in work in fields.

Apart from some works in field whereby men could work hand in hand with women it appears that women were more confined in the domestic sphere while men occupied the public space. It is worth mentioning however, that at present this sexual division of labor is changing especially in urban areas where accessing of women to labor market is increasing on a daily basis. Thus, paid domestic workers are employed to occupy the room traditionally taken by women. These 'substitutes' of women are not necessarily women. A sizable number of men are employed as domestic workers who are involved in the various domestic activities including cooking, serving meals, baby sitting, and the like.

This division of labor covered several areas concerning lives of men and women, and it contributed very significantly to sustaining the binary relationship between both categories. This binary relation created a scenario whereby women's roles were overshadowed by men as they were (and are still) the ones who appeared at the scene. Their interests were more put in the streamline, which undermined those of women. This was more observable in decision-making processes whereby women were not allowed to appear in the board. For example, women could not access the public tribunal (*Gacaca*) that was exclusively a men's space. However, this was not because women were not potentially able to take important decisions. The general agreement is that women played a critical role in the Rwanda traditional society though they remained behind the scene. Some women proved that they were able to effect important changes in the country by use of the powers at their disposal. This is the case of some queen mothers who influenced politically and militarily changes that are historically known in the country. One of the commonly known as a powerful queen mother was *Kanjogera* who successfully organized a coup and overthrown the king *Rwabugiri* to install her son *Musinga* as the new King of Rwanda.

Nevertheless, it is noteworthy that no matter how powerful queen mothers were, they were using their powers to defend the interests of the royal family. In other words, they sustained patriarchy as they were operating in structures conceived and implemented by men.

Although the queen mother could take important decisions, she was not allowed to access the public in a bid to announce those decisions or monitor their implementation. She was always operating through men from whom were selected her advisors. The latter were powerful men who could influence the queen mother's decisions. For example, *Abiru*³ are known as one of the most powerful organs that influenced decision-making at the royal court. The queen mother could have women advisors but the latter were not known as they were operating behind the scene. Thus, the position of the queen mother as a powerful woman does not invalidate the binary relationship highlighting the difference of treatment between men and women, given that even the most powerful woman of the country was limited in the execution of her powers. This underscores the gender inequalities that were sustained by the Rwandan traditional school.

1.1.2 Traditional school

Traditional education was given in the family, village and communities as the child was considered to belong to all these social entities. However, in addition to family school whereby the child was taught by father, mother and adult people, there was a formal traditional school called *Itorero* that received only selected boys. There boys learned cultural values, artistic, military, political and sport activities. Besides, they learned good manners, rhetoric, poetry; and many other programs were designed depending on the needs of the country. A girl was prepared to help her mother in the housework, which was the core business she was called to fulfill in her own house when she gets married. So, it appears that traditional education system maintained a philosophy of not only training boys and girls separately but also shaped them for different programs offered in different spaces. This separation underlined the binary relationship between boys and girls, and shaped them into future men and women who could live as husbands and wives or partners but it excluded the idea of equal partnership.

³ Advisors at the royal court who served as guards of traditions.

This different treatment entrusted power and values in boys that were also reflected in games and the way boys and girls used their leisure time.

1.1.2.1 Games

Boys were encouraged to play games that were connected to the kind of roles and responsibilities they were preparing for. These included defending the territory integrity against enemy invasion. Thus, games such as archery, high jumping and wrestling were very much encouraged for boys but discouraged for girls. It was scandalous for a girl to play with an arrow or a spear. Women in general were forbidden to touch on weapons. Likewise, it was a taboo for a boy to simulate being a mother by carrying a child on his back. In their leisure time girls were encouraged to learn dances and to make ornamental objects such as baskets, mats, and the like. This encouragement of boys' involvement in military power related activities on one hand that was paired with the discouragement of girls' involvement in such activities on the other hand, was an indication of a patriarchal commitment to maintenance of the gender imbalance of power. The latter could be seen in sexuality, an area where more control was exerted on girls than boys.

1.1.2.2 Sexuality

As it is in the current form in many African countries, sexuality was a taboo in the Rwandan tradition. Children do not talk about sexuality with their parents, which makes it a very problematic topic, leaving boys and girls with distorted information or total ignorance about it. The little information about sexuality that boys or girls have is learnt from their peers who also learn from other peers. Young girls who reach the age of puberty are taught how to extend their labia minora and this practice is meant to prepare the young girl to become a sexually pleasurable wife for her future husband.

This practice was seen as one of the pillars for the relationship of married couple. More teaching on sexuality was given to the bride before wedding, in a form of indoor exercise by aunts or families' friends. This exercise could take several days and one of elements that the bride was to give more attention to, was how to behave in bed with her husband. It appears that much effort was put on the preparation of the bride to be able to please her husband sexually but what the groom was doing on his turn to please his bride sexually is not well known. *Harelimana* (1997:107) suggests that young men were sexually trained by their brothers' wives. However, nothing is said whether this training was meant to please their brides. The attention placed on women's body reveals more a sign of control rather than a sign of care.

On the contrary, sex practices were encouraged for young men. For example, parents were pleased to hear that their son was attempting to meet young girls and come home late. Thus, sexual relationship outside marriage is condemned for single female but condoned for males. Commonly men do not have restriction as such in meeting women for sexual matters. For example, a married man could initiate sexual intercourse with another wife with no fear of harming his wife.

On the contrary, if a woman seeks out another man that would be seen as a dishonor in the community. All these are examples highlighting not only the gender imbalance of power that was encouraged by the traditional educational system but also the extent to which the system was unfair for women given that they were not even allowed to control their own bodies. Worse, was the case of unwanted pregnancy whereby the young woman was drowned in a river. No need was felt to investigate on the man who had impregnated her. Cases of discrimination against women could be verified in several other contexts that are not discussed in this chapter.

To sum up it appears that traditional education conceived boys/men and girls/women differently by placing them in the context of binary relationship whereby men were favored and given more power and value than women. This binary relationship led to a kind of dichotomy or bipolarity based on the opposing positions that the two categories were occupying. Thus, men belonged to the public space while women were confined in the domestic space, men were decision-makers while women could only advise (behind the scene), men were encouraged to play warlike games while women were forbidden to touch on weapons, men were supported to be sexually active while women were not, to name a few. Even the sexual activity that women were encouraged to do was intended to please their future husbands. So, this scenario is a good indication that not only men and women were treated differently but also their treatment conferred more power and values to men than women. It is in this context of gender imbalance of power that colonialism was introduced in Rwanda.

1.2 COLONIAL INFLUENCE

The arrival of colonialism in Rwanda came to cement the gender imbalance of power that existed in the country given the patriarchal thinking that characterized the colonial powers. The same thinking was verified within Christianity as spearheaded by missionaries to whom colonial powers had entrusted the bulk of the formal education. The first policy document in Rwanda was designed in 1912⁴. It sub-divided the Rwandan youth into three categories according to their age. The first category was composed of young boys and girls aged between 7 years and 12 years. The second category was composed of children aged between 12 years and 15 years old and the third category was made up of more mature people aged between 15 years and 20 years old. Curricula for these categories were different with more manual work for the last category, as they were approaching time to form their own families. Although the

⁴ Source: Department of Planning, Ministry of Education, Science, Technology and Scientific Research, Kigali

policy did not specify any discrimination against girls but the reality was that no single girl attended the first formal school. Given the traditional concept of woman as homemaker, only boys were encouraged to go to school leaving their sisters behind to assist their mothers in domestic activities.

This policy was changed in 1925 especially in terms of structures. This led the primary school to have two main cycles: the first cycle and the second cycle, each cycle having three-year duration. The following subjects were the main components of the curriculum for the first cycle: religion, agriculture, counting, *Kinyarwanda* (mother tongue: basics of writing and reading), manual work and hygiene. The curriculum for the second cycle remained unchanged but an emphasis was placed on the manual work as a way to prepare the pupils for the practical life awaiting them. This system was restructured in 1948 to have three cycles of two years each with a clear distinction between boys and girls at the level of the curriculum. In addition, to the subject of agriculture that was covered for the two first cycles by both boys and girls the latter had to learn sewing, domestic works and home management. There was a third cycle for only selected boys to be prepared for secondary school. In this cycle more emphasis was placed on agriculture, horticulture, handicraft and French. There was no third cycle for girls. Their training ended with the second cycle after which they were supposed to go home where they were to stay with their mothers assisting them in the house chores until they get married. This system continued until 1938 when the first secondary school for girls was established. It is noteworthy that the first secondary school for boys was created in 1907 at *Nyanza*, the then Capital City of Rwanda, for future Administrators. These were the sons of Chiefs.

As the traditional education did, the colonial education favored more boys than girls. Boys were encouraged both in terms of the content of curriculum and the duration of their training. Subjects taught to boys exposed them to the public life while specific subjects for girls exposed them to the domestic life. Girls were not encouraged to do secondary school which is an indication that they were conceived for domestic life. The first secondary school created in the country was for Administrators, a role that was not meant for girls. Girls had to wait until 30 years later to see their first secondary school created.

This is a good indication that both the traditional system and the colonial system of education were not in favor of girls and this has influenced to a greater extent the current situation of women's education in the country, as discussed in the following section, which looks at the educational system during the post colonial period.

1.3 POST COLONIAL INFLUENCE

Since Rwanda got its independence on 1 July 1962, important changes at the policy level took place in the educational system both at primary and secondary levels. Free education for all was one of the guiding principles of education during the first Republic, as transpired in the 1966 school law under Article 4 stipulating that *"primary education is free and compulsory for all children who have reached the schooling age"*⁵. This period was also characterized by the proliferation of schools both at the primary and secondary levels. Changes touched the structure of the primary school program that was transformed into two cycles of two years each. Thus, all children had to cover four years, instead of six years, for girls and non selected boys, and six years for selected boys as previously structured. Although girls were allowed to do secondary school they were more encouraged to do subjects associated with their stereotypes as care givers. Thus, subjects such as nursing, midwifery, home economics and teaching were more taken by girls than boys. Subjects such as business administration, mechanics, handicraft, science, and agriculture were the preserves of men.

The discouragement of girls to go beyond primary school was a disguised way of sustaining intellectual gender imbalance given that the subjects they were studying equipped them with more skills to perform better in their socially preconceived roles. The newly created schools gave most access to university for boys. It was not surprising therefore to find that women represented only 16 % of the total student population in 1983⁶, twenty years after the National University of Rwanda was created.

⁵ Ministère de l'Éducation Nationale, Loi du 27 Août 1966 sur l'Éducation Nationale de la République Rwandaise, P 1.

⁶ Source: Archives, Department of Planning, Ministry of Education, Science, Technology and Scientific Research.

This situation remained unchanged until 1994 when the horrendous genocide broke out in the country.

The sections above give us a picture of educational policies that were oriented toward a rural driven education with a strong resonance of a traditionally patriarchal influence backed up by a colonial and Christian thinking all contributing to the submission of girls/women for whom education was just a tool to sustain their stereotyped social roles and responsibilities. Although some of the policies seemingly encouraged girls to do secondary school, they remained gender biased in a sense that they maintained the distinction between boys and girls as shaped by tradition with the blessing of colonialism and Christianity. Ironically, it was until after the 1994 genocide that Rwanda took a new image in the area of policy making whereby a special emphasis was put on women as highlighted in the various policy provisions addressing women's interests in different fields. Those policy provisions are found in the national constitution, the gender national policy, the education sector policy, and in many other important government documents including the Vision 2020. The following sections look at some of those policy provisions, the strategies designed for their implementation and the context behind their establishment.

1.4 GENDER POLICIES

Given the cross-cutting nature of gender, gender policies are encapsulated in various government documents but the following lines discuss those reflected in the Vision 2020, the national gender policy, and the education sector policy, as per their relevance to the subject under study. Besides, only policies that are related to women in higher education and especially in science and technology will be highlighted.

The section below describes the circumstances surrounding the establishment of those policies?

1.4.1 Context

The 1994 Rwanda genocide affected deeply the country's social fabric, as well as its economic system. The Government of Rwanda had therefore daunting challenges of rehabilitating the country in all its aspects and putting the national machinery in motion towards sustainable development. To achieve that goal the Rwanda Government has embarked on a development oriented vision containing key elements which are good governance, democratization, national reconciliation, national political stability and security⁷. For this vision to become a reality the involvement of all Rwandan men and women, boys and girls in the government's development related programs was a must. This implies the necessity of gender as a dimension that must be given a serious consideration in all aspects of the vision. It is in this context that the national gender policy was designed as a framework for a smooth gender mainstreaming in all development activities undertaken by the government.

Gender policies came also as a response from the Rwanda Government to comply with related international legal instruments that it had ratified. Those include the *Convention for the Elimination of All Forms of Discriminations Against Women*; the *Lagos Plan of Action for Economic Development of Africa 1980-2000*; the *Beijing Plan of Action*; the *United Nations Education for All*; and the *2000 Millennium Development Goals*, to name but a few. All these legal instruments converge on a critical notion of promoting gender equality and empowerment of women. One of the areas where the promotion of gender equality must be strongly rooted for a better achievement of the above goals is education. This section looks at tertiary education with an emphasis on women in science and technology as this constitutes the main concern in the subject under study. The following are relevant policy provisions as stipulated in the government policy documents mentioned above.

⁷ Rwanda's Vision 2020. Ministry of Finance and Economic Planning, Kigali.

1.4.1.1 Vision 2020

The following are some of the articles from the Rwanda's Vision 2020 that are dealing with gender and education:

Article 196: The discrimination against women originates from the Rwandan culture and tradition which consider the girl as inferior to the boy, physically, intellectually and socially.

Article 200: ...by 2020 Rwanda will have reached parity between the two sexes in tertiary education and women will represent at least 30% in posts of responsibility and will thus be empowered at all decision-making levels.

Articles 218: ...Rwanda will do whatever possible to develop science and technology education at secondary and tertiary levels and adapt it to the needs of the country... take into consideration the national culture and gender issues in the development and adaptation of science and technology.

The spirit behind these provisions is reflected in the education sector policy and in the gender national policy in forms of specific policy statements and associated implementation strategies, as unfolds below.

1.4.1.2 Education sector gender policy

A Access to education:

Secondary and tertiary education shall be extended by encouraging day attending rather than boarding, but taking into consideration the specific constraints, needs and incentives of women and men, boys and girls.

- A1 **Strategies:** Encouraging distance learning in all types of training (formal, non-formal and informal).
- A2 Take measures that promote performance of men, women, boys and girls;
- A3 Take affirmative actions to promote the education of girls and women in secondary and higher education in appropriate manner.

B *Quality and relevance:*

At the same time increasing access to education, quality and relevance in education shall be given strong attention. Scientific and technological research shall be strengthened in all research centers, including universities and higher learning institutions. Output-oriented curriculum to be used by all schools shall be developed, monitored and reviewed as necessary. Relevant text books shall be provided.

- B1 *Strategies:*** Train teachers at all levels of education in sufficient number and quality.
- B2 Provide relevant text books
- B3 Develop, print and distribute a revised and harmonized syllabus
- B4 Reinforce in education system the positive values of Rwandan culture and other cultures through:
 - A curriculum development free of any kind of discrimination and gender stereotypes.

- A learning environment, in terms of space, equipment and learning material that take into account gender differences i.e needs of women and men, girls and boys. For example, existence of separate toilets for women and men, girls and boys.

B5 Carry out studies in critical areas in education and science and technology.

B6 Performance indicators will be established and each institution will be evaluated according to these indicators.

C Education system and management:

The central government shall be responsible for setting policies, standards and norms for monitoring and evaluation;

Planning and management of the system shall be based on well researched statistics and information;

The education acts, rules and regulations shall be reviewed where necessary;

There shall be full and regular communication between the Minister in charge of education and all his/her partners;

C1 **Strategies:** Reinforce the planning department at central and decentralized levels;

C2 Review procedures relating to the management and administration of education for their adaptation and modernization;

C3 Teach career guidance and counseling to all teachers and practice them at all schools especially with reference to career and HIV/AIDS;

C4 Mechanisms for coordination between the Ministry of education, science, technology and scientific research and its partners shall be rationalized.

D Financing of education:

The budget allocation for each sector will be engendered in line with the government's gender budget initiative, in order to match the specific education constraints and needs of women, men, girls and boys.

D1. **Strategy:** Involve students and parents in institutions' and school's budget preparation and financial management.

E Scientific teaching and information communication technology (ICT) in Education:

Science and mathematics teaching and ICT shall be at the heart of the education system. This shall be taught at all levels of education.

Links will be started between all higher learning institutions and secondary schools as a start and progress to as many as secondary schools as possible.

To take measures that promote women and men, girls and boys access and performance in science and information communication technology.

E1 **Strategies:** Train a critical mass of science and ICT teachers.

E2 Ensure practical skills and provide science equipments and computers to identified schools and progressively to all schools, as means allow.

E3 Establish model centers of excellence in science, mathematics and ICT at secondary school level

F Disparities in education:

There shall be no disparity in education be it by sex, region, social group or other reasons;

The current achievements in regard to access of girls to primary and secondary education shall be safeguarded while strengthening their performance especially in science, mathematics and technology.

F1 **Strategies:** closely monitor girls and other vulnerable groups' performance and achievements at all levels and take necessary corrective measures;

F2 Encourage girls and other vulnerable groups' participation in science and technology related fields;

F3 Take affirmative action for girls to study science and technology related subjects;

F4 To tackle all causes of girl's and woman's drop out and low performance at all cycles of education.

1.4.1.3 National gender policy

The Rwanda national gender policy includes among other things the specific objectives to address the cases of gender imbalance for the different areas of concern and the strategies to achieve them. The following are the specific objectives and associated strategies for the area of education:

G Education and professional training:

To ensure that boys and girls have equal access to educational opportunities in a manner that guarantees satisfactory performance and output in all fields of study;

To promote girls enrolment in Science and Technology;

To increase the literacy rates of women and men, with specific emphasis on women.

G1 Strategies: Introduce measures that aim at ensuring that gender issues are mainstreamed in the educational system, in the areas of curriculum, policy, and all educational programs;

G2 Introduce measures that aim at enhancing opportunities for boys and girls at all levels of education and in all institutions of higher learning and training;

G3 Introduce special measures to improve girls' enrolment in the non-traditional fields of study particularly in Science and Technology, to increase their performance;

G4 Introduce measures to promote and enhance vocational skills and functional literacy for women and men taking into consideration gender roles and responsibilities.

1.4.2 Statement of the problem

As a result of government's commitment to policy provision of equal educational opportunities for both men and women, and the implementation strategies already highlighted above it can be said that women in Rwanda have free access to education including the traditionally male preserved domains such as science and technology. Thus, boys and girls, men and women at primary, secondary and tertiary levels of education can be assumed to have equal access and treatment. This is however far from being the case given that the gap between men and women remains significant not only in the men's preserved fields but also in the rest of academic areas especially at tertiary level, as observed in the statistical records from institutions of higher learning. The same records show that the gap between men and women is much deeper in science and technology. As matter of fact the rate of women's participation in these areas has fluctuated between 14 % and 20 %⁸ over the last five years, as evidenced by statistics. This suggests that despite of the new policies, there have not been major changes in the status of women in science and technology since the government showed its commitment to equal educational opportunities for nearly ten years ago. Thus, this situation proves to be a daunting challenge to the Rwandan government. In actual fact it would be very problematic to address poverty and other socio-economic issues if women who represent 52 %⁹ of the population, remain underrepresented in education, and particularly in science and technology, areas that the government considers the heart of education program.

⁸ Source: Register's offices from the National University of Rwanda and the Kigali Institute of Science, Technology and Management.

⁹ National census, 2001. Ministry of Finance and Economic Planning, Kigali

1.4.2.1 Research questions

In the attempt to understand the reasons underlying the above scenario this study has focused on science and technology, areas that are believed to be the cornerstone of intellectual advancement and socio-economic development. The aim of the study is to explore the poor representation of women in science and technology. It is articulating around the following research questions:

1. What have been the mechanisms put in place by the concerned academic institutions for a successful implementation of the national gender policy?
2. What are the strategies that targeted higher learning institutions have adopted to sustain further participation of women in science and technology?
3. What are the gender dynamics existing within the concerned institutions and how are they impacting women's participation in science and technology?
4. What are the future prospects for gender equality in science and technology?

While answering the above research questions the study has addressed the objectives described below.

1.4.2.2 Objectives

1. To look at the policies that the concerned institutions have designed for a successful implementation of the national gender policy.

2. To identify strategies within those policies aimed at sustaining further participation of women in science and technology.
3. To uncover the gender dynamics within the targeted institutions and see how they are impacting on women's participation in science and technology.
4. To identify future prospects for gender equality in science and technology.

1.4.3 Significance of the study

Since the establishment the transitional government after the 1994 genocide, a new impetus was given to higher education in Rwanda. The reason behind the urge for higher education was mainly two-fold. Firstly, because the Rwandan government is fully supportive to the human capital theory holding that human resources constitute an important area for investment. The government is convinced that the same concept that applies by placing money in a bank to yield return, applies as well when investment is made in the education of human resources. In some contexts the spill-over effect of investing in human capital produces more impact on economic growth than investing in physical materials, as revealed in Fedderke Johannes (2001). Thus, the Rwanda government has embarked on a program of training all Rwandan men, women, boys and girls because they are seen as the most powerful resources of the country.

This is evidenced by the creation of the Student Financing Agency for Rwanda (SFAR), a government fund that is granting scholarships in a form of loans to qualified Rwandans who wish to do higher education. This program carries more weight when it is remembered that it was established with the backdrop of the 1994 genocide that claimed around a million of human lives which affected severely the pool of human resources that the country relied on.

Secondly, encouragement of higher education came to terms with the revitalization of the dispensation of African higher education that aimed at contributing to the intellectual and socio-economic advancement of the continent through knowledge based economy (Ajayi et al, 1996). This required a pool of African intellectuals suitable both in size and in quality to address challenges that Africa is facing. This applied to Rwanda as well. It is in this context that the number of higher learning institutions increased from 4 institutions that existed before the genocide to 16 that are currently operating. However, the goal to eradicate poverty and reach a successful development will not be achieved without a massive involvement of both men and women in the government development related activities. For this involvement to become a reality both men and women need to be equipped with required skills, which implies an educational system that is gender discriminatory free. In the search of boosting higher education a special emphasis has been placed on science and technology, areas that are believed to be the pillars for the socio-economic development of Africa (Ajayi et al, 1996).

The significance of the study lies therefore in the fact that addressing the gap between men and women in these areas would contribute significantly to advance Rwanda towards sustainable development, a goal that is encapsulated in its Vision 2020. It is in this context that a Ministry of Gender and Women in Development was created for a regular monitoring of gender mainstreaming in all government development related programs. Closing the gap between men and women in science and technology is one of the duties that this Ministry has been assigned to, as highlighted in the national gender policy.

CHAPTER II

LITERATURE REVIEW

AFRICAN OVERVIEW

2.0 INTRODUCTION

This chapter discusses higher education in Africa and looks at the representation of women in this area. It discusses the role played by both traditional and modern educational institutions, to influence the poor representation of women in the African academies. Through a gender analysis the chapter unveils the elements that have prevented them from fully integrating into the academic world. This scenario of inequality has remained a serious challenge to African tertiary institutions, and has prevented their full development and contribution to the continent, though this was among others the role that post-colonial African higher education was meant to play. A special emphasis will be placed on gender inequalities in the area of science and technology, a field that is known as one of the pillars for the advancement of African development, and a space where the under-representation of women signals the persistence of heavily male dominated cultures.

2.1 PRE-MODERN HIGHER EDUCATION IN AFRICA

Higher education is an old institution in Africa. Its roots can be traced to ancient Egypt with the creation of the Alexandria Museum and Library three centuries B.C, which was an institution that is reflected in the features of modern academic institutions. It served as a forum for scholars of international reputation where they could meet and share in terms of production and dissemination of knowledge. Eminent men of letters and science met there and discussed issues touching national, regional and international interests.

For example, Eratosthenes, *“the father of scientific geography who measured the circumference of the earth, an African from Cyrenaica, was Librarian there”*(Ajayi, 1996: 6).

Euclid, Archimedes and many other highly reputed scholars, whose influence spread wings to the rest of the world, met there on a regular basis. Quoting El-Abbadi, (1990), Ajayi (1996: 6-7) sustains that

...the fascination of the ancient Alexandria lies in the fact that it was at the roots of a remarkable scientific movement, which remained unrivalled until modern times. For well over a millennium, the scholarly achievement of the ancient Alexandria served as guiding light for the great humanists of the European renaissance. It is perhaps legitimate to say that before the Alexandria era, knowledge had been to a great extent regional but with the creation of the Alexandria as the first universal library in the history of mankind, knowledge too became universal.

Despite the universal character of knowledge, as spearheaded by Alexandria, this knowledge remained inaccessible to women, who were excluded from formal academic institutions and centers of learning. This was a lived reality in Alexandria and Al-Azhar in Egypt, Timbuktu in Mali and in other places of Africa, a continent where women did not begin to access the academies until the twentieth century.

Nevertheless, the exclusion of women from pre-modern academies did not prevent them from accessing other forms of knowledge. This knowledge was produced and disseminated through various traditional mechanisms. Thus, besides academic institutions, Africa had other means for the production and transmission of knowledge. The traditional systems of knowledge production were run by the sage who could have both spiritual and cultural powers. Their knowledge was intended for people of an advanced level in terms of age, equivalent to modern higher education, given that youngsters within the range of birth and puberty were mostly under the care of mothers and fathers in a family context. In other contexts, it was generally at the age of puberty that a shift to maturity was experienced by boys and girls, either through rites of passage, or other relevant practices depending on the community's culture. At this juncture, young girls were prepared to become among other things good wives, meaning that they were taught how to take care of their family, which was one of the main roles they were supposed to play as future wives.

This could be done through various domestic and extra-domestic activities. Likewise, young boys were taught how to be good husbands. Assuring security and providing for the family were some of the responsibilities that men were supposed to assume.

Some forms of indigenous knowledge were imparted in a gender discriminatory way. For example, iron-working technology that was developed in Western Africa towards 1st century BC (Alexis.B.A Adande, 1997: 73), was in the hands of specialized social groups exclusively composed of men. These groups could be found in the communities of the Waaba of North-West Benin and in the Ibo communities of Southern-Eastern Nigeria¹⁰. However, women were welcomed in some other forms of knowledge such as traditional medicine, which was handed down to children who had shown an interest in the subject regardless of gender (Simone de Suza, 1997: 211). Traditional medicine included the use of leaves, roots, fruits, seeds, cowries and other shells, mineral substances, and locally produced items that were processed to make a cure for the various diseases that communities were faced with. Likewise rain-making, a subject that remained controversial as far as its veracity is concerned, was also passed on to those who had shown certain qualities such as exceptional courage, politeness and integrity. Though the majority of those who qualified proved to be old men, young men and women were also eligible (Gbnoukpo Bodhou Dah-Lokonom, 1997:91).

Knowledge was transmitted through various media. These were mainly oral and / or writing skills that were disseminated to communities. Egypt, Ethiopia and Somalia and number of other countries had systems of writing that had evolved from graphical writing to phonetic writing. Most of the writing systems were introduced to Africa in the 11th century, especially in sub-Saharan Africa, by Muslim traders and missionaries who taught their converts how to write, as a tool for fluent communication to promote both trade relationships and religious ideologies. The question that remains unsolved is why the pre-colonial African civilization that practiced writing, did not develop in equivalent way to other regions that practiced writing such as Arab countries.

¹⁰ Ibid, p 73

Akoha (1997:298) argues that the Western printing system and the slave trade may be among the major factors that contributed to the demise of indigenous writing systems in Africa. Egbo argues that both the traditional and Islamic education were based on the principal of functionalism and aimed at sustaining the “practical, social, spiritual and intellectual needs of the communities” (2000:64). She goes on to say that both educational systems converged at the immediate introduction to society and preparation for adulthood. In the process learning was oriented towards various activities, and family background played an instrumental role in determining which activity to learn. Thus, boys learned their father’s activities and girls were trained accordingly.

The influence of Muslim education over indigenous education is not seen in the same way. Egbo argues that both systems complemented each other harmoniously. She goes on to say that Muslim educational systems did not in any way devalue the knowledge possessed by various social groups. She argues that on the contrary,

all knowledge was valued and the conceptual separation of the ‘formal’ (vocational) education of each gender was a matter of practical convenience rather than one of gender discrimination (2000:65).

Brenner disagrees with this view when he explains the rapid expansion of Islamization as quickened by the series of jihads (2001:1). The latter were wars waged against indigenous populations, in the name of Allah, through which they occupied vast territories covering big parts of Western, Central and Eastern Africa. Thus, one cannot overlook the Muslim influence, that followed war crimes and other resulting from these jihads, which were imposed on local populations to whom Muslim faith and culture were inculcated. It goes without saying that these atrocities and war crimes were more heavily felt by women than men. Besides, the *Shari’a*¹¹ law, which is one of the pillars of Muslim judiciary, proves fiercely gender discriminatory. For example, the stoning of a woman in the case of extramarital pregnancy when the man who impregnated her remains unpunished, speaks for itself. This is still a lived reality in some African countries including Nigeria and Sudan.

¹¹ Shari’a : “the law of Islam believed by Muslims to be divine revelation, and drawn from a number of sources, including the *Qur’an*, the *Hadith* , and the consensus of the Muslim community” (see Dictionary of Ideas, Thinkers, Theories and Concepts in Philosophy, Science, Religion, Politics, History and the Arts, 1997. Brockhampton, London)

Likewise, the African indigenous way of living was imbued with gender imbalances pertaining to power, as reflected in the various skills that were meant to be possessed by men, and the power that those skills inferred to them. Drawing on his experience, Shenjarai (1994) shows us how, for example, in the traditional *Shona* society of Zimbabwe, language and space were part of major social forces, that shaped masculinity and femininity in that society. A young boy without verbal skills would be sent for errands, which was an activity 'normally meant' for women, due to his poor performance in language. In other words, defaults in supposedly 'manhood' qualities implied womanhood, which revealed a relationship of superiority and inferiority between men and women. Shenjarai (1994:150), argues that verbal skills were very critical for men, especially those who were in authority and addressed issues concerning judicial matters, that were settled in a public space, called the *dare*. Women were not allowed to access that space, except when they came in "*as victims, victimizers or jurors in judicial matters or when they brought in food for the men*" (Shenjarai, 1994: 150). Ironically the role of women was vital in the formation of masculinity. Shenjarai (1994:153), tells us how boys were prevented from accessing kitchens by their mothers, who threatened them with kitchen implements. Those boys learned that the kitchen was not a space for men, and any activity carried out there was to be done by women. Thus, while men were shaping women's activities and the space where they were to be carried out, women were also doing the same for men.

It is legitimate to recognize the complementarily aspects between men and women. In various contexts, women were involved in income generating activities, playing therefore the role of breadwinners. The women in the Yoruba market in Nigeria are one of the myriad examples of the contribution of women to the socio-economic development of their communities (Oyewumi 1997). She shows us how these women had control of trade markets and the ritual spaces, which were very critical elements for their society's economic and spiritual life. Cases of the involvement of women in productive activities, aimed at boosting the wellbeing of their families and communities, were (and are still) common in Africa, and this was given its due credence.

Thus, despite their exclusion from pre-colonial academies, women were traditionally involved in the production and transmission of knowledge. However, this contribution

would have been more significant if their participation in the academies had been encouraged. On the contrary, the situation was that in addition to the traditional educational system that opposed women's entry to higher education, the colonial education system came to strengthen this status quo through various factors as unfolded below.

2.2 COLONIAL EDUCATION

European colonialism was informed by its Victorian and Christian concepts of women. As a matter of fact, the participation of women in higher education had long been opposed in the West. According to the European model, the perception of women was supposed to,

transmit values of humility, have low ambitions and systematic under-estimation of girls' and women's ability in cognitive achievement and social attainment, and their capacity to work in the public sphere (Assié-Lumumba, 1994:23).

As a result, colonialism compelled African women to stay at home and to be involved in reproductive activities, which therefore crippled the traditional skills that they had developed, which allowed them to play their roles in the public and domestic spaces they had originally occupied. Thus, colonialism, which was embedded with new epistemological notions around the roles and responsibilities of women, played an alienating role that affected African concepts of womanhood, leading to what Teboho Lebakeng (2004:109), called the “*epistemicide*”¹² of African values. The traditional system of knowledge production and dissemination was thus affected, and transformed into a new system that defined new sexual divisions in labor, according higher values to the activities of men than of women.

In the same vein, men were encouraged to occupy and control the public space, and were therefore to carry out income generating activities as the breadwinners of families; but most of all as the subjects of colonial authorities, who needed auxiliaries for various supporting positions. This encouraged men to join the few colonial colleges that were in place (e.g Nigeria, Ghana, Uganda and South Africa), and to

¹² Alienation of cultural values leading to a loss of cultural identity and emotional being.

work as colonial subjects in both the public and private sector. As for women, they were excluded from colonial institutions. Colonial tertiary institutions were male preserves where knowledge production was a male motivated and oriented process.

Religious doctrines contributed to the poor representation of women in the African academies. Two major religions influenced Africa in her knowledge production system, namely Christianity and Islam. Both religions offered very little room for the participation of women in the public sphere, and discouraged their participation in higher education. Religious institutions played an instrumental role in the establishment of higher education institutions in Africa, and elsewhere. Their doctrinal influence served to put a hold on the advancement of women in education. These doctrines developed African tertiary institutions into male domains, which were fertile grounds for masculine doctrines and political landscape that men continued to occupy with less commitment to the involvement of women in tertiary education.

2.2.1 Modern Institutions of Higher Education

Modern institutions of higher learning are a reflection of patriarchal values which do not well augur for women. However, this did not prevent African women from struggling to access higher education. At some universities women were admitted after a long struggle (Mama, 2003: 108). For example, the Makerere University that opened its doors in 1922, received its first woman student in 1945. The National University of Congo that started in 1954 admitted its first woman student in 1962, and as late as 1971 the rate of women enrolled at the national University of Cote d'Ivoire was 6.75% (Ajayi et al 1996:184). As much as access to higher education for women was not encouraged, so their participation in science and technology was much discouraged. For example, in Egypt opposition to the matriculation of women in science was clearly expressed by university authorities. Al-Qalamawi, one of the four women pioneers of Egyptian higher education had initially wanted to join science, but the British Dean of the faculty of science turned her request down (Badran, 1995:149).

It is important however to note here that contrary to the European tertiary education, that excluded women, the African academic institutions did not discriminate women at policy level (Rathgeber, 1999:181).

After independence the number of African universities increased tremendously, but the issue of the representation of women remained unresolved. As a matter of fact, only 18 universities and colleges existed in the sub-Saharan Africa during the colonial period, whereas today the number has increased to around 900 universities and institutions of higher learning and¹³. However, this increase in the number of tertiary institutions does not line up with the increase of the participation of women despite constant calls for gender equality in higher education. In actual fact, it has been more than three decades a call for change went out, but so far no significant results have been achieved, in terms of gender equity in African tertiary education. Gender mainstreaming at higher education level has been encouraged as a strategy to reach that goal, but it appears that there is still a long way to go.

2.3 STRATEGIZING FOR EQUALITY IN HIGHER EDUCATION.

The issue of the representation of women in African academies and gender issues in general, were revealed as a major concern during a debate around the paper *“Perspectives in the Transformation of Africa: Challenges to the African University as a Model to Society”*; which was commissioned by the Association of African Universities on the occasion of the celebration of its 25th anniversary in January 1993, Accra, Ghana. It became clear that the majority of academic leaders were not even aware that gender parity was an issue (Ajayi et al 1996).

Urgent measures were needed to address the lack of gender awareness in the academy. It is in this context, that Katherine Namuddu (1995), challenged African academies to strategize in a bid to address the massive gender gaps, among students and staff on campuses. The following was her proposal:

¹³ The International Association of Universities and Association of African Universities 2004. Guide to Higher Education in Africa, 3rd ed pp vi. New York, Palgrave Macmillan.

Ensure that women are granted admissions into courses through pre-determined quotas; head-hunt women for advertised academic and management positions; where necessary design capacity building programs for women; introduce and implement policies on sexual harassment; identify, track and nurture strong women students for development; ensure that good women candidates for higher positions are duly promoted. (Cited in Bennett, 2002)¹⁴

Responses to this call have materialized through various policies and actions, touching three main aspects of the question of women's under-representation in higher education. Firstly, affirmative action in the form of policies and programs were designed and implemented in some institutions, to increase the participation of women in higher education, and this has helped to make some progress. For example, affirmative action policies implemented in 1990, increased women's representation from 20% to 33% at Makerere University, where qualified women students are given a 1.5 point as a surplus, to facilitate their access to the university (Kwesiga 2002:98). Similar measures have been taken at the University of Zimbabwe where the cut-off point for women joining science and technology is 2 points lower than their counterpart men (Chagonda and Gore 2000), just to name a couple of higher learning institutions on the continent that have embarked in tackling the issue of gender equity seriously.

Secondly, efforts for the sustainable participation of women in tertiary institutions were made and they converged on the need to review the content, methods and various approaches by which curricula, research and other academic activities engaging knowledge production were done. This led to the establishment of gender and women's studies in various universities as channeled through Institutes, Departments and Gender Units. Thus, the African Gender Institute (AGI) was created in 1996 at the University of Cape Town; Gender and Women's studies at the University of the Western Cape started in 1995; the Gender Dimension Program at the University of Dar-Es-Salaam was introduced in 1994; and the Department of Women's and Gender Studies at Makerere University, was started a bit earlier in 1991, and there are other examples. In the same vein, various organizations and research centers were established in African countries to network with the academic gender institutions.

¹⁴ Jane Bennett 2001. 'Exploration of a 'Gap': Strategizing Gender Equity in African Universities'. [On line]: <http://www.feministafrica.org>. Available, June 25, 2005.

They were established to research comprehensive ways of looking at issues of gender equity in African higher education. These are for example the Association of African Women for Research and Development (AAWORD),¹⁵ headquartered in Dakar, with offices in Nairobi and Lagos, the Center for the Study of Violence and Reconciliation, the Gender Unit in South Africa¹⁶, the African Regional Sexuality Resource Center¹⁷ in Nigeria, the African Women's Development and Communication Network¹⁸ in Kenya, and the Tanzania Gender Networking Program¹⁹, to name a few. The above is an indication that a step forward, in terms of gender equity in higher education (and other gender related areas) has been made at the levels of research and policy, but the situation in the field leaves a lot to be desired.

This leads us to the third aspect of the question of gender equity in higher education, which touches the implementation of the various types of affirmative action and related programs. Despite the good reasons underlying affirmative action, which are mainly aimed at increasing and sustaining the participation of women in higher education, the intellectual environment of men resists this move, basing their arguments on the same policy of undermining women's capacities and of "validating" "their" so-called weakness. This stance is connected for example, to affirmative action policies that reduce the cut-off point for women's entry into the institutions of higher learning. In other places affirmative action policies are taken in the form of bridging courses (less resisted) that are given to women, as a pre-university program, after which an exam is written to select those who qualify for university. This is the case for example at Kiriri Women's University of Science and Technology based in Nairobi, and the University of Dar Es Salaam. Nevertheless, this program may play a role in blaming the victims for those who do not pass the exams, given that they are preparing and writing it in the same environment where they failed the exams previously. In actual fact, they are not exempt from the "*double burden*", among other things, which results from the sexual labor division that affects them and impacts on their academic performance (Tamale Sylvia and Oloka-Onyango, 2000:8).

¹⁵ <http://www.afard.org>

¹⁶ <http://www.wits.ac.za./csvr/projects/greender.htm>

¹⁷ <http://www.arsrc.org>

¹⁸ <http://www.africaonline.co.ke/femnet>

¹⁹ <http://www.tgnp.co.tz>

Resistance to affirmative action policies aiming at increasing women's participation in higher education, is coupled with a critical problem, which is sexual harassment and sexual violence. This is a huge theme that has attracted great attention among feminist researchers. Chagonda and A. Gore (2000), Yahya Othman (2000), Mbilizi (2001), as cited in Bennett (2002)²⁰ express a strong concern to sexual harassment, that is shown and described as a weapon at the disposal of masculinities to police, threaten, silence, traumatize, confuse and to control women and girl students on campuses. Bennett (2002)²¹, observes that initiatives aimed at addressing this issue have been taken by various universities both in South Africa and elsewhere on the continent. A collision resulting from diverging sources of cultural, economic, gendered, political and religious interests and meanings, have made it difficult to find common ground in the search for a lasting solution to sexual harassment and sexual violence, and to its devastating effects that women students continue to face on campuses. While research continues for a comprehensive analysis of sexual harassment, women in African academies continue to suffer morally, spiritually and physically, in silence, to save their identity, gender, citizenship and faith, as all these things have implications on their academic performance.

The above section portrays in brief the achievements made in response to the call for gender balance in African academies, and the hurdles, that attempts to respond to that call, have been facing. It appears that there is still a long way to go in the journey to gendered academic institutions. However, the observation is that the machine has been set in motion, and things are moving to join the idea of Ashley Martabano and Michelle O'Sullivan (2004), at the rate of *"three steps forward two steps back"*. Nevertheless, this pace should be accelerated if Africa is to fit into the "today world", with all its rapidly changing aspects.

To address that challenge, Africa should start by engendering her intellectual engine, which is her higher education, for a knowledge production that fits her entire population. Makhubu argues that what our countries badly need is a recognition of the fact that *"Africa will remain an underdeveloped and globally despised continent as*

²⁰ See archive on <http://www.feministafrica.org>

²¹ Ibid

long as it continues to have less-than-lofty ambitions for developing the totality of her people” (1998:493).

It is the slowness of the academic institutions to respond to the call for engendered African academics, that some African scholars are interrogating, to find out where the crux of the matter lies. Commenting on the statistics of women “drop outs” Mama (2003), argues that there is a tendency to point an accusing finger at women for ‘their drop outs’, as though they were the only sources responsible for their departures, or locating the reasons behind poor women’s representation in African academics, at the lower levels of education (primary and secondary education). This clouds the idea that *“there might be gender dynamics within tertiary institutions that operate to create an environment that may, in fact, push-out women students”*(Mama 2003:111). This point of view is very critical to this study, as it has informed the methods and conceptual framework used. As determined by its scope, the study is conducted within two academic institutions to explore their responsiveness to the call for a sustained women’s participation in science and technology as transpired in the gender national policy for Rwanda. Though men remain overwhelmingly represented even in other academic areas, the question needs to be asked why the gap between men and women in science and technology is more pronounced? The section below looks at this question to see to what extent the field of science and technology is embedded with gender dynamics, which render the academic terrain more than a ‘narrative of gaps’. In actual fact, increasing the number of women in this field just for the sake of filling the gaps would not be helpful if the dynamics underlying those gaps are not closely analyzed and addressed.

2.4 WOMEN IN SCIENCE AND TECHNOLOGY

The role of women as users and developers of technology has long been overlooked, despite their historical position as central actors in science and technology. For example, women physicians were common in the Middle Ages, and Early Modern Italy was known for its women mathematicians, which was a situation that prevailed until when women were discouraged from participating in science and technology in most of modern Europe. Another example is Britain’s Royal Academy that was

created in 1662, which did not admit women until 1945, (Rathgeber 1999:181). The lack of gender parity in the world academies especially in the field of science and technology has raised reactions at the level of the United Nations, which has debated this issue in various international conferences on women in science and technology. These reactions were motivated by the observation that no global development will be achieved if half of the world population is not integrated in the global economy.

Thus, the Vienna Program of Action on Science and Technology for Development (UN 1979), recommended women's participation in all types of training and education; the Advisory Committee on Science and Technology (UN, 1984), recommended a review of school curricula, text books and teaching materials that incorporate women's needs and interests. This conference was followed by the Nairobi Forward-Looking Strategies for Advancement of women (UN, 1985), which recommended the promotion of equal opportunities at all levels of education; then came the Rio de Janeiro conference (1992), that highlighted the role of women in environmental preservation, and stressed the need for measures to increase education and training in science and technology especially, at post graduate levels.

These recommendations were not received with the same enthusiasm in all of the UN member countries. Eva M. Rathgeber (1999:182), argues that *"efforts to implement these recommendations have been made in some countries but in others, prevailing cultural norms and practices have posed strong deterrents to reform"*. These cultural norms, practices, sex roles, social stereotypes and beliefs have been identified as some of the factors contributing to the poor participation of women in science and technology. All of these cultural elements converge to form the perception that women are not made for science and technology. This conception has led to the lack of interest in science and technology of women, as they do not see themselves in these domains (Erinosho, 1993:41). In other words, the area of science and technology does not accommodate women both at the level of the content and the teaching methods, as women are represented there as outsiders. Quoting Kelly (1989) Rathgeber (1999:191), argues that text books rarely depict women as active participants in science and technology.

She goes on to say that even when they are depicted *"they are shown as amazed onlookers"*. Despite the many hurdles that constrained the smooth implementation of

the recommendations that emerged from the international conferences, and others of a regional or national nature, some achievements have been made. Various organizations, associations, and clubs aimed at advancing women in science and technology were created across the world and Africa has been touched by that “wind of change” despite the slowness of the implementation of these recommendations. Thus, the Forum for African Women Educationalist (FAWE) was created in 1992, in Kenya, as a mechanism to meet the goals designed in the program on Education for All, in sub-Saharan Africa²². Based in Kenya, the forum has 33 national chapters today, that are involved in the advancement of girls and women’s education, and science and technology is one of the key areas that FAWE has invested in. The Kiriri Women’s University of Science and Technology in Kenya, is another important achievement aimed at advancing women in science and technology education. As the university is still in its initial phase, it offers a BSc in Computer Science and Mathematics, as academic programs. Given that the university is a private institution, it may not be immune to the difficulties facing private academic institutions, in as far as the quality of service is concerned, but one has to commend the relevant authorities for their courageous initiative to start such a significant enterprise, given the importance of financial resources needed due to the nature of the fields they have engaged in.

In the same line of thought, other associations of an academic and non academic nature were created on the continent, such as the Association of Women Engineers, Technicians and Scientists in Uganda working with Kabissa²³, to help various women’s organizations in Eastern Africa to access internet; the Science, Technology and Mathematics Education Clinic (STM) in Ghana that works under the Ministry of Education to improve enrollment and subsequent performance of girls, in the study of science and technology at the level of primary, secondary and tertiary education²⁴; and the South African Reference Group on Women in Science and Technology, to name a few of them.

²² See www.fawe.org

²³ A Swahili name (meaning COMPLETE) for the network providing ICT to various organizations for gender advocacy.

²⁴ See www.wisgsat.org

After this brief review of the development of women's involvement in science and technology, we will look at the patterns, concepts and theories that underlie their poor representation in the said areas.

2.5 EMERGING PATTERNS, CONCEPTS AND THEORIES IN AFRICA

There is a growing amount of literature dealing with women in science and technology across Africa, which provides insights for both methodology and strategies to address the question under study. Various aspects of the issue have been studied, and results are presented in the forms of main patterns that are verified during the course of women's education, from primary to higher education levels. These patterns are reflected into the very remarkable presence of girls and women at the primary level. This representation is not sustained, as their presence decreases the higher they go. Another notable pattern is that women are more represented in arts than in science and technology. However, it is worth mentioning the predominance of men in all academic fields. In the fields of science, where women have relative representation, the characteristics of these areas are associated with their stereotyping. For example, due to 'their' believed nurturing and caring nature, women enjoy an important representation in the medically oriented fields, such as nursing and other fields like home economics, management, arts and humanities related subjects. Literature on this subject discusses a number of possible accessibility factors that are classified differently according to the respective writers, but with more or less the same underpinning concepts. Citing K.A.L. Hyde 1991, Kwesiga (2002) suggests a method of analyzing accessibility factors through societal, institutional, and family frameworks.

2.5.1 Societal factors

Kwesiga (2002:55), argues that society as a whole plays a major role in hindering the advancement of women in higher education. She goes on to say that society places a higher value on marriage than on education for girls, but it is at the age of marriage that young women are supposed to join higher education. At this juncture women are confronted with a puzzle of knowing

which direction to take: whether to get married or to proceed with higher education. Young women, who are lucky enough to survive restrictive measures at the lower levels of their education, end up surrendering under societal pressure to found families (Yahya Othman, 2000:35). Very few of them will resist this pressure and very few of those who get married will get a chance to resume their studies

2.5.1.1 Institutional factors--Policy Issues

Policies constitute an important basis of various approaches aimed at addressing various problems, including gender issues. International and national legal instruments (e.g. *Convention for the Elimination of All Discriminations Against Women-CEDAW*; *UN Commission on Women Status Declaration*; national gender policies and other various national and regional legal documents against women's discriminations) have been put in place, but very interestingly, the use of relevant instruments remains unimplemented and therefore problematic, even by those who have ratified them. In discussing about affirmative action policies Assié-Lumumba argues that:

affirmative action policies have many shortcomings, whether they apply to gender, ethnic groups, race, or region. They give decision-makers a sense of having done their duty while structural factors continue to reproduce inequality. However, if conceived as a short-run solution while working on structural change, such policies may provide some kind of impetus(1994:27).

The question here is to know whether gender sensitive policies, accompanied with gendered structures, would address the question of gender equality in higher education? Without denying the importance of policies and the gendering of academic structures, it appears that a set of different elements need to be looked at, for the successful implementation of those policies. Rathgeber (1999:182), shows how even if the numbers were increased as a way of bridging the gaps, the

problem of gender mainstreaming in science and technology would still remain. She goes on to say that for real change to take place, it has to occur at the level of conceptions and practices of these areas. She argues that the mere fact of increasing the number of women in science and technology will not necessarily effect fundamental change, in the conception and practice of science. She adds that if the current practice of science and technology is to be reformed, then it will be necessary not only for more women to be represented, but also for a critical assessment of the underlying assumptions that guide the creation of science and technology, to be undertaken.

All the above arguments sound strong in their support of important steps to be made towards gender equity in science and technology. However, it still seems that addressing issues of policies, women's involvement in academic structures and "*assumptions underlying creation of science*" would not help that much. The question appears to be rather more cultural than technical. In actual fact, women may be part of academic structures, but the likelihood of their presence to influence the implementation of gender-aware policies would go unnoticed. The real transformation should start at the level of mentalities that accord a higher value to men, as at present they see women as their assistants rather than their equal partners.

This mentality is formed at an early age, at family level, such as when there is a financial crisis, a boy is more encouraged to study and a girl ordered to stay at home to help her mother with house chores. The discussion below is a confirmation of this sad reality that Kwesiga (2002:52), considers as one of the factors contributing to the poor representation of women in science and technology, as verified at family level.

2.5.1.2 Family factors

Family has proved to be a place for the reproduction of gender discrimination, which impacts on the poor representation of women in science and technology. Kwesiga (2002:52), highlights among other things the two following access factors. Firstly, she looks at the family and the kind of influence that it has on women's education. She discusses the low value accorded to girls, which is reflected in the way girls are treated compared to their brothers. She gives an example of girls who remain busy assisting their mothers with reproductive activities after class, while boys play or work on their school assignments. Encouraged by their mothers who do not want them to be involved in house chores, boys take the opportunity to play outside with their peers or to do other things they deem more important. This view shares affinity with Shenjarai Shire's view (1994:153), who argues that women are sustaining masculinity by chasing out boys who want to access the kitchen. It is in this socialization process that most African women find themselves ironically reinforcing masculinities on one hand and femininities on the other, contributing therefore to sustain patriarchy by widening the existing gaps between the two sexes.

Secondly Kwesiga (2002:170), indicates how opportunity cost constitutes a huge hurdle that needs to be addressed for the advancement of women's education. The opportunity cost comes into play when the mother prefers her daughter not to go to school, but rather to stay at home to assist her in her domestic works. In that case, the son will be the one to go to school. The opportunity cost becomes then a corollary of the higher value that is placed more on boys than girls. Thus, the family becomes a site for the reproduction of gender discriminations, through sexual labor division that keeps girls and women involved in the house chores, which deny them opportunities to study (Tamale, S and Oloka-Onyango, 2000:8). Referring to the impact of the family, Idah Sithole (1993:25), argues that some girls in

adolescence tend to be self-conscious, and support the idea that family inculcates in them that “*it is not feminine to be good at any thing especially technical, scientific and mathematical*”. Such an attitude, that is actually unnatural to women, contributes very significantly to prevent them from enrolling in the areas of science, technology and any related subject. This difference in the consideration of a boy and a girl is a lived reality in most African societies, including Rwanda.

2.5.2 The Rwandan Context

As discussed in the introductory part of this study (see section 1.1), Rwandan society allocated a very high value to a boy child simply because he is the family heir, responsible for the perpetuity of the family and the name of the clan. Economically, the boy constitutes a means of life insurance for the parents in their old age. He will become financially independent and he is relied upon by his family to take responsibilities in all circumstances. The girl helps her mother in the house chores and is the confident of the family. Although she is also liked, the girl's value is undermined by the patriarchal system governing the Rwandan society. This is observed, for example, when the young girl gets married. She leaves her parents and joins her husband and becomes the property to her family-in-law. Children belong to the clan of her husband. Economically, she is dependent on her husband and generally she cannot make any decision in the use of income products. Investigations conducted around this topic found that in 55.6% of cases where women have cash crops, their husbands decide the use of these products. Concerning the management of these crops only 6.5% of interviewees wanted women to handle them, while 41.7% preferred this responsibility to be assured by husbands. Fifty one, point eight (51.8) per cent²⁵ thought that management of cash crops should be jointly handled by both husband and wife. So, it is clear that boys are highly valued compared to girls in the Rwandan society.

²⁵ Percentages collected from “*A Study on beliefs, attitudes and social-cultural practices related to gender in Rwanda*”. A study conducted by the Ministry of Gender and Women in Development in conjunction with the United Nations Population Fund, 2002.

This is what complicates the notion of gender equity in Rwanda, that men have difficulties grasping the new concept that demands that women be equally treated to men. However, there are men who understand the concept, and who are trying hard to put it into effect. Though these men remain the minority, there are hopes that their number will increase. On the same note, not all women are supportive of gender equality. There are some who still support the patriarchal status quo, and take it as the order of the day. Both categories of men and women who object to gender equality need to be approached and assisted in appropriate way to help them move forwards as there is no way Rwanda can develop if the issue of gender inequalities is not addressed in all walks of life, let alone science and technology.

Given the above situation, it appears that successful gender mainstreaming in science and technology, will result from the intersection of an array of factors touching society as a whole, academic institutions and families. These factors can be divided into two categories: technical factors and cultural factors. Among the technical factors one can cite gender sensitive policies, the inclusion of women in the various structures of academic institutions to allow them to participate in decision-making, a change at the level of concepts and practices behind science and technology, and the addressing of infrastructural and financially related issues and other factors. Cultural factors are those beliefs, concepts and practices that are socially constructed to 'justify' the poor participation of women in science and technology.

Though addressing these technical factors would be an important step forwards, but that would be like treating the symptoms of a disease instead of the causes. The actual problem lies in the cultural factors encapsulated in patriarchy, that has never held men and women on an equal footing. That is why including women in decision-making, supported by policies, no matter how gender-aware they are, would not really work, because that would be asking patriarchy to accommodate gender, but they are two philosophies that are incompatible. It is patriarchy that has created the concept of woman as a helper of man, not his equal partner.

This perception of woman as a helper is strongly rooted in the minds of the majority of men and some women. It is this perception and the whole mindset around it, that needs to be transformed or reformed into a new one, that sees women as equal partners to men. This transformation requires special programs and strategies to address the cultural side of the issue, which is actually the crux of the matter. So, a comprehensive solution of the problem would be a combination of both technical and cultural factors. This joins the idea of Makhubu, who argues that

“while universities may open their doors to women, the apparent contradictions between those aspects of African culture which designate women as mere tools for homemaking and the aim of a modern university to admit women on equal footing with men, still impede women’s access to both higher education and to playing a meaningful role in the development of our institutions of higher learning” (1998:497),

Much of the literature about women in science and technology, has placed more emphasis on access, as reflected in policies designed with a resonance of recommendations from relevant researches, but very little has been done to further their participation, once they reach higher education. Without denying the importance of access factors, going beyond access, with a focus on the gap between men and women in science and technology, is the goal of this study. Most of the research on the subject under study has been conducted with the aim of providing the relevant bodies with needed data for planning or policy-making purposes, and this gives more credence to quantitative than to qualitative data. Thus, very few of them have reflected the need of the people concerned.

What is missing in most of the accounts, is therefore the standpoint of women doing science and technology, especially on how they assess and make sense of their own abilities, experiences, environment and achievements as they move through higher education. This is one of the approaches used in this study.

2.6 HIGHER EDUCATION IN RWANDA

2.6.1 Historical Background

Higher education in Rwanda started in 1936 with the creation of the *Nyakinama* Faculty of Theology, before the creation of the National University of Rwanda (UNR) in 1963, a year after the country's independence that was celebrated on 1 July 1962. Before looking at a description of the higher education in Rwanda, let us have a glance at the lower levels of education, namely primary and secondary, from which a pool of candidates for higher education was to be formed, to see to what extent women's underrepresentation in the Rwandan higher education is informed by the previous stages of education and training.

Primary education started in 1907, and was run by missionaries who also proceeded later on with the creation of secondary education (Erny, 1976). Primary education underwent various stages of restructuring as time went by, and a distinction between boys and girls programs they offered was encouraged especially in the fifth year, which was the end of primary school. At this level a selection for future elite of administrators was made among boys, only. It was the same elite that constituted the pool for secondary school. At this juncture it appears that girls were not allowed to do higher education, as they were not encouraged to do secondary school.

Girls finishing primary school, were given a program on home management to prepare them for 'their' future traditional roles and responsibilities, as mothers and care givers of families.

The same divisions between boys and girls were maintained when women's secondary schools were opened in the 1950s. Secondary school curricula for girls reflected women's stereotypes. For example, the first secondary schools for girls aimed at training primary school teachers, home managers and

midwifery-assistants. Schools for boys offered programs on administration, agriculture, accounting, carpentry, and tailoring, which was a visible preparation for boys to occupy the public space in the future. Like many other patriarchal societies, the Rwandan tradition conceives a woman as a homemaker, which does not differ from the Christian and the colonial conceptions. Thus, all schools created in the late 1950s, giving access to higher education, were not admitting women, though there was no written policy excluding them.

With respect to technical schools and others offering pure science, not a single woman was admitted. It was common culture for women to do home management but doing science was very unpopular for them. Thus, seeking admission in to a technical school was very much discouraged for women. For instance, until the 1970s not a single woman was admitted at the *Kicukiro* Technical School that was created in 1954. This school trained junior technicians in mechanics, carpentry, building, electricity and tailoring. Women's education kept the focus on homemaking which explained their absence at the National University of Rwanda when it was created in 1963.

2.6.2 The Impact of Genocide on Higher Education

In addition to the challenges facing higher education in Africa, Rwanda has its peculiarities adding more pressure on the country's tertiary institutions. The 1994 genocide worsened an already bad situation, as it destroyed the few basic infrastructures that the country had put in place, and more importantly it claimed the most precious assets a country can have: her human resources.

An estimate of around one million human lives were lost, among whom were a sizable number of graduates. Thus, there was, and still is, a strong need to train nationals to close the gap in human resources, which is impacting heavily on the national economy. As a matter of fact, Rwanda has adopted an emergency plan for a massive recruitment of expatriate teachers for higher education, which is costing millions of US dollars, that could be used for other development purposes, if the country had nationals to do the work.

Putting such a country on track to engage in the global competition for economic prosperity still presents a daunting challenge, and thus relevant strategies have been ongoing, and higher education has to play an instrumental role in this process. As it is the driving force for the current economic systems worldwide, knowledge based economy is supposed to be welcomed and fueled by tertiary institutions, which are hubs of knowledge production. Thus, higher learning institutions have become key players as they are in privileged positions as knowledge producers. Likewise, the primary role of the Rwandan higher learning institutions is to address the challenge of producing knowledge that can address the needs of the population, and to make this knowledge accessible to the majority of the country, if the latter is to fit in the global competition. To play their role in successful ways, Rwanda academic institutions need to strategize to find solutions to the lack of professionally qualified teachers and researchers, and insufficient infrastructures and staff retention, as local and international organizations are attracting academic staff because of the better working and salary conditions that they are offering.

While the issues of basic infrastructures, facilities, training and retention of staff, and strengthening research and teaching remain serious challenges for Rwandan higher education, redressing gender issues should not be overlooked. This is an imperative issue that should be part and parcel with the package, to bring on board a better integration of the totality of Rwandan men and women in the global family.

2.6.3 Rwandan Higher Education Today

To address the above challenges the Rwandan government has adopted a number of strategies including encouraging the creation of private universities, and more public tertiary institutions, among others. Since the 1994 four new academic institutions have been created to make a total of six public tertiary institutions, including the two existing before the 1994 genocide. It would be interesting to have a picture of women's involvement in Rwandan higher education, to see to what extent these strategies have been effective in addressing gender inequalities. The section below covers only the two

academic institutions but given the fact that they are leading in the areas concerned nationwide, one can have an idea of what women's participation looks like in the rest of the academic institutions²⁶.

2.6.4 Women in Higher Education

As in many other countries, women students' participation in Rwandan higher education is poor. At KIST the overall women students' participation has been oscillating between 19 and 21 %, over the last four years. At UNR the rate of women's participation has been fluctuating between 15 and 20 %. With respect to staff, overall women's representation leaves a lot to be desired. At KIST and UNR the women's ratio is 23% and 18% respectively. The situation becomes alarming at the upper level of academic ranks. The general observation is that the higher you go, the fewer women you have. The UNR situation speaks for itself. Out of 180 Assistant Lecturers, 46 are women, representing 25% of the total. Out of 106 Lecturers, 16 are women representing 15% of the total. Out of 57 Senior Lecturers, 4 are women representing 7% of the total. Out of 23 Associate Professors, 1 is a woman representing 4%, and out of 13 Professors, no single Professor is a woman. So, the successive decrease of 25%, 15%, 7%, 4% and 0% is a good example of the glass-ceiling phenomenon²⁷. Bearing in mind that these are the leading public institutions in the concerned areas, one can see that women's participation in higher education remains a daunting challenge to the Rwandan government.

²⁶ In addition to the six public institutions, 10 private institutions have been created and they are receiving a significant number of women. For example, the academic year 2003, the only Free University of Kigali had 3 418 women nearly equal to the number of women admitted in all public institutions combined: 3488 women. In the same period, the total number of women admitted in private institutions was 5 434 versus 3 488 in the public tertiary institutions.

²⁷ Glass ceiling phenomenon refers to "a barrier to personal advancement especially of a woman or ethnic minorities". See Lesley Brown 1993. The New Shorter Oxford English Dictionary. Vol 1 pp 1097. New York, Oxford University Press

2.6.5 Women in Science and Technology

There is a paucity of literature on Rwandan women in science and technology. The bulk of existing literature is mainly characterized by consultancy works informed by donors and other funding organizations whose needs are aimed at documenting their processes of planning, and policy-making, to name a couple. So far no publication on Rwandan women in science and technology has appeared, and this has caused difficulties in finding relevant literature within national context. Finding data that is likely to address the research question has therefore been demanding. However, statistics from archives and various reports from relevant authorities, have played an important role, so as to give an idea of the situation on the ground. As in many other countries, available statistics reveal massive gaps between men and women in the Rwandan institutions of higher learning. For example, the total number of men admitted in higher education (13 675) is almost double that of women (7 922)²⁸ in the academic year of 2003. Compared to this, the gap is even wider in the area of science and technology, whereby out of 801 men and women admitted at the Rwanda National University in the same year, 140 were women represented 17%. The scenario is a bit different at the Kigali Institute of Science, Technology and Management whereby female representation was 14% at the inception of the institute in 1997. Women's representation at this institute was raised and maintained at 30% in 2003. However, this percentage was helped by the faculty of management that admits a significant number of women. The situation in science and technology alone would give a lesser percentage, as shown in the following example: the 2001 first year female intake in part-time ordinary Diploma in technology was 11%, while it was 66 % in management.

The creation of the FAWE²⁹ Secondary School, based in Kigali, the capital city, is worth mentioning, as an indication of some efforts made by the Rwanda government, in the sense of encouraging women to do science and

²⁸ UNR Strategic plan 2004-2009

²⁹ FAWE: Forum for African Women Educationalists, an association created with the mission of promoting gender women's education at all levels.

technology. Without denying the efforts made by these academic institutions to increase women's representation in science and technology, it appears that more efforts are to be made to close the gap between men and women that remains significantly wide. The question however, is to know why that gap remains so wide, while the political effort to bridge it is visible? Another question would be to know whether the mere fact of increasing the number of women to bridge the gap, would be enough to address the issue of gender equity in science and technology? This juncture brings us back to the conceptual question raised above (see sections 1.4.2 & 2.5.1.1), which deserves more attention than it has been accorded. This requires an investigation, by an appropriate overall approach or methodology that goes beyond the visible (figures and policies), to come up with a lasting solution to this issue. Methodological orientation is then the aim of the next chapter.

CHAPTER III

METHODOLOGY

3.0 INTRODUCTION

In this chapter, I discuss the methodology that I have used to conduct the research. I present the epistemological orientation, conceptual framework of the study, followed by a discussion of the methods or techniques used to collect desired data. Deciding which concept and methods to use for a given study depends on the question to be addressed (Carla Willig, 2001:21). Exploring the poor representation of women in science and technology urges a step beyond the statistical figures for a better understanding of factors underpinning that scenario. This implies interrogating the statistical profile of women compared to men in science and technology by means of available information, with an additional use of qualitative methods. To achieve this, I gathered and analysed relevant documents but more importantly, I discussed with relevant key informants. These methods allowed access to the hidden elements of response that could not be revealed by figures or documents. Thus, I have used a set of methods comprising archival exploration (use of statistics, analysis of existing policies, and other relevant documents), and qualitative methods composed of focus groups interviews and individual interviews.

The position of the researcher in relation with the study is also discussed in this chapter to have a clear picture of the connection between him and the research. This allows among others to understand how the researcher has developed an interest in the study and to what extent his role and responsibility came into play. Commenting on the feminist's denial of neutral, value-free science and knowledge Mbilnyi (1992:53), argues that "the researchers are part of the world under study". She goes on to say that "our conception of the problem under study, our construction of research instruments, our interpretation of data, are all effected by our multiple identities and discourses". The following sections discuss the epistemological orientation of the study, the conceptual framework, and the methods used respectively.

3.1 EPISTEMOLOGICAL ORIENTATION

With globalization, a new world economic order initiated and boosted by the World Bank and other international funding agencies, African governments seized the opportunity to advance higher education institutions seen, as discussed in Mama (2003: 105), as the *“key sites for the production of intellectual capacity that is both socially responsible and relevant to regional development”*. On the same note, Mama (2003: 114), goes on to say that African governments have privileged science and technology over arts and humanities, *“because of the presumed link between science and modernization and the assumption that science will help Africa ‘catch-up’ with Western Industrial capitalist contexts”*. Given that women constitute the majority of African populations, if not worldwide, it would therefore be inconceivable to advance African development if such an important part of its human resources are not equipped enough to give their full contribution in the development processes of the continent. Thus, educating women is imperative and should be given the attention it deserves, for them to develop the required knowledge and skills to give their share for the advancement of their well-being and for the development of the continent as a whole. However, genuine advancement for Africa will not be achieved if gender inequalities in education (and in other areas) are not addressed. For this to be achieved educational institutions should take necessary measures to fight all forms of gender imbalances both academically and administratively. Special strategies should be adopted to change the status-quo in the traditionally male dominated fields such as science and technology to challenge traditional concepts and epistemologies around women in science and technology. These are part and parcel of the key factors underlying the poor representation of women in science and technology.

The notion of epistemology which refers to *“different theories about knowledge and specifically about how knowledge is produced, distributed and consumed”* (Mbilinyi 1992:32), raises the following questions:

who can be a knower (only men?); what tests beliefs must pass in order to be legitimated as knowledge (only tests against men's experience and observations?); what kind of things can be known (can "subjective truths", ones that only women- or only some women- tend to arrive at, count as knowledge?); the nature of objectivity (does it require "point of viewlessness"?); the appropriate relationship between the researcher and his/her research subjects (must the researcher be disinterested, dispassionate and socially invisible to the subject?); what should be the purpose of the pursuit of knowledge (to produce information for men?).

The above questions form a gender-driven concern with epistemology, and centre in a nutshell on "*who knows what, about whom, and how this knowledge is legitimated*" (Mary Maynard, 2004: 381). These epistemological aspects are reflected in this chapter as they form, as to paraphrase Hawkesworth (1987), the inescapable ground for methodology. The above questions can serve as a stepping stone to question the poor representation of women in science and technology, which leads to interrogate some of the existing assumptions used as an attempt to understand that situation. The following assumptions have been selected due to their relevance to the subject under study, as reflected under the above review of literature:

1. Less gender committed mechanisms and/or strategies introduced by institutions to:
 - facilitate women's access to science and technology;
 - further women's participations in science and technology;
2. Institutional cultures preventing women from picking interest in science and technology;
3. Academic practices and their relevance with women's participation in science and technology.

These assumptions formed the backbone of the spirit that guided the formulation of interview guides, and informed the exploration of the under-representation of women in science and technology. Are these assumptions going to prove the real reasons underlying the poor participation of women in science and technology? Are there any other factors hidden behind these assumptions to serve as genuine reasons underpinning the under-representation of women in these fields? These are questions that this study seeks to address. To respond to the above questions there is a need of a conceptual framework to serve as a grounding to inform this study.

3.2 CONCEPTUAL FRAMEWORK

The exploration of the gap between men and women in science and technology requires a deeper understanding of the situation beyond the figures. This turns to the idea of Miblinyi (1992:53), who argues that some of the most significant phenomena in society are not directly observable, including gender, imperial, class and race/ethnic relations. She goes on to say that seeking to explain and to change these relations researchers enter an exploratory terrain and look for explanations for events and patterns of behaviour, often in the unconscious of the individual psyches or in social structures. As a guide towards the hidden side of the issue, there is a need of a conceptual framework reflecting concepts or theories that are connected or associated with the nature of the question. A set of theories have been used to form the backbone of this study due to their relevance of the questions to be addressed. Those are the *standpoint and situated knowledge*, and *gender and positionality*. The section below, looks at how the selected theories interact to address the problem under study. Besides, the position of the researcher is discussed to see to what extent he relates in a way or in another to the study. In actual fact, knowing for example who is marginalized or victimized or victimizer depends on where we stand, or the angle under which we are looking at things.

3.2.1 Standpoint and situated knowledge

The underlying aim of feminist standpoint theory is to bring the voices of those in the peripheries³⁰ to the centre. This came as a feminist criticism regarding women's absence from, or marginalized position in, social science. Hartsock (1983: 160) argues that different groups or categories in a given society produce a system of dualism that privileges some people and devalues others leading to the creation of social groupings of oppressors and oppressed. She goes on to say that standpoint theory reveals an interesting insight that while the oppressed are learning from their own position for their survival, they also learn from their oppressor's position, which equips them with ability

³⁰ Those whose voices are not in the streamline.

to critically reflect on the privileged position, which cultivates an “*epistemic advantage*”.

By extension, the standpoint theory applies to women as a social category in the sense that “*women’s experience of oppression produces particular and privileged understandings*” (Mary Maynard, 2004:381). It is these understandings or insights, which are out of men’s reach that allow women to view the social world differently. Thus, women’s voices should be heard for a more comprehensive perspective of the social world. The standpoint theory is suitable for this context because it has the strength of emphasizing the importance of listening to women’s voices. However, post modern feminists have a different view to this universalizing thinking that looks at women as a homogenous category. They have introduced new perspectives touching gender, class, race, ethnicity, religion, age, and other aspects of social relations, which attribute different life experiences to women. In some African traditional contexts, for example, women were enjoying economic and ritual power, which ascribed them a high social status. The Yoruba market women in Nigeria, discussed above (see section 2.1), occupied a very important economic and ritual space (Oyewumi, 1997). So, depending on contexts women were (and are still) experiencing different life realities, which invalidate their homogeneity as a category. The standpoint theory is related to this study, as it serves as a way of making women’s lives (depending on their socio-cultural contexts), visible. This leads to the notion of positionality and its impact on gender sensitive research as unfolded in the following section.

3.2.2 Gender and Positionality

Quoting Manicom (1990), Mbilinyi (1992:33), maintains that “*gender refers to social relations between and among men and women*” and describes them as something that is not static. She goes on to say that “*gender is subject to change, to abolition and to transformation through everyday happenings as well as periodic moments of crisis and transformation*”. Given that men and

women are socialized differently they are ascribed different sexual roles, and thus, they have different views of the social life.

Depending on the social position they are occupying, be it race, ethnic or class context they are very likely to live a different life. Difference is also verified at the level of women themselves or men of same social group. For example, a poor woman will not face the same life experience with the rich woman from the same ethnic group. Likewise, their values and interpretations vis-à-vis social realities will differ. Thus, belonging to the same ethnic group is not enough for women to enjoy sameness. They do not share social values, dreams, and interests, which invalidates their homogeneity in terms of life experience.

It is the intersection of the various social positions such as gender, race, class, age, religion, and many others that determines the positionality of an individual. This context helps understand that talking to Rwandan women who are involved in science and technology would give more insight on their poor representation in these areas than talking to a Rwandan woman from a different field. The same women are expected to give different views or insights on the question under study as they originate from different family and social backgrounds. This diversity of voices or positioning would be of a paramount importance in the exploration of the question researched on. In the same line of thought, the researcher's positioning comes into play as somebody whose location touches directly or indirectly the epistemological question raised above on *"who knows what, about whom and how this knowledge is legitimated"*.

Researcher's positioning: this section addresses the question of knowing to what extent the researcher can serve the interest of the researched, especially when they do not have the same positioning. More precisely, it discusses how for example, a man (in this case the researcher) can articulate women's voices given that they are gendered differently and therefore have different views of social life? At this juncture, despite my interest to bring women's issues to the fore, I was faced with a challenge: how to come to term with my positioning?

In other words how, in my position as a Rwandan man, could I articulate the voices of Rwandan women who are pursuing science and technology?

Initially, I thought my position as a researcher was to serve as a channel or facilitator so as not to engage in the power differential with my informants and therefore serve the cause of credible standpoint by allowing them to express their own experience. Such reasoning sounded interesting but something was tricky with it: I came to realize that I was going to fall in the trap of thinking of myself as a value-free character forgetting, moreover, my role as research designer, analyst and reporter. I, therefore, preferred to describe my profile as a way of handling the problem of bias to turn to the idea of Mbilinyi (1992:56), who is of the view that value judgments exist in all of us and that we can never be 'value-free'. She goes on to say that "*we can increase our value premises and judgments. By bringing them into the terrain of research process, the researcher can try to control their influence and by informing the readers, allow them to judge their impacts for themselves*".

My profile reflects two main phases of my life experience that connect me to this study. The first phase describes my life in exile and the second phase depicts it in my home country. I acquired experiences from both contexts that complemented each other to answer the questions I had in connection with social roles and responsibilities of women. In actual facts this study comes in as one of my reactions to those questions.

Seeking the truth while in exile: I am a Rwandan man, born and brought up in exile (Burundi), with a strong background of life experience in a refugee camp. What I saw and what I was told on the account of women there plunged me in kind of confusion, which I was able to get rid off in mid 1990s. I grew up in a patriarchal society that allowed me and my peers to develop our masculinities paired with certain concepts and perceptions on women. We were told a set of stereotypes on women, which described them as 'weaker sex', 'not intelligent', 'cries like kids', 'fearful' and many others that located them in vulnerable positions. However, what I observed was the opposite: I realized that women were not what men claimed them to be, as weak and

vulnerable creatures. I saw them making great achievements including feeding families and providing them with the kind of care and protection they needed. Some of them were called *abagabo* (men) because they behaved in a responsible manner and made important achievements. In the Rwandan culture, high achievers, both men and women are called *abagabo or intwari*, to mean persons of high moral standards and integrity. On the contrary, I saw men abdicating their responsibilities, because of hardship, and running away for greener pastures leaving behind their families with no assistance at all. Those kinds of men may be called *imbwa* or *ibigwari* (literally meaning dogs or cowards respectively), which is opposite to men in the sense described above.

I was struck to see that no single woman, the so-called 'weaker sex', followed the move by men who deserted their families. I am not denying, however, the fact that there were men who behaved in very responsible manner, caring for their families and contributing, as required at their levels, to address the needs of the general public in the refugee camps. Besides, I do recognize that there were some women who failed to play their family roles as mothers. However, the label that was placed on women, as a category, through various stereotypes was not justified. I kept on thinking that may be something was wrong with women but I could not match what I was told on them with what I experienced with them achieving. I witnessed widows assuming dual responsibilities, as both mothers and 'fathers', I saw women struggling for the survival of their families and I even saw those who went beyond securing their survivals and worked hard for their economic and political promotion to turn to the idea of Mama (2002: 3) who rightly argues that "*African women do have aspirations that go far beyond securing their survivals: political, economic, social, intellectual, professional and indeed personal desires for change.*"

Outside the refugee camp was the school environment, another space that allowed me again to view women differently from the perspective that society was inculcating in me. Since I started schooling I had always witnessed cases of girls who were brilliant. I saw them winning prizes in various areas including science, a field that continues to be a male reserve' though. I saw

them competing with men as athletes, and all this came to increase my curiosity to the extent that I started questioning seriously what society was telling me. Still, I could not know what to take between what I was witnessing and what society was telling me especially through my peers whose influence was very heavy on me. I lived in that dilemma until the moment when I saw women's reaction in the aftermath of the 1994, Rwandan genocide. I realize that they were capable of doing even more than what I had seen them doing in the refugee camp.

More discoveries at home: the Rwandan genocide came ironically as unique opportunity for women to access the public space and to show the general public what they were capable of. Though this horrendous event claimed around a million of human lives but at the same time it opened new spaces for women. Till then women had been faced with insurmountable traditional barriers preventing them from accessing the public sphere, though a timid opening for women's representation in decision-making had started earlier before 1994. This was indexed by the nomination of *Agathe Uwilingiyimana*, one of the leading figures in the then opposition, as the first Rwandan woman to occupy the post of Prime Minister in 1993. She was unfortunately killed during the genocide. It was after the genocide that a first-of-its-kind event took place in Rwanda in the area of decision-making when a military woman, Major *Rose Kabuye*, was appointed as the Mayor of Kigali, the Capital City. In the parallel move women occupied other important posts ranging from Heads of Districts to Ministers. Since then the situation has developed from strength to strength to culminate to the today's 48% women's representation in the parliament³¹ making Rwanda the leading country worldwide in as far as the representation of women parliamentarians is concerned. It would be interesting to investigate what were the reasons underlying such socio-political development in the post genocide Rwanda.

³¹ See www.rwandaparlament.gov.rw

There are suggestions that two main factors would be behind this scenario: firstly women constituted the majority of the genocide survivors and therefore they were to take the lead both for their survival and for the reconstruction of the country, as there were not enough men to assume their traditional responsibilities. Secondly, the Rwandan Patriotic Front (RPF) that halted genocide and thereafter took over the country had in its military and political wings a sizable representation of women and the first mayor of Kigali City was actually a military Senior Officer from the military wing. So, it was not unusual for RPF to give room to women in decision-making as they had developed that habit while they were still in the bush. This Rwandan scenario is interesting as it has not been always the case for a number of other armed movements to promote women to decision-making positions after victory. The situation in Zimbabwe for example, shows us a different situation whereby women who fought alongside with the ruling Zimbabwean ZANU PF were sent back to the domestic realm after liberation struggles (Nhongo, Simbanegavi, 2000); (Tanya Lyons, 2004).

The active involvement of Rwandan women in decision-making and other areas after genocide enriched my life experience on a backdrop of women's sense of responsibility and important potentials they are imbedded with. I saw them constructing houses, building bridges and roads, and carrying sick people to health centres and hospitals just to name a few. All these are activities they were not used to, as the tradition prohibited them to do them, but they improvised and did something that proved to be very beneficial to themselves and to their communities. These women's behaviour in the aftermath of the Rwandan genocide served as an eye opener, a discovery that helped me put an end to the confusing stereotypes on women. It allowed me to take a stance that has been my guidance when it comes to look at both categories of men and women worldwide. I see them as human beings with versatile potentials that need to be put to full use within a context of mutual respect of each and everyone's rights for their individual well-being and for the betterment of their societies. Additionally, my professional position served me as a channel not only to have a sense of gender as a social issue but also as an academic program.

Professional exposure: the gender balanced stance I had towards men and women was one of the things that attracted the attention of my employer, at the Kigali Institute of Science and Technology, who entrusted important administration responsibilities in me though I was still a novice in the area of academic administration. I occupied a variety of positions ranging from the post of Personnel Officer, through Executive Assistant to the Vice-Rector in charge of academics, to the Head of Department of Gender and Technology Transfer. It would not be superfluous to mention that my colleagues nicknamed me “*Gender Man*” following my outspoken engagement in gender. My employer who had seen in me a fertile ground for gender considered my request for training in gender studies as I needed more skills for a better performance in my new appointment. He recommended me for a government sponsored scholarship and in the meantime he spread his wings to the University of Cape Town, where he liaised with the African Gender Institute (AGI) for my admission for a master’s degree program in Gender and Transformation. This initiative aimed among other things at advancing gender between KIST and AGI. So, on one hand, researching on women in science and technology with an approach of giving them a space to articulate their voices fits well in my professional background. On the other hand, it came as the ultimate point of a long process that was deeply rooted in my life experience. I believe this will help the reader to grasp my positioning and thus, differentiate it from that of my informants. This section was addressing gender positionality as one of the theories informing this study. The following looks at the methods or techniques that were used for both data collection and data analysis.

3.3 METHODS OF RESEARCH

3.3.1 Introduction

The methods used in this study vary according to the nature of desired data and as dictated by the research questions. Two types of data were needed: qualitative data which were collected in forms of focus groups interviews and individual interviews, and archival data, collected from documentary sources. The latter were statistical data and other forms of information that were collected from written materials.

With respect to data analysis, content analysis was used as an approach. Given that this approach is not a single technique but rather a collection of techniques that can be used to analyze a body of text, thematic analysis has been used as one of those techniques. The paragraphs below describe how and why these methods were chosen.

3.3.2 Choice of methods

The choice of methods was based on the argument by Carla Willig (2001:21), that *“the research question, data collection techniques and methods of data analysis are dependent upon one another. They cannot be considered separately and they should not be chosen independently from one another”*. Besides, objectives of the study play a critical role in the selection of methods for data collection and data analysis as well, as they remain connected to the three components mentioned above. Bearing the above in mind one has to look among other things, the size of the work to do, location of the field, and possible constraints, before one decides which type of design to use for the research work. Thus, the case study has been chosen as a design or methodology of this research for reasons detailed in the sections below.

After deciding on the methodology the remained question was to know which methods to use? The same Carla Willig's³² argument held in the process of selecting appropriate methods. The research questions and the objectives/research questions discussed in the introductory part of the study allowed a combination of two sources of information: documentary source and interviews. The data from documents or archives covered some of the aspects reflected in the research questions. Those were related to achievements as compared to what was planned, mechanisms and strategies adopted to implement national gender policy and further women's participation in science and technology, and future prospects for gender equality in science and technology. However, this answered partly the research questions. The question on gender dynamics underpinning the under-representation of women in science and technology required qualitative data and was addressed through focus groups interviews and individual interviews. Thus, documentary and qualitative methods or techniques were used for data collection, while thematic analysis was used for data analysis. Detailed discussions on chosen methods are described in the sections under the case study (see under 3.3.4).

3.3.3 Scope of the study

The study was conducted in Rwanda in two academic institutions, the National University of Rwanda (UNR) and the Kigali Institute of Science, Technology and Management (KIST) that are leading in the concerned fields nationally. Target populations were women and men 4th year and 3rd year students who were doing science and technology. Men and women teachers with the academic ranks of lecturers and above were also interviewed for academically balanced information.

This choice was dictated by both the relevance of participants: their fields of study were connected to the subject under study and their experience in their respective fields. More specifically the term science here referred to pure science. So, a sample of students from the departments of Biology, Chemistry,

³² Ibid p.21

Mathematics and Physics were considered. Concerning technology, students from Civil Engineering, Computer Engineering, Electrical and Mechanical Engineering were considered. Students doing pure science were selected from UNR and those doing engineering were selected from KIST. For the teaching staff, four men and four women from both institutions were interviewed. Those teaching in engineering were from KIST and those teaching pure science were from UNR. Two men lecturing in Computer Engineering and in Mechanical Engineering were interviewed at KIST. Only one woman lecturing in Civil Engineering at KIST was available. The other woman was a Senior Instructor specialist of workshops. At UNR two men, one teaching in the Department of Pharmacy and another in the Department of Biology attended the interview. Two women both teaching Biology were available. The study covers a five-year period ranging between 1999 and 2004. The choice of this period was dictated by the fact that the national gender policy used for this study was implemented within that range of time.

The study uses students and teachers as primary data sources but the case applies to both institutions. In other words the study looks at the response by the two institutions, to the national gender policy, but not by students. The study is not comparing the two institutions but it is using both of them combined, as a case. This allowed covering a bigger range of perspectives. The section below describes four types of methods as part of the general approach or methodology used, which is the case study.

3.3.4 The Case Study

The case study was chosen as a design or methodology for this research. Cresswell (1998:61) defines the case study as follows:

Whereas some consider 'the case' an object of study (Stake, 1995) and other consider it a methodology (e.g Merriam, 1998), a case study is an exploration of a 'bounded system' or case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context. This 'bounded system' is bounded by time and place, and it is the case being studied—a program, an event, an activity or individuals.

This view on case study has important elements in common with the way Martyn Hammersley (2004: 92), sees it. He argues that “*we can identify a core meaning of the term, referring to research that studies a small number of cases, possibly even just one, in considerable depth; although various other features are also often implied*”. These two views have two critical elements in common which are the smallness of the object of study and the in-depth analysis that this size allows. This has been mainly the reason behind the choice of the case study as the general design of this study. Besides, not only the case fits the size of the study but also it helps overcome time and financial constraints that other methodologies were likely to pose. This approach is suitable to this study because of its exploratory status that wants to understand those realities behind the figures, which can be achieved through an in-depth analysis. The sections below look at the techniques used for this study.

3.3.4.1 Documentary sources

Scott (1990: 281), argues that “*document is any kind of physically embodied text, and handwritten or printed text on paper, such as a letter or government report, is the archetypical document*”. He goes on to say that other forms of sources of information can be called documents such as audio, when information is collected by listening or visible when the information is provided in forms of images. These two last forms of sources of information have not been used. Only the first form has been used and this included written materials, ranging from policies; annual reports; strategic plans and other relevant materials from the concerned academic institutions and Ministries, to complete data from interviews. The following form of written materials was also used:

3.3.4.1.1 Unpublished materials

Due to the paucity of relevant published materials, I consulted unpublished materials from some governmental and non-governmental organizations involved in education. For example, I collected data from consultancy works commissioned by PROFEMME, which is the biggest women's network addressing women's concerns nationwide, reports combined by the Ministry of Gender and Women in Development in conjunction with United Nations Population Fund (UNFPA), and the like.

3.3.4.2 Focus Group Interviews

In the search to further my interest to bring those in the margins³³ to the centre, I thought of strategies that could lead me to the materialization of this goal. Bearing in mind that participants originated from different social backgrounds, hence different locations and identities, I privileged a scenario whereby they were to provide data resulting from their common agreement, accommodating their perceptions on the discussed issues. Such scenario was facilitated by focus group interviews to turn to the idea of J. Kitzenger and R.S. Barbour (1998:4), who argue that focus groups interviews are distinguished from the broader category of group interviews by the explicit use of group interaction to generate data. It is this interaction between the participants that led me to in-depth communication with them, which helped me to dig deep in their hearts so as to find out their common stand on the discussed questions, hence joining Stewart. D and Shamdasani (1998:17), who hold that the purpose of focus group is to stimulate in-depth exploration of a topic about which little is known.

³³ Women's voices are not heard in most of social science researches. Their experiences and perceptions of the world life are invisible, which is marginalizing them.

At this level, I was confronted with the issue of accessing those participants who were potentially equipped enough to provide me with the kind of information I was looking for. The section below is a description on how I recruited participants.

3.3.4.2.1 Recruitment of participants

Recruitment of participants for focus groups interviews was a process covering critical stages that I had to go through, before I got the participants of the profile I was looking for. The bulk of the work went as initially planned but somewhere in the process I had to change the plan as dictated by the situation on the ground.

The following are the main stages I had to cover before I reached the desired data.

Request for permission to access desired data: I had to go through the relevant authorities at the concerned academic institutions to be allowed to conduct research there. I wrote a letter requesting for permission to meet students and staff for focus groups and individual interviews respectively. The same letter requested for access to relevant documents to supplement the interviews. This process took two days after which I proceeded with contacts with the relevant authorities or bodies to reach students and staff for focus groups interviews and individual interviews, respectively.

Recruitment of student participants: in this section, I discuss the recruitment procedures for participants in the focus groups interviews. To recruit students I had to go through their representatives (there are women's students associations both at KIST and at UNR), who contacted the needed students and to arrange for our focus group

interviews. I had hesitations before my first call as I did not know how the representative was going to react to my request. I had to prepare for possible questions like those I had learned from my experience during my Honour's research project (e.g. what triggered your interest in the topic? What purpose is your study serving? etcetera.) and other questions that were likely to be asked. Though, my academic rank offered me a relatively higher status, the students' representatives had their upper hand as no access to students was allowed without their approval. Besides, I had to show a letter from the university authorities allowing me to conduct research there. Papers were required everywhere I went for data collection.

However, apart from the two academic institutions, the rest of places where I went for data collection accepted my UCT (AGI) papers.

My meeting with students' representatives looked at a variety of key elements for our focus groups interviews. We discussed among other things the characteristics of participants, the logistical aspect of the venue and time for the focus groups interviews. At UNR, the President of women's students association could not find the appropriate number of participants for the focus groups interviews. J Kitsinger and S. B Rosalanne (1998:8), suggest between 8 and 12 participants for a group. We had to include those in the 3rd years, given that their experience in terms of gendered experiences at their university does not differ that much from the final year's students. Given the orientation of the study that was exploring issues of their common interest participants gave the interviews a serious treatment (this is my feeling). Such treatment allowed a smooth communication between myself and them, which created a conducive atmosphere for the rest of our discussions.

Likewise, participants received the interviews with enthusiasm at KIST, under their representative who organized both men and women and arranged for the venue and time for our discussions. There, I came across another instance of unforeseen in my plan. After focus groups interviews with women students the latter requested me to accommodate in my schedule a mixed focus groups interview as they wanted to discuss the same topics with their male counterparts. The aim was for them to cease the opportunity to discuss gender issues of common interest with men, as such opportunity was rare, they said. This is one of the instances showing that a qualitative research is not conceptualized in terms of strict stages that must follow a pre-determined set of sequences. Research plan may unfold as the researcher pursues the various phases of his/her study. Bogdan and Biklen (1992), liken a qualitative researcher with "*a loosely traveller*". Likewise, I had to consider unplanned aspects of my methods as they arose from the situation on the field. Thus, I considered their demand not only because I understood their point but also because I thought that the mixed focus group was likely to generate new insights on the topic.

Focus group interviews: I introduced myself before interviews started. My research assistant did the same and I explained to the participants the role of the research assistant, which was basically to record the discussions. On their turn students introduced themselves by giving their names and telling us what triggered their interest for science or technology. This was already the first question as planned in the interview guide, which helped for a smooth transition towards the focus group interviews.

The interview guide was to help me keep the track otherwise, the flow of discussions was a kind of fluid open-ended interviews. Before we proceeded with the interviews, I asked students to feel free to ask questions both on my personal life and professional experience. I found this of a paramount importance as it was an opportunity to open the doors of our hearts to each and every one of us to turn to the idea of Oakley (1981:41), who argues that *“the goal of finding out about people through interviewing is best achieved when the interviewer is prepared to invest his or her own personal identity in the relationship”*. I answered all their questions with honesty and sincerity.

On the question of confidentiality I assured them to respect their anonymity. Besides, I told them the aim and the goal of the study and promised them that a copy of this dissertation will be availed in their library once the research work is finished. I also told them that in case they wanted to provide information they did not want to be recorded they had to let the research assistant know so as not to record it. I used an interview guide of 10 questions that were designed in relation to the research questions. With respect to the language of use, we agreed upon *Kinyarwanda*, the Rwandan mother tongue, as this was the language all participants were conversant with. The interview duration was one and half hour.

3.3.4.3 Individual Interviews

Individual interviews are suitable methods for this study as they also allow access to information that is hidden beyond the figures. The beauty of individual interviews is that they facilitate a deeper individual understanding of questions to study.

Exploring for example the discrepancies between men and women in science and technology requires a more profound understanding of parameters underlying such a situation, which is in agreement with David L. Morgan (1997:22), who argues that individual interviews occur when the goal of the researcher is to gain an in-depth understanding of the person's opinions and experience. Within the context of my search for bringing the marginalized to the view, I used open ended-interviews to allow participants more space to voice their opinions. I had a set of eight open-ended questions that served as interview guide to work in the same logic with E. Babbie and J.Mouton (2002:289), who suggest that unlike a survey, "a qualitative interview is an interaction between the interviewer and respondent in which the interviewer has a general plan of inquiry but not a specific set of questions that must be asked with particular words and in a particular order".

Recruitment of participants: individual interviews were designed for teachers involved in science and technology. Two men and two women were needed from each academic institution. Securing appointments with teachers was a bit more challenging, as I had to go through their respective faculties, which urged me to follow some bureaucratic procedures. It took me for example, two weeks at UNR to meet the teachers that I had to interview. To contact them, I used various means of communication including telephone, e-mails and SMS. I had to explain the purpose and the interest that the study had for both the university and the country as a whole. I knew some of the participants, as I did my undergraduate studies with them at the University of Burundi. At KIST, things went faster probably because I am a staff member there. Thus, contacting the relevant authorities and participants was much easier than at UNR. Within a week, I was done with the interviews. However, I had to answer questions from the teachers as well, regarding the relevance of the subject under study, its purpose and the interest it had for KIST.

At each academic institution, I was faced with the challenge of not finding the kind of profile of female participants I was looking for, both on the side of students and teachers. My initial plan was to interview female teachers ranging between the ranks of Lecturers and Professors but out of four interviewees (two from KIST and two from UNR) the highly ranked one was a Senior Lecturer. Among the rest, two are Senior Instructors and one is an Assistant Lecturer. Out of four male teachers, I interviewed, the higher ranked was an Associate professor and the lowest rank was a lecturer. However, I was informed that for men, they had teachers who have reached the rank of Professor but could not attend the interview because they had other commitments. After recruitment followed interviews.

Interviewing process: I went through the same protocol for the teachers' interviews as I had done for the students. Concerning for example the recording of interviews, one teacher did not allow me to record him though he was very cooperative for the rest of the interview. I had therefore to use jotted notes to collect desired data from the interview. In general, teachers answered all the questions I asked them and given the fact that interviews were open-ended this allowed them to make use of their lecturing skills, by giving more details in their answers, but this did not impact on our time management. Interviews' duration was one and half hour for each interview. I was not able to meet the Vice-Rectors both academics and Administration from both institutions as initially planned, due to their busy schedules. As a remedy to this situation, I collected relevant policies and other documents from these institutions as they were likely to answer the kind of questions we were going to discuss.

Recruitment of government officials: two highly ranked government officials were available for interviews. Those were the General Secretary in the Ministry of Gender and Family Promotion (MIGEPROFE), and the Executive Secretary for the Forum of Rwanda Parliamentarian Women (FRPW).

Though, I had initially secured an appointment by phone, I had to go through the required procedures for each case to reach the concerned official. At MIGEPROFE, I had to go through the Secretariat, introduced myself and explained that I wanted to see the Secretary General, as I had an appointment with her. This was communicated to the Secretary General, and in the meantime, I was seated in the Secretariat while waiting for her feedback. As I was on appointment my waiting did not take long for me to be received.

I was amazed to meet a very humble General Secretary! I had been told about her simplicity during my prior contacts while I was seeking for her appointment, but the humbleness I saw in her went beyond my understanding. She was such a patient and attentive person, which was reflected in the comprehensive way she answered the questions during the interview. This attitude paired with her deep exploration of gender issues countrywide, encouraged our communication, which reduced very significantly the weight of the feeling of intimidation I had developed during the time I was waiting in the Secretariat. Even if I did not notice any sign of power display from the side of the Secretary General, the idea that I was interviewing a very important person remained in me until the end of the interview. It is at this juncture, however, that I came to realize that actually I had developed unnecessary anxieties given that the whole interview went very smoothly with very insightful ideas from the Secretary General.

The scenario was a bit different at the Parliament House where I met the FRPW Executive Secretary. For security reasons there was a check point at each entrance of the Parliament House. When I reached the main entrance, I had to be checked and left my identity card there with the security officers after filling in the visitors' book. In the Parliament, I was seated in a visitors' lounge while I was waiting for the due time for me to be received.

I was struck to see the FRPW Executive Secretary herself coming to take me to her office! I was used to see officials of her profile sending their Secretaries or other relevant staff to do that assignment.

In her office we had some formality exchanges after which we went ahead with our interview, as we had discussed the bulk of my study on phone. Apart from the procedures associated with the access to the parliament house, the waiting in the visitors' lounge, and the kind of anxieties that this had caused in me as to the importance of the person I was to meet, I did not notice any sign of power imbalance during our interview. The FRPW Executive Secretary had a tendency of giving details on her views, which I think was more likely to be associated with her professional background, as a visiting lecturer at the National University of Rwanda. Nevertheless, the demarcation line between her position as a university lecturer and as a member of parliament was very fluid, which complicated a notion of power she might be displaying, whether academic or political. In any case, my presence as master's student researching on women in her office with her dual position both in academics and in politics afforded me little power, though her humbleness favoured very much our interview.

It sounds a bit contradictory the feeling of intimidation I had as compared to the kind treatment she offered me. Her attitudes towards me did not reflect any sign of intimidation, or sort of power display from the very beginning till the end of our meeting. She rather seemed to be very simple and a good communicator with a very strong interest in gender. Apart from the authority that I associated with her positioning, that might have intimidated me beforehand; she rather displayed a supportive profile. This contributed to the smooth and fruitful interview we had. To sum up, interviews were generally balanced, as part of my informants was of a higher profile than mine and another part of lower profile. I did not have full power neither over women, both students and government officials, nor over both categories of men, students and teachers.

After this description of how focus groups interviews and individual interviews were conducted, the section below discusses the approach used to analyze collected data.

3.3.4.4 Thematic analysis

The thematic analysis, which is a part of the approaches that constitute content analysis (Krippendorf, 1980:60-63), was used to analyze the data collected from both the focus groups interviews and individual interviews. This approach was used because it is among the suitable techniques used to analyze texts (Robert Franzoni, 2004:186), which applies to the interviews that were collected in forms of written texts. With thematic analysis, a coding scheme is used to extract dominating themes out of the text. There is no universal coding scheme given that researchers orient their coding system depending on the focus of their studies. As the focus of this study is on institutions, emerging themes are associated with the concerned institutions. Some of the themes confirm the assumptions used to design interview guides but others are revealing new realities. Statements by participants were used as supporting evidence during the process of analysis.

In this chapter, I have looked at the methods used for data collection and data analysis. I have preferred mostly the qualitative methods given the exploratory nature of the research. I supplemented these methods with documentary sources for a comprehensive pool of data. Besides, I have addressed the theories informing this study, which are the standpoint theory and situated knowledge, and gender and positionality. The choice of these theories has been dictated by the nature of the research questions that seek to go beyond the figures. With regard to data analysis, thematic analysis has been used as a suitable technique to analyse data collected in form of texts. Analysis is to be conducted on basis of emerging themes as described in the chapter below.

CHAPTER IV

DATA ANALYSIS

4.0 PRESENTATION AND ANALYSIS OF FINDINGS

4.1 INTRODUCTION

This chapter has two main sections. The first section looks at archival or textual data that were collected from relevant policy statements documents from the concerned institutions. Documents available were mainly strategic plans, giving detailed goals and strategic objectives designed to fulfill their visions. Annual and progress reports giving developments of activities as per schedules in the strategic plans were also used. Official statistics were collected from the Registrars and Personnel offices. The second section deals with qualitative data collected from focus groups interviews and individual interviews. Both types of data are addressing the research questions discussed in the chapter under introduction. Thus, analysis of both forms of data is based on themes that emerged from the findings. The following are the research questions that framed the study:

1. What have been the mechanisms put in place by the concerned academic institutions for a successful implementation of the national gender policy?
2. What are the strategies that higher learning institutions have adopted to sustain further participation of women in science and technology?
3. What are the existing gender dynamics within the two target institutions and how are they impacting on women's participation in science and technology?
4. What are the future prospects for gender equality in science and technology?

4.2 PRESENTATION AND INTERPRETATION OF ARCHIVAL DATA

This section discusses the existing institutional contexts framing the poor representation of women in science and technology. Data in form of provisions and statistics are looked at and a critical analysis is made based on emerging themes around institutional gender inequalities experienced by women. Gender inequalities were mainly observed in the following areas: decision making, academics and infrastructures. This was set against a policy background that was not committed enough to tackle these inequalities.

4.2.1 Gender Inequalities in decision making

Gender inequalities constitute a striking feature of the higher echelons of decision-making at Kigali Institute of Science, Technology and Management and National University of Rwanda. In the current form the two Rectors and the two Vice-Rectors in charge of administration and finance are men. The two Vice-Rectors in charge of academics are also men. The practice in these institutions is that decisions are taken by various committees but the persons heading various committees are also in most cases men, who have the last say on most decisions. Given the general poor representation of women in decision-making bodies, it goes without saying that important decisions are taken in the main by men who most of time ignore women's concerns. The representation of women in the following organs which are the most important decision makers at both academic institutions speaks for itself.

4.2.1.1 The Kigali Institute of Science, Technology and Management (KIST)

At KIST the composition of the most important committees, as provided in the legal Statutes³⁴ of the institution is an eloquent example of how women are excluded in the highest decision making organs of the institution. KIST legal Statutes provides four organs in which most important decisions are taken. Those are the Council, the Senate, Management Committee, and faculties, schools and centers boards. The Council, which is supreme and makes decisions in all domains, is comprised of Chairperson and deputy; Rector; representatives from government; representatives from the private sector; representatives from students' body (both sexes); and representatives of secondary schools with most students joining KIST. Out of these representatives very few are women. For example, the 2002 KIST Council was composed of 15 members out of which only 2 were women (a representative of secondary schools and a representative of KIST students' body). At present it has a total of 13 members out of whom 2 are women. Both the Chairperson and Deputy Chairperson are men³⁵. Without denying the importance of these women's representation, it would be hard to imagine such a low rate (15 %) exerting any influence on the Council's decisions.

The Senate which has supreme and ultimate academic and research authority, prepares and designs the academic policies of KIST. This highest academic organ is composed of Chairperson (being the Rector); Vice-Rector (in charge of academic affairs); Directors of centers and heads of departments; Chief librarian; Representatives of the faculty's Centers and Departments, and two representatives from the students' body one being a woman³⁶. Out of 49 members composing the current senate only 6 are women representing (12 %).

³⁴ See KIST Progress report 1997-2003, pp20

³⁵ Source: Personnel Office

³⁶ See KIST Progress report 1997-2003; pp20

The Management Committee which monitors and reviews all duties allocated to each organ such as academic, administrative and managerial activities is composed of the Rector and Vice-Rectors; Faculty Deans; Directors of Centers; Heads of Departments; Director of Finance; Chief librarian; Head of General Administration and the Dean of students. Bearing in mind that the Rector and the two Vice-Rectors are so far men, the composition of KIST's current Management Committee for example would give us a clear picture on women's representation in this important decision-making organ. Out of a total of 19 members only 2 are women. Table 1 below shows detailed information on the statistical profile of the most important organs at KIST.

TABLE 1: GENDER PROFILE OF KIST ORGANS

BOARDS	MEN	WOMEN	MEN %	WOMEN %
Council	11	2	85	15
Senate	43	6	87	13
Management Committee	17	2	89	10
Faculty of Management	21	11	66	34
Faculty of Science	21	1	96	4
Faculty of Technology	23	5	83	17
School of Languages	22	8	74	26
CCE ³⁷	21	3	88	12
CITT ³⁸	7	3	70	30

Source: KIST Personnel

Table 1 depicts overwhelming under-representation of women in KIST's various decision making bodies. This seems to be a replication of the traditional perception of women as non-decision makers.

³⁷ CCE: Centre for Continuing Education

³⁸ CITT: Centre for Innovation and Technology Transfer

Table 2 below shows gender inequalities prevailing within the various categories among the staff of KIST.

TABLE 2: GENDER PROFILE OF KIST STAFF

CATEGORY	MEN	WOMEN	MEN %	WOMEN %
Academic Staff	162	33	83	17
Administrative Staff	56	28	68	32
Support Staff/Technicians	161	90	64	36
Support Staff/others	24	3	89	11
Volunteers Staff	6	1	86	14
Total	409	155	73	27

Source: KIST Personnel Office

Tables 1-2 portray the current gender profile of KIST staff. The under-representation of women is more visible at the level of academic staff. They are highly represented in the categories of technical staff and administrative staff as opposed to the decision-making categories in table 1. Men are overwhelmingly represented even in the category of supporting staff, an area that colonial traditions had reserved to women. This reality is still verified in many African countries (N'Dri Thérèse Assie-Lumumba, 1997:307).

4.2.1.2 The National University of Rwanda (UNR)

The same under- representation of women in the decision-making echelons is very evident at UNR. The gender distribution of the university organs and staff speaks for itself (see Table 3 and table 4 below.

TABLE 3: GENDER PROFILE OF UNR ORGANS

Organ	Men	Women	Men %	Women %
Council	26	1	96.3	3.7
Senate	49	2	96	4
Coordination Committee	21	3	87.5	12.5

Source: UNR Registrar's Office

TABLE 4: GENDER PROFILE OF UNR TEACHING STAFF

FACUTLY	MEN	WOMEN	MEN %	WOMEN %
Agriculture	25	5	84	16
Law	9	7	57	43
Education	43	11	75	25
Arts-Humanities	46	3	94	6
Medicine	37	9	81	19
Languages	22	5	82	18
Economics, Social Science Management	61	15	81	19
Science & Technology	66	12	85	15
Journalism & Communication	6	3	67	33
Public Health	8	3	73	27
Total	323	73	82	18

Source: UNR Registrar's Office

A closer look at Table 4 allows us to notice confirmation of the reality around the overwhelming representation of men in all areas including Arts and Humanities. However, there is an interesting high participation of women in law, which needs to be explained. This high representation of women in Law is also verified at the University of Ghana³⁹.

³⁹ The Development and Women's Studies Programme, Institute of African Studies, University of Ghana. Study on developing feasible strategies to increase female participation in tertiary education particularly in science and technology. 2002.

A very interesting scenario is that the gender inequalities in decision-making verified in the two academic institutions arise in the context of different policies in terms of gender sensitiveness. The UNR policy reflects less explicit engagement with gender compared to KIST's more proactive policy. Nevertheless, statistics do not show a significant difference in terms of women's representation at both institutions. The particular under-representation of women in science and technology is addressed in the following sections.

4.2.2 Gender inequalities at policy level: women in science and technology at UNR

No specific policy or provision was found at UNR addressing the issue of poor representation of women in science and technology. However, some policies and strategies addressing the question in general, of poor representation of women in higher education were observed in the five-year strategic plan documents of the university. The following are provisions on women's participation in higher education as hinted in the university's vision, in some goals and strategic objectives of the said strategic plan. The UNR vision stipulates as follows:

The UNR vision is to become a bilingual and regional university of excellence based on solid IT supported education and problem oriented research leading to peaceful, democratic, and gender-balanced transformation of urban and rural society⁴⁰.

To achieve this vision UNR has developed specific goals or strategic objectives, and specific objectives have been designed for each goal to be achieved. Gender equity has been covered under the first specific objective of the first goal. The latter stipulates as follows:

⁴⁰ Translated from the following French version: La vision de l'UNR est de devenir une université bilingue et régionale d'excellence, fondée sur une l' education appuyée par la Technologie de l'Information, la recherché qui apporte des solutions a nos problèmes et débouchant sur des changements pacifiques , démocratiques, sensibles à la parité hommes/femmes tant dans les milieux urbains que ruraux.

Goal 1: Education: offering undergraduate program of high quality based on consistency and relevancy, and on programs leading to the development of techniques for continuing education.⁴¹

Specific objective 1: To increase the number of students taking into consideration of gender balance; equipping them with practical knowledge (entrepreneurship and knowledge in ICT), education on HIV/AIDS, communication, self learning, civic education, etc.⁴²

It is under Goal 1- Specific objective 5 that promotion of science and technology is highlighted. However, no clear strategic activity is given under this clause to address the under-representation of women in the area of science and technology as transpired in the strategic activities aimed at promoting science and technology below.

Goal 1-Specific objective 5: Three strategic activities are planned:

1. Designing a policy on the teaching of science and technology;
2. Providing equipment to the faculty of education and the faculty of science and technology;
3. To increase the number of students in science and technology.

Gender is also touched under the following fifth specific objective of the third goal:

Goal 3: Human resources: To reinforce, maintain and to keep academic and non academic staff that are competent and highly motivated, taking into account the notions of culture, equity and strategic management⁴³.

⁴¹ Translated from the following French version: “ But 1: L’éducation: dépenser un enseignement de haute qualité au premier et deuxième cycle basé sur des programmes consistants et intégrer ainsi que des programmes menant au développement des techniques de l’enseignement continu.”

⁴² Translated from the following French version: “Augmenter la population étudiante en respectant l’équilibre des genres; la doter de connaissances pratiques (entrepreneuriat, et connaissances en technologie de l’information), éducation sur le VIH/SIDA, communication, auto apprentissage, éducation civique, etc.”

⁴³ Translated from the French version: “But 3: Les ressources humaines- Renforcer, maintenir et continuer à disposer d’un personnel académique et non académique compétent et hautement motivé, tout en gardant en tête les notions de culture, de parité et de gestion”.

Specific objective-5 of this goal highlights the promotion of gender balance at UNR and stipulates that **“In the same line with the government’s policy UNR, will encourage promotion of gender balance by putting in place a relevant clear policy to be implemented in more elaborate manner”**

UNR has designed strategic activities aiming at facilitating the achievements of the above goals and objectives. Goal 3-Objective 5: Two strategic activities are planned under “promotion of gender balance at UNR”. One is to design UNR gender policy and two is to implement it. It was planned that the said policy was to be implemented in 2005. Besides, the UNR strategic plan was supportive to the affirmative action policy of having at least 30% of women in the decision making of the university by 2009. In addition to these elements of policies aimed at addressing gender imbalances at UNR, the latter has created the Women Students’ Association (WSA), which is a forum in which various issues affecting women students’ lives are supposed to be discussed and addressed.

Although there is an apparent move towards addressing gender imbalance at UNR, as transpired in the university’s vision and strategic plan, a closer look at the above policies shows a less specific attention to women’s participation in science and technology. The strategic activities planned for the promotion of science and technology do not make mention of strategies aimed at encouraging women’s participation in the above fields. The document looks at students, in general. It has no agenda for women as indexed under Goal 1-specific objective 5 mentioned above. The strategic activity dealing with the increase in number of students in science and technology does not clarify how many women are to be admitted as opposed to men. Besides the document does not tackle other issues that can be addressed in forms of affirmative actions, which majority of participants have characterized as pressing needs. Those are for example, residences for women⁴⁴, increase of scholarship for women due to more needs they have compared to men, etcetera.

⁴⁴ UNR plans to build residences for students as stipulated in its strategic plan but again does not say how many women are beneficiaries.

This lack of gender commitment at policy level may explain the poor representation of women in higher education in general and in science and technology, in particular.

The strategic activities planned to promote gender do not show how many women are planned, for example to be part of the student population. As the strategic plan clearly articulates that for staff women will occupy 30% in the decision making of the university, it would be advisable to have a figure of women students that are expected to be at the university by faculty and by gender, by 2009. As the university was planning to design a gender policy for staff, to be effective by 2005, it would be advisable to design a gender policy that addresses issues of students as well. Such a policy would play an instrumental role to address issues facing students in general and women doing science and technology in particular.

Contrary to UNR, KIST has policies that look more proactive but very interestingly they leave a lot to desire when it comes to implementation. The section below reflects on this phenomenon.

4.2.3 Gender inequalities at policy level: women in science and technology at KIST

The 2003-2008 KIST strategic plan has more specific statements on gender in science and technology but these are set against a vision that is less gender explicit as compared to UNR. KIST vision stipulates as follows:

Committed to advancing Rwanda's development by graduating highly skilled people for the country's economy and by providing technical and technological assistances and services to all sections of the community, KIST aspires to become a center of excellence in science, technology and management education, comparable in standards to the very best in the world⁴⁵

⁴⁵ See 2003-2008 KIST Strategic Plan, p8

To fulfill this vision KIST has set a number of objectives as transpired in its strategic plan. Gender is addressed under objective 8 and objective 21. The following is the content of Objective 8: **“implement an annual full-time intake of 600, split approximately Technology 360 and Management 240, but monitor closely students’ demand, entry qualifications, and gender balance”**. One of the required actions to achieve this objective is to **“meet target by faculty and gender”**. Objective 21 says:

“Increase the proportion of female full-time entrants from the present 30% to at least 45% by 2008, and seek means to reduce the higher attrition rate among female than male students”. Under actions required for this objective to be attained, KIST undertakes to **“admit all female who qualify”**; **“provide hostel accommodation to all female students”**; **provide scholarships/bursaries or seek funding to support qualified female students”**. In addition to this objectives KIST has launched Equality and Diversity Policy in August 2004, in which it is *“committed to the principles of promoting equality of opportunity through eliminating discrimination and disadvantage, and recognizing the benefits of diversity”*⁴⁶. KIST has also a women students association that serves as a forum where women students meet and discuss issues of common interests. The women students association has among others out reach programs aimed at meeting young girls at primary school and secondary school levels to encourage them to do science and technology.

It appears that KIST has covered important steps at the level of policies to address gender inequalities and other forms of discriminations. However, the existence of gendered policies has not yielded significant changes with regards to women’s participation in science and technology. The difference between KIST and UNR in terms of gender sensitiveness of policies is not proportionate to the real women’s representation in these institutions. One would expect a significantly bigger participation of women at KIST compared to UNR (see statistics in the sections below).

⁴⁶ See under Policy Statement in the KIST Equity and Diversity Policy, P 5.

This state of affairs can be associated with the scenario described in the introductory part of this study whereby the political will that encourages women to take science and technology does not translate into action (see section 1.4.2). The above phenomenon highlights the question of knowing why despite of gender-aware policies (for example at KIST) the issue of women's under-representation in science and technology remains unresolved. The following element has been verified in both academic institutions and can be associated with the gender inequalities in terms of women's representation in science and technology but it seems to be not the end in itself, which underlines the need of going beyond statistics for a better understanding of the problem. That common element is infrastructural gender inequalities described below.

4.2.4 Gender inequalities: infrastructural aspect

At policy level it appears that there is a pressing need for basic infrastructures at both academic institutions in terms of lecture rooms, various equipment and residences for students and staff. Apart from KIST that is more specific on providing women students with residences, there is no clear policy on how women are going to benefit from the planned residences at UNR. The KIST policy expressed commitment to provide all women students with "*hostel accommodation*", which underscores the need of residences on the part of women students than men students. However, this policy is yet to be implemented, as the need for women's residence remains unmet.

Although addressing this need would help to encourage women's participation in science and technology, still the question of addressing the issue of gender inequality in these areas remains eminent. The gender inequalities discussed above are more visible in terms of figures as displayed in the statistic profiles below. This addresses the issue of gender inequalities in academics, which is discussed qualitatively under section 4.3.3.

4.2.5 Gender inequalities: women's profile in academics

The tables below show a statistical profile of women's representation in science and technology at the concerned academic institutions. The statistics confirm the confinement of women in 'their' caring and nurturing roles and responsibilities. As matter of fact women are more represented in programs such as food science and management with a rate articulating around 40% and 30% respectively. They are overwhelmingly underrepresented in science and engineering with a rate ranging between 15% and 23%.

TABLE 5: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF SCIENCE AND TECHNOLOGY AT THE NATIONAL UNIVERSITY OF RWANDA 2001/2002.

DEPARTMENT	1 ST YEAR			2 ND YEAR			3 RD YEAR			4 TH YEAR		
	M	W	T	M	W	T	M	W	T	M	W	T
Common Year A	176	13	189									
Common Year B	126	51	177									
Applied Mathematics				15	1	16	8	0	8			
Biology				15	0	15	5	2	7			
Chemistry				15	1	16	7	2	9	3	1	4
Pharmacy				13	7	20	11	0	11	6	2	8
Physics				4	0	4	5	0	5	1	0	1
Grand Total	302	64	366	62	9	71	36	4	40	10	3	13
%	82.5	17.4		87.3	12.6		90	10		77	23	

Source: UNR Registrar's office

M: Men; W: Women ; T: Total

**TABLE 6: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF
SCIENCE AND TECHNOLOGY AT THE NATIONAL UNIVERSITY OF RWANDA
2002/2003.**

DEPARTMENT	1 ST YEAR			2 ND YEAR			3 RD YEAR			4 TH YEAR		
	M	W	T	M	W	T	M	W	T	M	W	T
Common Year A	123	21	144									
Common Year B	147	51	198									
Applied Mathematics				17	0	17	11	1	12	7	0	7
Biology				8	7	15	10	3	13	5	2	7
Chemistry				17	4	21	20	2	22	3	1	4
Pharmacy				29	12	41	12	7	19	9	2	11
Physics				10	0	10	4	0	4	5	0	5
Grand Total	270	72	342	81	23	104	57	13	70	29	5	34
%	79	21		78	22		81.4	18.5		85.2	15	

Source: UNR Registrar's Office

**TABLE 7: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF
SCIENCE AND TECHNOLOGY AT THE NATIONAL UNIVERSITY OF RWANDA
2003/2004**

DEPARTMENT	1 ST YEAR			2 ND YEAR			3 RD YEAR			4 TH YEAR		
	M	F	T	M	F	T	M	F	T	M	F	T
Common Year A	197	29	226									
Common Year B	148	39	187									
Applied Mathematics				18	2	20	13	1	14	11	1	12
Biology				18	15	33	10	6	16	9	3	12
Chemistry				20	3	23	16	5	21	19	2	21
Pharmacy				46	12	58	28	11	39	13	6	19
Physics				11	1	12	10	0	10	4	0	4
Grand Total	345	68	413	113	33	146	77	23	100	56	12	68
%	83.5	16.4		77.3	22.6		77	23		82.3	17.6	

Table 5, 6, and 7 tables show a picture of students by gender in the faculty of science and technology at the National University of Rwanda over the last four academic years effective from 2001. Their rate fluctuates between 15% and 20%. The first years are common for all students planning to do science or engineering. At that level they are prepared before they engage with their respective areas of specialization from the second years onwards. Women are overwhelmingly under represented in the areas of Applied Mathematics, Physics and Chemistry, areas that are known to be the foundation of technology and engineering. They are relatively represented in the areas of Biology and Pharmacy, which is in line with the stereotypes that are associated with their perceived reproductive roles. A similar scenario is observed at Kigali Institute of Science, Technology and Management whereby women are more represented in Food Science and Management programs as compared to engineering (see table 8 & 9 below).

TABLE 8: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF TECHNOLOGY AND THE FACULTY OF MANAGEMENT AT KIST: ACADEMIC YEAR 1999-2000.

YEAR	ENGINEERING			MANAGEMENT		
	M	W	T	M	W	T
1ST Year	186	59	145	110	60	170
2nd Year	95	11	106	32	05	37
3rd Year	281	70	351	142	65	207
Grand Total	562	140	702	284	130	414
%	80	20		68.5	31.4	

Source: KIST Registrar's Office

Table 8 shows statistics on registered students by gender in the faculty of technology and the faculty of management at the Kigali Institute of Science, Technology and Management for the academic year 1999/2000. A closer look at these figures shows a big gap between men and women in the department of engineering.

Although the gap between men and women in the faculty of management leaves a lot to desire, it still remains less wide compared to the gap in engineering. Tables 8-9-10 indicate a decrease in women's participation between 1999-2002 (from 20% in 1999 to 14.8% in 2002), in engineering while in the same period their participation in management stabilized around 37%.

TABLE 9: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF TECHNOLOGY AND THE FACULTY OF MANAGEMENT AT KIST: ACADEMIC YEAR 200-2001

DAPARTMENT	ENGINEERING			FOOD SCIENCE			MANAGEMENT		
YEAR	M	W	T	M	W	T	M	W	T
1st Year	189	28	217	62	41	102	151	117	268
2nd Year	161	41	202	00	00	00	87	56	143
3rd Year	87	10	97	00	00	00	31	04	35
Grand Total	437	79	516	62	41	102	269	177	446
%	85	15		60.7	40.1		60.3	39.6	

Source: KIST Registrar's Office

The gap between men and women in the area of food science is narrower (see tables 8-9-10), compared to the gaps in other areas, which hints a replication of women's discrimination in terms of representation in the field of engineering.

TABLE 10: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF TECHNOLOGY AND THE FACULTY OF MANAGEMENT AT KIST: ACADEMIC YEAR 2001-2002.

DEPARTMENT	ENGINEERING			FOOD SCIENCE			MANAGEMENT		
YEAR	M	F	T	M	F	T	M	F	T
1 st Year	264	34	298	48	38	86	149	115	264
2 nd Year	183	24	207	45	27	72	178	78	256
3 rd Year	124	44	166	00	00	00	82	43	125
4 th Year	72	10	82	00	00	00	30	04	34
Grand Total	643	112	755	93	65	158	405	240	645
%	85.1	14.8		58.8	41.1		62.7	37.2	

Source: KIST Registrar's Office

TABLE 11: REGISTERED STUDENTS BY GENDER IN THE FACULTY OF TECHNOLOGY AND THE FACULTY OF MANAGEMENT AT KIST: ACADEMIC YEAR 2002-2003

DEPARTMENT	ENGINEERING			FOOD SCIENCE			MANAGEMENT		
YEAR	M	W	T	M	W	T	M	W	T
1 st year	227	43	270	45	19	64	166	94	260
2 nd Year	225	31	256	40	34	74	145	101	246
3 rd Year	156	27	183	42	29	71	157	85	242
Grand Total	408	101	509	127	82	209	468	280	748
%	80.1	19.8		60.7	39.2		62.5	37.4	

Source: KIST Registrar's Office

A picture of a summary of women's representation in terms of totals of student populations indicates that no significant change has taken place in terms of women's participation in these areas over the last five years for both academic institutions as displayed in the tables below.

TABLE 12: SUMMARY OF REPRESENTATIONS BY GENDER IN SCIENCE AND TECHNOLOGY AT THE NATIONAL UNIVERSITY OF RWANDA OVER THE LAST FIVE YEARS.

ACADEMIC YEAR	MEN	WOMEN	TOTAL	MEN %	WOMEN %
1997-1998	306	55	361	84.8	15.2
1999-2000	199	48	247	80.6	19.5
2000-2001	482	87	569	84.9	15.1
2001-2002	579	97	676	85.5	14.5
2002-2003	661	140	801	82.6	17.4

Source: UNR Registrar's Office

TABLE 13: SUMMARY OF REPRESENTATIONS BY GENDER IN SCIENCE AND TECHNOLOGY AT THE KIGALI INSTITUTE OF SCIENCE, TECHNOLOGY AND MANAGEMENT OVER THE LAST FIVE YEARS.

ACADEMIC YEAR	MEN	WOMEN	TOTAL	MEN %	WOMEN %
1999-2000	281	70	251	80	20
2000-2001	499	125	624	80	20
2001-2002	736	177	913	81	19
2002-2003	895	226	1021	80	20
2003-2004	1092	296	1388	71	21

Source: KIST Registrar's Office

4.2.6 Discussion

The general representation of men and women at both academic institutions over the last five years shows a very wide gap with women's rate fluctuating between 14.5 % and 21 %. Without denying that some improvements have been made, as became known in the above figures, it appears however that no significant change has taken place compared to efforts made at governmental policy level to encourage women to do science and technology. There is a political will for a gender balanced higher education, as reflected through the various policies at ministerial levels, with an emphasis placed on science and technology but the crux of the matter remains that of translating those policies into action. Besides, the same scenario is verified at institutional levels. KIST policies show more engaged gender awareness compared to UNR but they show significant gaps when it comes to implementation. UNR policies reveal a less gender commitment but the gender awareness reflected in the university's vision is an indication that the political will for a gender sensitive education is there though not unpacked enough. What can be learned from this situation is that the existence of gender sensitive policies is not a *sine qua non* condition for women's sustainable participation in science and technology.

Despite the difference at policy levels the two institutions under study have two strong elements in common: the under-representation of women in decision making and the poor participation of women in science and technology. Are these two elements connected? If they are connected, this would lead to the two following assumptions among others: the first assumption would be that the increase of women's involvement in decision making would lead to the increase of women's participation in science and technology. The second assumption would be that the reasons underlying the under-representation of women in the decision-making would be the same reasons underlying the poor participation of women in science and technology.

Addressing these assumptions requires a qualitative approach as answers cannot be found through documentary sources. The first assumption however seems debatable. In actual fact, the involvement of women in decision making processes would not necessarily influence women's participation in science and technology. In other words, it is not their nature as women, that is going to trigger any gender oriented changes in the concerned areas. This would require them to possess appropriate skills, powers and a strong commitment to effect changes aimed at increasing women's participation in science and technology. On the other side, it is not the nature of men that dictates them to design policies that are less gender committed. Gender sensitive men can design gender-aware policies and these are the very men who can promote gender equality through effective implementation of those policies. That is what is required for both men and women to advance gender equality. Thus, gender effectiveness is more about skills, knowledge, powers and commitment than nature itself.

However, one should not overlook the possibility of a scenario whereby a person may fulfill all the above mentioned conditions and yet fail to put them into effect. So, what would be behind this failure of implementing gender sensitive policies even when implementers are gender aware? This question alludes to the issue of the binary relationship between men and women discussed above (see section 1.1.2), which is likely to underlie this inertia when it comes to effect changes that are gender equity driven. The same question implies the second assumption discussed in the paragraph below.

The second assumption suggests that the reason (s) underpinning the poor representation of women in decision-making of higher education is/are the same that underpin (s) the under-representation of women in science and technology. Is it the bipolarity that seems to govern gender relations that is behind such a situation? Or is there any other reason (s) or dynamics explaining the existing gender inequalities between men and women in science and technology? A look beyond statistics appears to be a necessity, which can help finding answers to these questions.

4.3 QUALITATIVE ANALYSIS OF EMERGING THEMES.

The sections below include a qualitative analysis of major findings. The analysis is conducted on basis of themes that emerged from focus groups interviews and individual interviews. Interestingly, the areas of decision making, infrastructures and academics where gender inequalities were heavily felt at policy levels resurfaced, as dominating themes. These same areas constituted the main gender dynamics underlying the poor representation of women in science and technology at the concerned institutions (see discussion under 5.1.3).

4.3.1 Gender inequalities in decision making

Poor representation of women in decision making were the concern of participants who argued that increasing the number of women decision makers in their institutions would serve as a motivation for more women to pursue careers in higher education and more specifically in science and technology. Participants argued that those women would serve as role models among other things. When asked whether the lack of role models in the hierarchy of their university is one of the factors contributing to the poor representation of women among student populations, one woman student answered: *“Definitely yes, if there were women in the various decision-making bodies of our universities, then women would be stimulated”*. The same view was supported by a man teacher who argued that *“women have no referents ahead to show them that they are investing in an area where things are possible for women”*.

In addition to role modeling, women in decision making of higher education would play other important roles. These include among others designing, implementing, monitoring and evaluating policies, adopting strategies geared to advancing various institutional programs, liaising with national, regional and international relevant bodies to boost cooperation around production of knowledge, to name a few.

It is in the course of their daily activities that women decision makers would play a vital role in bringing on board women's issues, and their contribution in addressing them would be of a paramount importance for a gender sensitive transformation of higher education. This is not to say that men cannot serve women's interests or cannot address women's issues, but the general agreement is that women remain better placed than men to feel, see and understand issues of their concerns than anybody else. Similarly, women are more likely to suggest lasting solutions to their issues and impact more positively to the entire institutional life. Thus, participation of women in decision making of academic institutions is imperative not only to serve as role models for other women, but also to challenge the patriarchal status quo that constitutes the key obstacle for women's access to higher education. Patriarchal barriers are stronger in the fields of science and technology whereby women's representation remains poorer than other fields. Thus, a significant women's representation in decision making of these areas is imperative.

However, increased participation of women decision makers in science and technology alone would not suffice to address the issue of poor representation of women in these fields. This is a gender issue that is not likely to be addressed by the mere increase in numbers of women in decision making. Some other factors have to come at play for an effective gender sensitive decision making. In addition, to gender aware policies there is a need for all decision- making stakeholders to be gender aware. This brings in the notion of engendering decision making, which was highlighted by participants as imperative to further women's participation in science and technology, as discussed below.

4.3.1.1 Engendering decision making

Women participants expressed the need of mainstreaming gender in decision-making. They argued that one of the reasons why they do not get a visible support from their decision-makers is because the latter are not gender sensitive.

Besides, instruments at their disposal are not gender committed. At the National University of Rwanda, students highlighted the lack of a gender policy, which was seen as the major stumbling block to gender sensitive programs of the university.

Our university should have a gender policy. If you look at what is happening here, it is just we students who are arranging ...you find that there is no clear gender policy to be implemented in the university daily activities.

This lack of a gender policy was a fact that the university's authorities recognized. It was stipulated in the 2004-2009 strategic plan, that a gender policy should be effective by 2005. The same strategic plan stipulates that at least 30% of the university management will be women in 2009. If this change is effected as planned, that will be a step forward towards a gender sensitive decision making. However, on top of a gender policy, measures aiming at equipping concerned men and women with gender analysis skills should be taken, for gender mainstreaming to be effective in the decision-making of the university.

Gender awareness alone would not help men and women in higher echelons of higher education to address the issue of poor representation of women in science and technology. Some other conditions need to be fulfilled. In addition, to gender awareness these men and women must be committed enough to implement policies and they need to be fully equipped intellectually and financially. Besides, they need to be entrusted with all powers required for them to accomplish their mission as decision makers. If the above are basically fulfilled, such a decision-making body would be likely to effect changes, as composed of men

and women who have what it takes to assume their responsibilities. This would be the kind of team to challenge patriarchy and transform the fields of science and technology into an academic environment that is conducive to the participation of women.

A gender sensitive decision-making in a tertiary institution is very instrumental to promote women's participation in science and technology, but this would require gender inequalities in other areas to be addressed. The areas that were mostly highlighted by participants were infrastructure and academics.

4.3.2 Infrastructural gender inequalities

The most pressing need that women participants expressed was that of residences. This appeared to be one of the critical problems women students are faced with, as it is connected to a number of other issues, as exemplified in the following statement by one of the participants from KIST.

We have a problem of accommodation at KIST and this has more impact on girls than boys. For example, a girl who is staying with a family will be faced with two main challenges: passing her academic programs and assuming family obligations. These obligations do not apply to men the way they do to women. For example, our society does not tolerate a woman who comes back home in late hours. The implication of this is that women will go home after class mostly around 5:00 pm in case of fulltime students, and will spend the entire evening involved in domestic activities. This means that back home women have little chance to concentrate on their academic assignments. This does not apply to men students who are culturally allowed to go home late in the night. They can use evening hours to study with their colleagues at campus. So, I think that there is a pressing need to construct enough residences for women students at KIST.

Women students who are not accommodated at campuses are supposed to stay with families. Staying in family means for a Rwandan woman to go home soon after class as the culture does not encourage women to go home in late hours. The normal expected time for a woman to be at home is between 5:00 and 6:00 pm as rightly mentioned in the above statement. Beyond that she starts feeling very uncomfortable both for security and cultural reasons.

It goes without saying that men students, to whom culture entrusts full responsibility to manage their time, have bigger time space to deal with their academic matters. This increases men's chances to pass to the detriment of women. This scenario creates a situation of gender inequalities that can be addressed by availing residences to women. To address the issue of accommodation, some women students organize for private residences but this move is not well perceived by a significant proportion of Rwandan society, which gives it a different interpretation. These women students are said to be exposing their lives to dangers. These dangers include among others sexual assaults that could result into unwanted pregnancies, sexually transmitted diseases such as HIV/AIDS and others, and all what this could create as emotional, psychological, social and financial implications. Shared views are that women could avoid these dangers by staying in families, as they are believed to be easily accessible in private residences.

Without underestimating the weight of the problems mentioned above, to justify why women students should not stay in private residences, one should not overlook the element of control that may be hidden behind the security façade. Conscious or unconscious control of women is likely to continue even when one is at higher education level. In actual fact, the mindset defining women as homemakers is still strong in the mind of majority of men and women of Rwanda. Thus, availing residences at campuses for women would be very beneficial to them. Not only they would be able to use the time after classes for academic purposes but also this would help them avoid possible issues of security and related consequences they may face in residences outside campuses. Besides, that would help them reduce very significantly the impact of their stereotyped roles and responsibilities, which affect their academic performances. This would play an instrumental role for women doing science and technology given that a significant proportion of their laboratory experiments are conducted till late hours at night, as commented one participant.

4.3.3 Gender inequalities in Academics

Gender inequalities were highlighted at three levels. Firstly, an emphasis was placed on academic policies, which are not supportive to married women especially with regard to access and maternity leave.

Secondly, academic programs that do not accommodate gender to provide a forum to discuss gender issues were also highlighted, as important area of gender inequalities. Thirdly, classroom cultures were given attention, as they proved to be supportive to the perception of women as not made for science and technology. The sections below discuss how each of these levels contributes to the poor representation of women in science and technology.

4.3.3.1 Women's access to science and technology

Apart from KIST which receives all women who qualify for science and technology, as stipulated in its access policies, there is no clear policy on women's access at UNR. The issue of access of women to higher education remains controversial. Some policies support the idea of affirmative action (e.g women to be admitted with lower cut-off point than men) to boost women's participation while others support bridging courses or other ways (see discussion under section 2.3). All participants, men and women, were not supportive to the idea of lowering the pass mark for women. While women saw that move as likely to create inferiority complex in them, men saw it as unfair to them. Women wanted to be given equal opportunities with men, as they believed that if they were treated on equal footing with men they would perform better. To avoid this controversy around the notion of affirmative action, universities should create conditions that are acceptable or fair to all candidates. For example, the policy at KIST of receiving all women who qualify should be encouraged as it is very likely to be accepted by both men and women.

4.3.3.2 Maternity policy

Participants argued that there is no maternity leave for women students. This affects them especially in the periods of exam. The situation is that any woman who gives birth during examination period faces the risk of repeating the year in case she does not write exams for maternity purposes. This may happen when the overall mark does not allow her to pass due to those exams or assignments she was not able to do because of maternity reasons. According to participants, maternity leave should be given to women students as it is the case for women staff. This lack of policy support denotes outstanding institutional hostility towards married women students. Much as this applies to all women students, but it is likely to be more felt by those doing science and technology as it adds to other forms of hostilities that are specifically directed to them (see section 4.3.3.4).

Another instance of lack of institutional support to married women lies in the lack of provision (s) for childcare. One of the government officials argued that *“married women need a place where their kids can be taken care of close to their place of work”*. She went on to say that *“this would give them peace of mind, which would be very conducive to their performance”*. This suggests that availing crèches for kids of staff and students would be very beneficial to married women students who would spare some minutes of their break to check on their kids. Besides, the peace of mind this would give them would make a strong impact on their performance. Some women have to suspend their studies due to childcare reasons, and very few of these women manage to resume their studies.

Although not apparently supported (in public and private organizations), the idea of crèche is not a novelty in Rwandan culture. It is a common culture within the rural context that when a mother is farming she can always prepare a space under a banana tree or

anywhere she assumes safe, where she can leave her baby while she is working. Thus, at the appropriate time she can go straight and breastfeed the baby while at the same time she can enjoy her break. The concept behind this practice is the same informing the idea of crèche. However, transferring such a cultural concept to Rwandan academies seems to be very challenging probably because that would be a way of encouraging women to participate in a space that is traditionally reserved for men. If the idea of crèche in higher education was encouraged, that would boost the moral of women (staff and students) including those doing science and technology.

4.3.3.3 Academic programs

Men and women students were of the view that gender as academic program should be integrated in their curricula, as they found it suitable to address gender issues that are underlying the under-representation of women in science and technology. Students believed that issues of policies, academic programs, interaction with teachers, stereotyped roles and responsibilities of men and women, sexuality, violence against women, etc. would be discussed during gender courses. They argued that gender programs are needed not only by students but also by university academic and administrative authorities, who would use acquired gender skills to take gender sensitive decisions. The general agreement among participants was that gender training would help both students and authorities have gender sensitive mindsets, which would create conducive environment for women's participation in higher education in general and in science and technology in particular. This is illustrated by the following statement by one of the participants:

Our universities should include gender in our curriculum to help us have gender sensitive mindsets. Gender training would not only help us, as students, but it would also allow our academic and administrative authorities to take gender sensitive decisions. As a result, this would create a good atmosphere in our campuses, which would attract women to join all fields including science and technology.

4.3.3.4 Classroom cultures

It emerged from participants that some teachers are not encouraging women students to do science, as transpired in the following statement by one participant: *“you know there are some teachers who think that women are not able to do science. When a woman gives a wrong answer they say: ‘shut up’ you are in a wrong place”*. This is an attitude of the kind of silencing a student for the rest of her classes at least for the courses given by this teacher. What if the student had two or more of these types of teachers? The likelihood for her to give up would be big. This situation confirms the conventional treatment of women doing science by teachers who neglect them and give more attention to men, as they believe that women are not made for science and technology. Participants argued that this attitude has become a class culture for some teachers who question performance of women on regular basis. Such situation is very likely to cause poor performance of women students, which may end up with them dropping out if this teacher’s attitude continues.

Class cultures were also exemplified by the huge distance existing between teachers and students. This scenario was confirmed by both teachers and students at the National University of Rwanda. Students and teachers see that distance as a big problem affecting interaction between them. This distance described as a *“wall”* between teachers and students, to use the term of one teacher participant, needs to be destroyed. That would help avoid situations of fear and trauma in students, which may be behind the existing poor interaction between

them and their teachers. It was said that interaction between teachers and students leaved a lot to be desired. Students were said to be at mercy of their teachers, as commented one teacher:

“I fully support the idea that interaction between teachers and students should be improved. It seems that there is a wall between them and if that wall was destroyed, that would put an end to the current situation whereby students are at their teachers’ mercy”.

The distance between teachers and students applies to all students irrespective of their gender, but it goes without saying that this distance is even wider between teachers and women doing science and technology. This is reflected through the comments by the teacher who used frustrating words to the woman student by indicating that science is a wrong place for her. These teachers’ attitudes towards women in science and technology are very much discouraging and they are likely to impact negatively on women’s performance. Thus, there is a strong need of encouraging an atmosphere of genuine interaction between students and teachers in general, and between women doing science and technology and their teachers, in particular. The gap existing between students and teachers creates tension and fear on the side of students, which is not conducive to learning processes. Classroom cultures do not only discourage women but they also create in them a feeling of permanent fear that may end up with hidden trauma leading to poor performance and eventually to drop outs.

4.3.4 Conclusion

This chapter examined the poor representation of women in the Rwandan higher education especially in the areas of science and technology at Kigali Institute of Science, Technology and Management and National University of Rwanda. Under-representation of women in these areas was found to be a daunting challenge for Rwanda government.

As matter of fact, women constitute the majority of the Rwandan population, which means that Rwanda will not fight poverty in a successful way if majority of her population is not well represented in areas believed to be the pillars of development; especially in science and technology (see discussion under 4.2).

The first section discussed the gender inequalities at policy level that women are experiencing. It appeared that policies are gender less explicit, and more importantly translation of even the few available gender provisions into actions has remained problematic. The statistical profile at both institutions confirmed the conventional patterns, whereby women are more represented in the areas that are associated with their stereotyped roles and responsibilities. The predominance of men was observed in decision making and the rest of academic areas let alone science and technology. The existence of some gender oriented policies did not prevent the under-representation of women in science and technology. A closer look at both policies and statistics led to the following observations: irrespective of their political will, the two institutions were found to be sites of women's discrimination in most of the offered programs, but a wider gap between men and women was observed in science and technology.

The poor representation of women was then looked at qualitatively and the following were highlighted as major findings: gender inequalities were highlighted in the areas of decision making, academics and infrastructures as evidenced by various statements by participants. Women's participation in decision making was seen as critical. They could serve as role models but more importantly they could contribute to challenge patriarchy and effect change. Academically, a strong need of better interaction between teachers and students was felt at the National University of Rwanda. This poor interaction was found to be an important stumbling block for students especially women doing science and technology, as some teachers adopt demoralizing attitudes towards them. With respect to infrastructures women need desperately residences, which would help them focus on academic assignments rather than house chores, as society expects them to do so when they stay in families.

Addressing issues of decision making, academics and infrastructure would be a tremendous step forwards in the search for gender equality in Rwandan academics, but this alone would not suffice to further women's participation in science and technology. Parallel actions aimed at addressing the issue of the mindset in Rwandan man, who still looks at a woman as his helper rather than his equal partner should be taken. The notion of equal partnership between men and women should be cultivated and sustained among men and women of Rwanda, as this is contrary to culture that has always placed higher value on a man than a woman (see section 1.1). For this to be effective, patriarchy in Rwandan academics, which is behind this state of affairs should be challenged and reformed to create a new system conducive to a mindset that would treat men and women as equal partners and therefore, serve interests of both categories on equal footing. This would require a strong involvement of gender-activist men and women in the higher echelons who are powerful enough to serve as engine that would pull the rest of Rwandan academics towards a gender discrimination free environment. Thus, conditions for sustainable participation of women in science and technology (and in other areas) would be achieved.

CHAPTER V

SUMMARY AND CONCLUSION

5.0 INTRODUCTION

This chapter includes three main sections: firstly, it revisits the research questions based on the findings and their implications. The research questions are (1) what have been the mechanisms put in place by the concerned academic institutions for a successful implementation of a national gender policy? (2) What are the strategies that targeted higher learning institutions have adopted to sustain further women's participation in science and technology? (3) What are the existing gender dynamics within the concerned institutions, and how are they impacting on women's participation in science and technology? (4) What are the future prospects for gender equality in science and technology? Secondly, the chapter draws some recommendations based on the findings and the literature review and thirdly, it discusses further areas of research.

5.1 RESEARCH QUESTIONS

5.1.1 What have been the mechanisms put in place by the concerned academic institutions for a successful implementation of national gender policy?

Analysis of existing policies within targeted institutions showed that some mechanisms have been established to facilitate the implementation of national gender policy. For example, the existence of the five-year strategic plans at KIST and UNR reflects the political will that both institutions show to address key issues facing them, including some gender issues. Gender issues addressed at this level include increasing women's participation in higher education both at academic and administrative levels, and constructing residences for women students. The strategic plans can serve as important mechanisms, as they can be used as yardsticks for programs to be implemented.

They give a clear picture of activities to be carried out for the given period of time. Strategies facilitating the implementation of those activities are also highlighted in the strategic plans. The latter can help know what has been achieved, what has not been achieved, and can be used to plan for future prospects. In addition to its strategic plan, KIST has designed a diversity policy, which is an important step forwards towards the right direction in addressing issues of diversity including some gender issues. At the structural level, women's student associations at both academic institutions have been created. These associations are very critical as they serve as forums where issues of women are discussed and addressed. Some of their activities are outreach programs on sensitizing young girls at primary and secondary school levels to do science and technology. These programs are critical, as they pave the way for women to higher education in general and science and technology, in particular.

However, both strategic plans prove less gender committed. At UNR, the strategic plan talks about increasing women's participation but does not show how this will be achieved. The document is relatively explicit about women's participation in decision-making (30%), but remains silent when it comes to poor representation of women students. At KIST, the strategic plan proves gender sensitive in terms of access, as it gives the rates of men and women by faculty to join the institute. The provision of admitting all women who qualify in science and technology is very promising, as it would boost significantly women's representation in these areas. The same strategic plan stipulates that all women should be allocated accommodation, which would resolve the thorny issue of residence for women. KIST is planning to go beyond 30% of women's participation in its various programs to reach 45% in five years to come, which is a move to encourage as this would give presumably more voices to women and thus, would address significantly the prevailing gender inequalities.

Much as the KIST strategic plan proves relatively more gender committed, than the UNR one, the two documents have important elements in common. Their implementation yields almost same results as no significant difference in terms of women's representation between both institutions is verified. Another critical similarity of the two strategic plans, is the silence around the participation of women in the area of knowledge production. One may assume that the 30% of women's participation in decision-making covers the areas of administration and academics but given the importance that research has for any academic institution, it should be clarified how many women compared to men, are going to be in research. All these questions were supposed to be addressed in a gender policy that each institution was supposed to have. The reality was that no clear gender policy was available at both institutions. The KIST diversity policy covers some gender issues but this should not validate the lack of a gender policy to cover comprehensively gender issues that the institution was experiencing. This lack of gender commitment of policies has a serious impact on women's representation, as it gives more room to gender neutrality, which sustains the status quo.

Women should be given explicitly appropriate room both in decision making and academics if gender equality is to be achieved. Besides, given that research is one of the key areas of knowledge production, women researchers should be promoted for their voices to be heard in that area, which remains the preserve of men. This would allow a production of knowledge that addresses fully issues facing men and women. The lack of gender commitment at policy level might be behind the silence around the major areas of gender inequalities further discussed qualitatively (see section 5.3), to uncover the reasons underlying the poor representation of women in science and technology. Before we look at those areas, let us discuss the strategies used by the concerned institutions to implement the said mechanisms and their implications on women's participation in science and technology.

5.1.2 What are the strategies that targeted higher learning institutions have adopted to sustain further participation of women in science and technology?

Concerned academic institutions have shown less gender commitment in adopting strategies for effective implementation of designed mechanisms, to address the issue of women's under-representation in science and technology. The 2004-2009 UNR strategic plan is talking about increasing students' participation in science and technology but does not specify how many men as opposed to women. Likewise, the university has planned to build residences for students but this policy falls short of gender commitment. It is not clear how many women doing science or technology are going to benefit from those facilities. The 2003-2008 KIST strategic plan gives some details on women's participation in science and technology. It gives figures of men and women who are supposed to be admitted by faculty. The KIST strategic plan highlights an important policy of admitting all women who qualify in science and technology. This policy should be encouraged as it is likely to meet less opposition from men and women. As a matter of fact, all participants were not supportive to the lowering of the pass mark to facilitate women's access to science and technology.

The UNR policies of increasing students' number in science and technology, and availing more residences for students are laudable. However, the gender neutrality in this policy clouds the specific needs of women for residences. The policy does not indicate the criteria on which the distribution of rooms will base, which is likely to encourage allocation of rooms by merit. If that was the case, very few women would get rooms, as their academic performance is more affected by their stereotyped roles and responsibilities than that of men. Without denying the importance of merit, as a criterion, one should not overlook the gender implication of such a decision. Much as the strategies adopted by both institutions to promote women's participation in science and technology remain generally sketchy, one can appreciate the step they have made at policy level.

However, further steps need to be covered in adopting gender sensitive strategies to address the daunting challenge of implementing the existing policies. In addition, to elements of gender inequalities reflected in policies, a set of gender dynamics underlying the poor representation of women in science and technology within the concerned institutions were also looked at. This answered the following research question:

5.1.3 What are the existing gender dynamics within concerned institutions and how are they impacting on women's participation in science and technology?

A set of gender dynamics existing within the concerned institutions were highlighted, as major areas of gender inequalities contributing to the poor representation of women in science and technology. Those are the areas of decision making, infrastructure and academics. These areas are inter-related and their interconnectedness is one of the major reasons underlying the poor representation of women in science and technology. For example, the poor representation of women in decision-making bodies is very likely to be behind the designing of policies that are gender less committed. As results, chances for women's concerns to be addressed would be very slim. This may explain the lack of concern to address highlighted issues of women such as issues of residences, maternity leave and class cultures that are hostile to women. Thus, issues of constructing residences for women, policies that are less gender committed, and teachers whose attitudes are demoralizing women doing science and technology, are unlikely to be brought in the streamline of pressing needs. The sections below elaborate on these dynamic and show how they impact on the participation of women in science and technology.

5.1.3.1 Decision making

The absence of women in decision-making was seen as one of the major factors contributing to the poor representation women in science and technology.

It was found that the inclusion of women decision-makers in the hierarchies of science and technology would increase women's participation given that women would identify themselves with these areas. Thus, women decision makers would serve as role models to other women. Besides, this would have important implications on policy making among other things. As a matter of fact, women's involvement in policy processes would have a strong impact on women's participation in science and technology, given that their input would contribute in addressing among other things issues of women that men are not able to see, feel or assess appropriately. However, for women to influence decision-making some other factors should come into play. Firstly, women should be gender sensitive and committed enough to effect changes. Secondly, women decision-makers will need required powers to exert their influence on decision-making. Thirdly, men decision-makers should be willing enough to support those women. For those men to promote women's cause (without overlooking men's cause), they need to be gender sensitive. Thus, there is a need of both men and women who are gender sensitive and powerful enough to influence decision-making in a gender sensitive manner. If these conditions are fulfilled, that would be an important step forward for the transformation of patriarchal predominance in the decision making of Rwandan academies, especially in science and technology, where women are overwhelmingly under-represented. For this transformation to be successful, other areas of gender inequalities associated in a way or another with decision making need to be covered, as discussed below.

5.1.3.2 Infrastructures

The lack of infrastructures especially residences for women was highlighted as one of the major factors affecting women more than men. This was found to be a serious problem as it has both academic and cultural implications on women's lives.

In addition to their academic assignments women who stay in families are expected to get involved in domestic chores after class, as per their stereotyped roles and responsibilities. This is not required for men who can use this time as a surplus for their academic assignments. In actual fact, culture allows men to devote as much time as they can on their academic programs. This cultural practice has a negative impact on women, as they are not allowed same amount of time as men. Providing them with residences at campuses would help boost their performance hence, their participation. This would have a special impact on women doing science or technology, as most of their laboratory experiments are done till late at night, commented one participant.

In addition, to the issue of residences, lack of other facilities such as lecture rooms, laboratories and other related facilities were found to be major reasons explaining women's under-representation in science and technology. The argument behind this was that very few tertiary institutions have fully fledged faculties of science and technology. This narrow space for science and technology urges the use of a restrictive entry system, which affects more women than men due to existing socio-cultural factors undermining women.

This adds to the fact that even the private institutions that are mushrooming across the country, as encouraged by the government, are not financially well equipped to afford science and technology related programs. As a result, those women with science background who do not get the required entry points for public institutions have to enroll in areas such as humanities and arts that are available in private institutions. While institutions offering science and technology are still few, policies facilitating women's entry such as the one at KIST of admitting all women who qualify should be encouraged. Alternatively, Rwanda government should encourage private institutions to establish faculties of science and technology.

5.1.3.3 Academics

Academics at both institutions were found to be a site of gender inequalities. The latter were localized at the level of policies that are not gender committed and thus overlook important issues including access and maternity leave among others. Integrating gender in higher education was found to be critical, as a strategy to address gender issues in concerned academic institutions. Engendering decision making and academics, was highlighted as a way of advancing gender sensitive decisions and programs. Elements such as classroom cultures reflected into teachers' attitudes towards women doing science and technology, were stressed to be part of factors contributing to the hostile character of academic environment against women.

The interconnectedness of the dynamics described above, affects women and more specifically those doing science and technology. To further participation of women in these areas, there is a strong need of addressing gender issues highlighted in those dynamics. That would pave the way for brighter future prospects for gender equality in science and technology, a question that remains eminent as discussed below.

5.1.4 What are the future prospects for gender equality in science and technology?

As the discussed policies are still in their preliminary phases of implementation, it would be early to assess the future prospects for gender equality within the concerned institutions. However, based on the content of their strategic plans, one may predict what is supposed to be achieved within the planned time frame of five years in specific areas. In decision making, women would be represented at the rate of 30% at UNR. Nevertheless, it would not be easy to tell how many women will be in the rest of the institution's structures, as the strategic plan does not elaborate on that.

Details on how to achieve gender equality at UNR will probably be given in the university's gender policy that was to be effective by 2005.

With regard to science and technology, the university was planning to increase the number of students doing science and technology but there was a need to know how many women would be admitted, as compared to men. Probably, details on figures and strategies to achieve those figures will be highlighted in the gender policy of the university. UNR was also planning to increase its capacity in terms of residences but still this policy fell short of proportions of men and women scientists to be accommodated. Lacking details should be clarified for well defined future prospects on gender equality in science and technology.

Concerning KIST, policies are clear in terms of figures of women students to be admitted by 2008. The objective is to move from the current 30% to 45%. Strategies on how to attain that objective are clear as well, and those include giving accommodation to all women who qualify and providing them with financial support in forms of scholarship or grants. However, KIST's policies are silent on decision-making and knowledge production. It is not clear how many women will be in the various decision-making organs by 2008. Besides, the policies are not explicit on how many women are going to be in academics and research.

Observation of the gender policies at government and concerned academic institutions levels, show a political will of advancing gender equality in higher education in general, and in science and technology, in particular. Much as policies in targeted academic institutions need to be more elaborate, one can tell that the political will of advancing gender equality is there. However, what is in the papers leaves a lot to be desired when it comes to implementation. As a matter of fact, statistics reflecting the situation on the field, show a different scenario from the content of policies. Besides, the content of the policies at Ministerial levels are not reflected at academic institutions levels. There is a strong need of link between the two institutions to assure consistency in the designing and implementation of policies at both levels.

5.2 RECOMMENDATIONS

The following recommendations should be considered by the concerned stakeholders to improve women's representation in science and technology:

5.2.1 Rwanda Government

Through relevant Ministries and institutions, the Rwanda Government should address the question under study bearing in mind the following questions: Why do we want more women in science and technology? What does this mean for Rwandan society, for women, and for science and technology? As discussed under 'epistemological orientation' of this study (see section 3.1), the rationale behind increasing women's participation in science and technology is development driven. However, for national development to be achieved several factors come at play. In addition, to academic institutions that must work on the side of training, government should prepare the society to absorb women graduating from science and technology. This means that government and its partners should strategize around job creation for those women, especially at the private sector level. Conditions for establishment of industries and research centers should be encouraged for women finishing in science and technology to be utilized.

Promotion of women working in the areas of science and technology should be encouraged for their better contribution to these areas and the sector of economy. Creating enabling conditions for women to get or create jobs would empower them and thus, they would be able to give their contribution as women not only for national development but also for the development of science and technology. This would help the government avoid the brain drain phenomenon that is likely to erupt if necessary measures are not taken. Much as number of women graduating from science and technology may create jobs for themselves, as encouraged by the new educational policy, the realistic feeling is that very few would make it.

Alternatively, relevant Ministries especially the Ministry of Gender and Family Promotion, and the Ministry of Education, Science, Technology and Scientific Research should work on mechanisms allowing them to monitor the implementation of their policies at the level of academic institutions. So far, those mechanisms are lacking.

To address the issue of narrow space at higher educational level, the Government should encourage private universities to establish faculties of science and technology by facilitating them to get required funds from banks or other funding institutions.

5.2.2 Academic Institutions

Policies should reflect gender concern seriously. For this to be achieved, relevant authorities should encourage gender analysis in the designing processes of policies. This gender concern should feature not only at the level of policy formulation but also at the rest of the levels of policy processes including advocacy, implementation, monitoring and evaluation. Besides, consultations with students on policies touching their lives should be imperative. This would help design policies that address women's genuine concerns. For example, the issue of maternity leave should have been addressed if women students were part of consultation processes that were supposed to precede policy formulation.

As a corollary to this, women should be appointed in upper echelons of higher education. They would serve as role models for women students doing science and technology (or other fields), and would contribute in raising and addressing institutional issues women would face. Also, women's participation in decision making would play a critical role in challenging patriarchy and bringing in gender sensitive change.

Construction of residences for women would help them a lot address issues associated with their stereotyped social functions that affect significantly their academic performance. This would give them ample time to work on their academic assignments, which is likely to boost their performance and thus, further their participation.

Gender as academic programs should be offered in forms of modules, courses or degree programs depending on the possibilities of institutions. Whatever form of gender training offered should be given as a cross-cutting subject. This would allow all men and women to complete their core programs with skills in gender analysis to be applied in their everyday professional activities. Besides, it would help address issues of gender inequalities impeding development processes socially, intellectually and economically.

It would be legitimate to encourage incentives for women doing science and technology. Not only they need this form of encouragement as an affirmative action but also they have more and different needs than men. Besides, this would be in line with the education sector policy that encourages affirmative actions for women's participation in science and technology. Some of the incentives would be for example construction of crèches at campuses and increase of scholarships money to address needs that are specific for women.

Networking between academic institutions and private companies is imperative. This would advance research in science and technology and as corollaries some other issues would be addressed. Those include issues sponsorships and grants for women. Cooperation between universities and private companies would resolve, also, the problem of unemployment both for women and men.

Measures addressing teachers' frustrating attitudes towards women doing science and technology should be taken.

5.2.3 Teachers

Teachers must reduce the existing distance between them and students to encourage good interaction and atmosphere of learning. This would have a positive impact on both men and women but it would be more beneficial to women who may suffer directly or indirectly from that distance in various ways.

Teachers, who discourage women doing science, should change their attitudes and behaviors. As teachers, they should understand that what they say to students carry a heavy weight. The message that their statements contain may support or affect seriously women's performance. Therefore, women doing science need to hear encouraging discourses and statements from their teachers. They need teachers' positive attitude and behavior to trigger interest and passion for science and technology.

5.3 DIRECTIONS FOR FUTURE RESEARCH

The issue of unwanted pregnancies seemed to be very critical. It would be interesting to see the impact this issue has on women's attrition and more specifically on those doing science and technology. The study would look at possible institutional factors that may be behind those unwanted pregnancies.

The denial of existence of cases of sexual harassment appeared to be very tricky given talking about sex remains taboo in Rwandan society like in many other countries. Researching on this to see to what extent sexual harassment may be causing unwanted pregnancies and women's drop outs in science and technology would be an important supplement to this study.

The silence of policies on maternity leave for students sounds very interesting. Researching on institutional factors underpinning this silence would help understand how academic institutions perceive women scientists and their suitability, as mothers, for professional career as scientists.

The problem of culture that has never allowed equal partnership between men and women is overshadowed by the issue of lack of role models, as if filling the gaps was the panacea of poor women's representation in science and technology. A culture oriented research on the concept around compatibility of womanhood and science and technology would help to see where to concentrate more effort for a holistic solution of the question under study.

The methodology to be used for the research on the suggested areas should be a combination of qualitative and quantitative approaches. As matter of fact, the lack of figures on how many women have dropped out due to unwanted pregnancies has been a tremendous omission for this study. Similarly, figures on women who got pregnant as a result of sexual harassment would have been a complement for this study. Issues of women heading families remain unnoticeable, yet they appear to be very critical as hinted by one of the government representatives. A survey on women who dropped would be important to this study. Information from face-to-face interviews with decision-makers in concerned academic institution was also an important lack. Much as the bulk of their ideas were collected from the various policies, direct discussions would have revealed new insights around gender issues and the way their institutions understand and address them.

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APPENDICES

APPENDICE D

INTERVIEWS GUIDE

I. Focus group interviews

- 1 What has triggered your interest to study science/technology?
- 2 Some people argue that “women are not made for science and technology”. What are your comments on that statement?
- 3 Statistics show discrepancies between men and women in higher education but the gap appears to be more significant in science and technology. What do you think is behind the poor representation of women in these areas?
- 4 What can be done at the level of academic institutions to further participation of women in science and technology?
- 5 There are comments arguing that “women do not fit for the professional career as scientists” given their position as mothers of families. What are your views on that assertion?
- 6 Given their nurturing role, women are said to be better than men in the teaching profession. What are your comments on this statement?
- 7 Lack of appropriate facilities is one of the reasons advanced elsewhere to account for poor representation of women in higher education. Is that the case at this university? If yes, to what extent does it affect your academic work as women in science and technology?
- 8 Like any other person, students need people to advise them when they are faced with problems of various kinds. Whom do you talk to when you are faced with academic problems?

- 9 Affirmative action policy has been adopted as a means to address the poor representation of women in higher education. However, it appears that over the last five years no significant change has been made. What do you think accounts for such a situation, especially, in science and technology?
- 10 Getting involved in a male dominated environment seems to be challenging. To what extent is this environment helping or constraining you in your daily academic life, as women involved in science and technology?

II. Interviews for Lecturers

- 1 Teaching science/technology to women seems to be challenging as they are said to be lacking abilities for those areas. What are your views on this assertion?
- 2 Women are said to be reluctant to take science and technology related subjects which might explain their poor representation in these fields. Do you share the same view?
- 3 Affirmative action policy is believed by some academic authorities to be a remedy to close the gap between men and women in higher education. Do you think that this can work for science and technology?
- 4 It is said that students with better performance at the secondary school level are likely to have the same degree of performance at the higher education level. Is this the case with female students in science and technology?
- 5 There are indications that students with a strong family background in science or technology are likely to pursue the same fields. Is that the case at this university with female students?
- 6 Adjustment of teaching methods is one of the factors that are highlighted accounting for poor or sustained participation of students. Have you ever felt the need to change your methods as a way of sustaining further participation of women in science and/or technology?

- 7 Interaction between teachers and students is viewed as one of the ways to boost students' performance. Do you think that can help to encourage women's participation in science and technology?

III. Interviews for the decision-makers in the Ministries

- 1 Affirmative action policy has proved to reduce the gap between men and women in higher education where it has been applied. Do you think that this policy can work to close the gap between men and women in science and technology? What are the measures or recommendations taken by your Ministry to address the poor representation of women in science and technology?
- 2 What has been the contribution of the academic institutions for the successful implementation of these measures?
- 3 What have been the shortcomings and/or merits of those recommendations?
- 4 What are the future prospects of the Ministry in the quest of addressing the poor representation of women in science and technology?

IV. Interviews for parliamentarians

- 1 The work of policy formulation and implementation seems to be very challenging especially in the area of education given the government program of capacity-building after the 1994 genocide that claimed hundreds of thousands of human resources. What are the constraints you are faced with at each level?
- 2 What has been the academic institutions' contribution in the implementation of the policies meant to address the issue of women's poor representation in science and technology education?
- 3 Despite efforts made at policy level and various discourses encouraging women to do science and technology it appears that the gap between men and women in those areas remains wide.

What are the reasons underlying such a situation? What are your future prospects in addressing the issue of women in science and technology?

APPENDICES E

FOCUS GROUP INTERVIEWS WITH UNR WOMEN STUDENTS

Interviewer (I): **Augustin Kimonyo**
 Researcher, Master's Students, UCT

Respondents (R): **UNR Women Students**

I Women are said to be poorly represented in science and technology because they are not made for these areas. What do you think of this statement?

R I don't agree with that statement because women are really capable of doing science and technology. The problem is culture that has been treating women as "weaker sex", that science is normally a tough subject, then they think that women, as a "weaker sex", cannot do it. These subjects are tough yes, but it is possible that women can take them. If ever they fail it is not because of their nature as women, but this happens to them as it happens to men.

R I think that women can do science and they can even compete with men. If they are poorly represented in this area it is because culture and the whole environment do not encourage them. So, they are naturally able but what is missing is encouragement.

I Some views argue that even those women who are already in science it is because they have been pushed there by their parents or some external factors, as if women cannot make it themselves. Can you tell us briefly how you end up in science or technology?

R Initially my interest was in nursing but as my brothers were doing science, my father told me that I should not think that my brothers are the only ones who can do science. He added that if I make more efforts I can also do science. So, he encouraged me and I went that way to science. As my father put it, it requires much effort to do science but it is possible.

I am really happy for having been able to show people that what they say, that women are not made for science, is completely wrong. So, far I am advancing well.

R For my case I am the one who chose science for myself. I was initially sent to do secretarial studies and I even spent there a whole semester but as I had appealed in the Ministry of Education for science, I ended up winning and now I am doing science. I chose this area myself because I love it.

R I grew up in South of Uganda and there was a woman engineer who was a gender activist. Her name is Winnie Byanyima. I admired that lady to the extent that I wanted to be like her. People were telling me that if I want to be like Winnie then I had to do science. By then I was in primary school and from there I decided to do my best to be like her. There was a fear of Mathematics among students but I said to myself that no matter what happened I had to pass mathematics. I invested seriously in that subject and I passed it and all other science subjects until I finish Senior six (A'level) in science. From there, I joined the National University of Rwanda, where I am doing computer engineering. So, it is possible for women to do science.

I What do you think universities should do then to further participation of women in science and technology?

R Women are vulnerable as they are faced with more problems than men. Here I am talking about women in general: it is not a special issue for women doing science but it is a common issue for all women doing higher education. Given that science subjects are more demanding than other areas, this adds to the many problems women are faced with, which frustrates them to the extent of even giving up.

I Do you have an idea of what would be for example, the special care to be given to women, as you are suggesting?

- R Yeah, there is for example a dire need of residence for women. If that issue could be addressed it can help a lot women as they are not safe when they stay far from campuses.
- I This is an important question regarding lack of facilities as one of the factors contributing to the poor representation of women in science and technology. Do you have some other problems related to lack facilities?
- R I am not answering this question but I've just got an idea of another problem that is peculiar to women doing science. You know there are some teachers who think that women are not able to do science. When a woman gives a wrong answer they say "shat up, you are in a wrong place". You find such a student frustrated and next time she will no longer ask a question, which may lead her to failure in her studies.
- I Do you have such cases in several classes?
- R Yeah, I agree with her and you can observe this through other cases for example when results are out you will find that when a woman gets good marks men students start questioning it thinking that the concerned woman have been given favors.
- In the same line of thought you find men teachers who question results of women (when they get good marks) in a course where the teacher is a woman. They think that women cannot get good marks especially in science.
- R I am the only woman student in my class where I am doing Civil Engineering. I have not seen any single teacher questioning my academic results but what I see on regular basis is that other people inside and outside the campus are gender biased. They think that I am passing not because I deserve it but given that I am the only woman in my class, they think that I am favored. Another thing is that people think that I cannot do science or engineering because I do not have enough muscles for it. They are always questioning my physical appearance, as if science was a boxing sport. Thus, whenever they see me advancing they think that I have been favored.

They cannot recognize my intellectual capacity but I always tell them that it is all about determination and courage. This is a situation I have been facing until now.

I Has any teacher, may be from another Department, told you those kind of words?

R Well, umm, I don't know how to put it but I remember one day a teacher asked me jokingly if I will really make it because he was explaining that in our culture women don't go up on the roof of a house.

I What did you tell him?

R I told him that I will make it because climbing up onto a roof of a house can cause no harm to a woman.

I You are a minority in a vast majority of men surrounding you in science and technology. Does the overwhelming representation of men affect your performance?

R (Laugh) I feel comfortable with men students. I remember when I was in the first year I was one girl out of ten boys. But what I have noticed is that they rather take care of you. So, unless you have external problems otherwise I think that being surrounded by men students is not a problem.

R I think that male students prefer to have girls as colleagues or classmates. When we were in the first year we were with male students who took Chemistry in the second year. They were always begging us to leave Biology to join them in Chemistry. So, I think they would rather prefer girl's company even if it's one girl rather than being in a class of only men.

I There are views that if the passing mark for women was lowered that would increase their participation in higher education, including science and technology. What are your comments on that assertion?

- R Lowering the passing mark for women would mean that women are not capable. In other words this would be like telling us look you don't have same intellectual capacities like men, then let us give you a push because you are not able to do it yourself. I think that women need other forms of encouragement but not lowering their passing mark for higher education..
- I What are those other forms of encouragement?
- R (Laugh) well, I think this is the role of the university management to see how to encourage them but personally I don't support lowering the passing mark for women.
- R There is an important problem of age that seems to be neglected here. Take for example a girl who join university at the age of 20 years. She will have to spend 5 years to finish Pharmacy or Chemistry. By the time she finishes she will be 25 years old and the likelihood to repeat in these areas is very big, which means it's very easy for her to finish when she is 27 years old. At this age chances are very few to get a husband and we should not ignore that this is a real threat in our society. So, if women are to do higher education, our society is to be sensitized especially men. They should understand that if they get married with mature women it is for the benefit of their families.
- I What do you think universities should do then to resolve such a problem?
- R Universities should see how to resolve issues that are specific for women. Think of for example a woman who, because of maternity problems, does not have time to prepare for exams. When she is settled she will be told that her time is over. The only alternative will be to repeat. I think universities should think of a system whereby women can assume their responsibilities as mothers of families and continue their studies. They should not repeat or be delayed in whatever way because of their family responsibilities, as if these are crimes they have committed. Universities should find a follow up system to address those specific issues women are facing.

- I Do you have a suggestion on strategies or measure that can be taken by universities to help women address some of these problems?
- R When you look at our university regulations, they are designed in a way that does not cater for married women. It is as if the university was created for singles or people who are always available. My thinking is that no woman should repeat a program for maternity reasons or compassionate reasons. Universities should think of how to follow them up for a smooth advancement in their studies. If say a date for exam is set, they should be flexible for those women who are not available for reasons mentioned above, or for any other sounded reason and find another date for her, instead of making her repeat for a course she did not fail. They will tell her that lecturers are not available to invigilate her alone! But should this be blamed on the woman then?
- I Do you have somebody whom you talk to when you have academic issues? Here I mean an academic counselor.
- R OK, we don't have a counseling center but if I remember well two years ago, there came one person who was not a counselor as such; I think he was a medical doctor. That man came and he was given an office here at university because the whole idea was that those students who have relevant problems, could talk to him. He came but nobody went to see him. He was bored and eventually he left. I don't know whether it is lack of information or what, but I think that we should have that courage of talking when we have problems and even move towards the people we think they can help us. I am sure students had problems by then and they still have them today, but talking is becoming very problematic.
- I There are views that given their nurturing role, women can be better teachers than men. What is your view on this statement?

- R People like generalizing. They will tell you that women are like this or that but I think men can also be good teachers. However, when I look at our women teachers I tend to agree with this statement because women in our class are somehow encouraging us. They are not like men who sometimes discourage us. Women look at your strengths not at your weaknesses. So yeah, I think in that sense women may be better teachers than men.
- I Other views argue that given their position as mothers of families women cannot be professional scientists. Do you agree with that assertion?
- R Well, I think what matters here is cooperation between the wife and the husband. If the husband accepts to stay behind in the family looking after the kids and what a view while the wife is outside, then I don't see what would prevent a woman from being a professional scientist.
- I Is the Rwandan man easily staying behind dealing with the domestic activities?
- R Well at least those who are young can may be do it because, according to what I hear from my classmates men saying, it seems they are ready to cooperate with their wives.
- I There is a number of assumptions on what is behind the poor representation of women in science and technology including culture, marriage and others. Do you see some other reasons that may explain the under-representation of women in these areas?
- R Umm, women like sitting there and make themselves beautiful waiting for somebody who will come to take them as their wives. I think this kind of spirit of just waiting for somebody to do everything for you is not conducive to doing science. Science is tough, and if you want to do it you have to be even tougher. Here I mean you have to work hard. So, loving soft life like cats does not help in science or technology.

- I What do you think university can do to address the issue of liking soft life that is observable among some women?
- R I think that university should organize conferences and public lectures to sensitize female students to avoid that spirit of dependency. I am not saying that women should not depend on their husbands, as sometimes this is a must, but they should at the same time think of developing self-reliance in them because their contribution is vital for the survival of their family.
- Umm, even among those who have been able to reach university there are still who think that when they finish here, their first degree will be enough and somebody will continue for them. I believe we need kind of sensitization on self-reliance though a wife will always need her husband's support under various angles but two are better than one, as they say. Thus we can go beyond first degrees and do masters degrees and why not PhDs?
- R In the same line of thought women should understand that it is their pride to give their financial support to their families. It would be more beneficial for a family if both the wife and husband are contributing financially. My thinking is that women should understand that they need to study and go far in their studies for the betterment of their future family lives. They should therefore seek degrees as their 'first husbands' or as 'one of the husbands' they must have.
- R Universities should have gender policies. Because, if you look at what is happening here, it is just we students who are arranging things like this interview, but you find that there is no clear gender policy to be implemented in the university daily activities. If this was there it would even help those people outside who would emulate gender sensitive activities that they would see at universities.

APPENDICES F

FOCUS GROUPS INTERIEWS WITH UNR MEN STUDENTS

Interviewer (I): **Augustin Kimonyo**
 Research, Master's Student, University of Cape Town

Respondent (R): **Men Students, National University of Rwanda**

I: What triggered your interest for science?

R: I picked interest for science since I was in junior secondary school. By the time I was finishing high school I had planned to do Medicine at higher education level. As I could not reach the required cut off point for Medicine I decided to enroll in Pharmacy. So, to answer your question, it is because of love I have for science that caused me to join Pharmacy.

I Can you tell us a bit why you love science?

R I love science because I want to understand things. As I said earlier I loved medicine because I wanted to discover what is hidden behind what I see in this area. Actually, it's a question of curiosity.

I Does somebody here have different reasons why he joined science?

R While I was still doing primary school I didn't have any idea of what science was. When I started junior school, my father encouraged me to do Mathematics or Biochemistry because, he had done Biochemistry. Thus, I majored in Mathematics and Physics at high school level, after which I joined science at university where I am doing Physics.

I Somebody else?

R I have two reasons why I joined science. Firstly, I was encouraged to do science by my father who did science as well. Secondly, I realized that many people were kind of fleeing Mathematics because they said "this area is tough", and indeed very few people did Mathematics.

So, I chose to do Mathematics because I said to myself that if people are running away from that domain, this meant that if I finish it, I will have more job opportunities than them.

I Any other comments?

R I joined science because I wanted to understand things that are surrounding me. When for example, you watch a movie you see many things: airplanes, vehicles of various forms and many other interesting things that you want to understand the theories or concepts that are informing their functioning. Once you are told that in order to understand those things you need to go through science, then you have to take that direction. That is how I joined science.

I What are you majoring in?

R I am majoring in Chemistry.

I Other comments on what triggered your interest in science?

R Contrary, to my classmates who were influenced by their fathers, my parents are not educated. I was not even brilliant when I was still at primary school. When I reached secondary school, I learned chemistry, which I found very interesting: I like observing chemical reactions and how through experiments you come up with tangible things. Because of the interest I had in this area, I worked hard and got the required mark to join higher education and today I am doing chemistry.

I Other comments?

R Initially my father had encouraged me to do agriculture but he encouraged my elder brother to do Mathematics. I do not know why my father was encouraging us to do different things. After genocide, I changed my view as I didn't want to become an agronomist or a veterinary doctor. So, I did Mathematics because I remembered this what my dad encouraged my elder brother to do. Later on when I reached university, I took biochemistry, which I am still doing.

- I Thanks for your comments and answers. Let us now tackle another question. Some people think that women are poorly represented in science and technology because they were not created for these areas. What are your comments on that assertion?
- R I don't agree with that assertion. My feeling is that young women are mostly influenced by their mothers. Given that most of our mothers have not done science, they tend to influence their daughters to do things they have done themselves. For us boys, we like watching movies that are connected to the various sciences, and our love for science comes in like that. Girls do not have often this opportunity. So, it is not because they were not made for science but it is rather because of lack of exposure to science that women are poorly represented in these areas.
- I Other comments?
- R It is wrong to think that women were not made for science. It's only a question of lack of opportunities. If women had opportunities to do science, they would work hard like men and definitely they would make it.
- I Okay, other comments?
- R I think that this is an old-fashioned way of thinking. You know traditionally there were very limited areas of science and technology. For example, initially in Rwanda there were carpentry, mechanics and lower levels of civil engineering. As some of the practices in these areas require muscles, people thought that women were not well placed for that. But today, I believe that a woman would enjoy seating on a computer and do her work. This is attracting women and it can influence them to do science which has a big range of varieties today.
- I Any other comments?
- R Women are much advanced in thinking ahead compared to men. When I was in high school, I asked one girl from my classmates what she was planning to do at university and she said "you know science takes a long time to finish". My feeling to this was that women are taking less difficult subjects because they fear for their age. They are reluctant to take science because they think that if they invest in it, then they are going to spend a lot of time, and by the time they finish they will no longer be suitable candidates for marriage.

- I Are you suggesting that marriage is preventing women from doing science?
- R Yeah, marriage plays an important role in discouraging women to do science or technology.
- I Does it mean that if a woman completes say, a science degree she remains with little chance to get a husband?
- R I don't think so. This happened in the past because the education system was different. For example, the primary school itself counted eight years. Depending on the nature of the program one had to do seven years to finish the secondary school. If one had to take Medicine, which counts another seven years it was very likely to finish specialization at the age of thirty or above. But, today things have changed a young woman of our generation will take maximum of twenty five years to finish a Bachelor degree in science. It's rare to turn thirty years old while still doing a bachelor's degree. So, things have changed: no woman will fail to marry because of age problem.
- I Other comments?
- R I don't agree with him because when you hear what men are saying about women who are doing science you find that they are discouraging women to do science. For example, if you ask a man from our generation whether he is ready to marry a woman who is doing science, he will tell you that science women are tough, because of the high reasoning that is associated with science. He will tell you that he needs a woman who has time to care for the family and for herself, which seems not to be the case with women doing science. So, if a young woman hears those comments, she will join the areas that are said to be less difficult because that's where men go to seek wives.
- I Are you suggesting that women who have done science don't know how to handle their families or are facing problems of finding husbands?
- R I don't agree with him because I know a couple of scientists who are living in harmony. Besides, I wonder why husbands would not like women who have done science. My feeling is that it is exactly this reasoning that a family needs to develop.

So, I see rather the man who would be married to a scientist, as a lucky man because he will have somebody who can contribute more efficiently to the well being of their family.

I May be there are people who think that marrying a woman who has done science would create problems in their families. What do you think would be the basis of their argument?

R Those are old-fashioned views that men are the breadwinners. I hear often our mothers saying that “umutware araje” meaning that our Prince or Leader is coming. Yes, a man can be the head of a family but he is not the only one to think in that family. Even the wife is capable of thinking. Let me give you an example: I have a classmate woman who is more brilliant than me. Do you think that if ever I marry that one I will be more advanced in thinking than her just because I married her? Not at all! My feeling is that a husband and his wife should complete each other.

I Apparently you are suggesting that men and women can do science irrespective of their biological make-up. How do you explain then the poor representation of women in that field?

R I think that the problem lies at the lower levels especially at secondary school. You will find boys who are discouraging girls telling them that if they take science they will not get husbands. This was just an example but yeah, I think that the big problem is that young women are not encouraged while they are still at secondary school level.

I Other comments?

R Yeah, women have been told and they believe that science is a very tough thing. Another thing is that there is a problem of environment. It would be for example, hard for a woman to think of doing computer science when she is originating from an area where she has never seen a computer.

I What about those women who reach university but fail to finish their studies? What is behind their drop outs?

R They don't finish all because they are distracted by many things and thus, they don't have enough time to invest in science, which leads often to their failure.

- I Somebody mentioned environment as a factor contributing to the poor representation of women in science and technology. Is your university, as an academic environment, contributing in a way or another to the massive drop outs of women in science and technology?
- R There was a culture at this university of failing students but fortunately the culture is dying progressively. Otherwise, the culture was in such a way that the more failed students the more credits the university had. It was said that this was the best way of teaching. For example, when we started in the first year, we were 120 students but only 70 students passed. So, this was one of the reasons why women feared science and technology. But now things are changing. There are more women in the first year now. However, there is still a difference between UNR and KIST. At KIST things are much better: students are studying in a good atmosphere, there are no problems between students and teachers. Problems were here at UNR.
- I Was this system of failing students focusing more on women than men?
- R No, even men were failing but this increased the state of insecurity in women who were trying to join the areas of science and technology.
- I What are other things associated with your university that are behind the drop outs of women in science?
- R Personally, I don't see any problem that is associated with university that is preventing women to pass. Those who are doing science or technology are even smarter than men. The question is that they rather concentrate in areas such as Biology, Chemistry, Medicine and Pharmacy.
- I Any other comments?
- R There is a problem of accommodation but this one applies as well to those who are in other faculties. The big issue for me is age. For example, I have a classmate and just because she is a woman, she thinks she is older than me. Yet she knows that we have same age. In addition, to that feeling, there is pressure from men who want to marry her. This can push her to give up studying.

- I There are views that because of “her role as a mother of a family a woman cannot be a professional scientist”. What are your comments on that assertion?
- R I think that this question is associated with the idea that “women are the custodians of kids’ education”. That is why a woman is supposed to be at home looking after them, which is likely to impact on her profession. My thinking is that both wife and husband should equally be involved in the education of their kids. Men are professional scientists because domestic activities do not affect them. My suggestion is that men and women should share roles and responsibilities both at home and outside home. That would give women more time to invest in their area of specialization. Thus, becoming professional scientist is not linked with their nature but with their social roles.
- I Any other comments?
- R Majority of our population is in the rural area where it is very rare to see a “woman scientist”. The few women scientists we have are in towns. So, I think it is a problem of environment that is somehow affecting the majority of women.
- I So, what do you think UNR should do to further women’s participation in science?
- R When you look at the policy of our government, you find that it is encouraging women to do science and technology, which is a very good thing. So, I think that things will improve as time goes by.
- I What does the government policy say in respect with women’s involvement in science and how is that attached to their increase in science at UNR?
- R Rwanda Government put in place the Ministry of Gender and Women in Development and the FAWE secondary school, which I think are major achievements aimed at encouraging women to do science and technology.
- I Other comments?

- R I think women should be encouraged to do science because it is the area that requires lower cut off point. For example, last year the cut off point was 2.8 for those joining science, but it was 6.5 for humanities. So, if women invest in science at lower levels it will be easier for them to take science at university, as the pass mark will be lower for science than humanities.
- I Do you think that lowering the entry mark for women would be a good option to increase women's participation in science?
- R Personally, I find it very negative for women. Actually this would be another way of showing them that they are weaker than men. Yet women are very strong in science: we have cases of women who are getting distinctions where men are even failing. So, the problem lies at the level of our culture that does not encourage them to do science and at the secondary school level where you find a small pool of those who finish in science.
- I Other comments?
- R I think that lowering the cut off point for women would be a good thing but not for all women. If you look at majority of women in rural areas, they are very busy involved in house chores. But for most of those who are in towns, their families have house workers which can help them to work on other things including academic assignments. So, lowering the cut-off point would be good for rural women but not those in towns. Besides, this is not something that should be there eternally. There should be a time limit after which all men and women would be treated equally.
- R I am not supportive to the lowering the cut off point for women. I think you are aware that at least 80 % of the secondary schools in this country are boarding schools and there students are equally treated. I think that would be unfair for men if the cut off point for women is reduced. I see it as kind of sexual discrimination. The problem with women here is that they don't trust themselves.
- R The problem is not in the nature of women but it is localized at the level of their families. What needs to be done is to find out how women would be given more time to cope up with their own business including academic matters.

- I If you limit yourselves at higher education, what do you think universities or institutions of higher learning should do to further women's participation in science?
- R At the level of universities the first problem preventing young women to finish their studies is due to unwanted pregnancies. So at this level the problem is no longer that of house chores or whatever. What women need is training on how to protect themselves against unwanted pregnancies.
- I What do you think can UNR do to help them in that sense?
- R Umm, of course UNR will not tell them to run away from men even if the latter are the key players for those unwanted pregnancies. Well, UNR is trying but I think the big problem lies at the individual level.
- I Some people assume that sexual harassment is one of the issues that women are confronted with, which may be behind their failure. Do you share that view?
- R Women are worried when they reach a certain age before they marry. So, my thinking is that universities should help them understand that life is possible without necessarily marriage. Actually, this should be communicated to women not only at higher education level but also at national level. Otherwise, I think that UNR is doing its best as evidenced by the very recent distribution of condoms that are now everywhere in campuses to help those who cannot practice sexual abstinence.
- I Any other comments on this issue?
- R I think that universities should build residences for women as a way of helping them overcome some of the issues they are faced with resulting from the way our culture treats them. For example, it is culturally embarrassing for women to go home in late hours. This situation itself is enough for a woman to drop out from her studies.
- I It appears that you are unanimously highlighting unwanted pregnancies as the reason why women are not finishing their studies. Who are impregnating them? Their classmates, their teachers or men from outside? Are these unwanted pregnancies resulting from possible cases of sexual harassments?

- R There are no cases of sexual harassments between women and men students. It may happen to have sex with a classmate or with somebody from a different class or different faculty but it always happens by mutual consent. Concerning cases of sexual harassment by teachers, it may happen but so far we don't know any single case. Most of cases of unwanted pregnancies result from relationships between women students and men from outside the campus.
- I There is an assumption that due to their nurturing roles women can be better teachers than men. What are your comments on that assumption?
- R I think this depends on the gender of who is saying it. If this was said by a man, then I would understand because a woman would say differently. Actually, women in general, say that men are better teachers than women.
- R My feeling is that women are better teachers not because they are women but because they may have more time to prepare for classes. You know men spend a lot of time drinking. Thus, they don't have time to invest in preparing their classes, which may affect their performance. On the contrary, women invest more time to prepare and therefore their performance may differ from that of men.
- I Some people say that because women involved in science are a minority this may cause them to perform poorly. What do you think of that assertion?
- R The big problem at that level is security for women. Because they have to stay in the laboratories till late in the night, women have problems to go to their residences after lab works, let alone those who stay outside the campus. But this situation has its advantages. I told one of my colleagues who is doing electronics; she is the only woman in her class of thirty students, that she is lucky because when she finishes, she will get a job before the rest of her class because she is a woman. You know, I said this jokingly but it has some realities in it.
- I There is an assumption that career guiding and counseling centers are some of the possible solutions to address various issues women and men are faced with in their academic lives. Do you agree with that? If no, why? If yes, to what extent can this impact on women's performance in science?

- R This is something very important we are missing. I wonder why we don't have those centers. You know some of us do not have parents who have studied to help us decide on which program to pursue. We are just coaching ourselves, which is not helping us that much. Yeah, I fully agree that this is something we need badly: there are a lot of psychological problems, social problems, let alone academic issues. These centers are meant to help students both men and women address various difficulties they are facing.
- R We do not have counseling centers at our university and as my colleague has rightly put it, we need a career guiding and counseling center. There are numerous problems at this university: young women and men who are heading households as consequences of genocide, women who have problems of unwanted pregnancies, financial and social problems all those issues were to be handled in a counseling center. Yeah, we really need it.
- R We have a small counseling center here but it is more HIV/AIDS oriented than any other thing else. For this one to be established, students raised the issue of HIV/AIDS and the university's authorities understood their situation and allowed its creation. I think we need to do the same to have a multidiscipline counseling center.
- I Thank you guys for your time and contributions. I am going to translate this interview in English, after which I will come back to you for you to make sure that the translation has been faithful to your views. Besides, when I finish my dissertation, a copy will be put at your disposal in your library, for consultation.

APPENDICE G

FOCUS GROUP INTRVIEWS WITH KIST STUDENTS MIXED GROUP

Interviewer (I): **Augustin Kimonyo**
 Researcher, Master's Student, University of Cape Town

Respondents: **Man (M) and Woman (W) Students**

I It appears that the number of women students in institutions of higher learning decreases as they move upwards. In other words, the higher they go in their studies the poorer their representation becomes. How do you explain that scenario?

M The problem is that the main focus of female students when they come at university is not really their studies. They rather use university as a steppingstone for rich husbands.

W I do not differ that much with the previous speaker. I fully agree with him that when young women come to university, they believe that they are mature enough for marriage. When they start thinking that they are aging, they find that in some years to come no one will look at them. This idea disturbs them a lot to the extent that they give more weight to husbands than academic matters. Marriage is a real limitation to women's participation in higher education. Otherwise, they are potentially intelligent but I don't know how to put it. May be it's an inferiority complex but yeah, marriage is constraining our studies. Actually, in a nutshell, the first goal is a husband.

W Women students are also distracted by material things, which affect their performance. What I am trying to say here is that sometimes a man comes and tries to show you that he is interested in you, while he is lying: he can do the same with many other ladies. This can take your time because once you have given him a room in your heart you can't spend a day without thinking of him.

He will ask you to go out with him, do this do that, all these are factors that may contribute to the poor performance or even failure of young women students.

I What should be done at the level of academic institutions then, to allow female students get married without interrupting or abandoning their studies?

W I am not answering directly your question but I am trying to think ahead. OK, she may get married and then comes back for her studies but you can see that she has two responsibilities: her family and her studies. While she is trying to pursue her studies, family responsibilities will hinder her academic programs. To answer your question I would not support the idea of doing both: getting married and studying.

I How can KIST, for example, assist those who want to do both: studying and getting married?

W I think that to answer this question, we need to look at those factors that prevent a married woman to further her studies. There are two aspects here: academic programs and family responsibilities. These are heavy responsibilities that a woman will not be able to handle if she is not assisted. I am not saying that university should help that woman on how to handle her family business, but I think that on the academic side something should be done. Here, I am thinking of a woman who has to go back home to breast feed her baby. Universities should establish caring centers where mothers can leave their children while they are studying. This is done in developed countries and I think it can help women significantly to pursue their studies while they are at the same time caring for their babies.

M I don't see for example KIST constructing a caring center for babies. However in the same context it can facilitate women who are breast-feeding by putting a room at their disposal for that kind of activity. Otherwise, caring centers are available in Kigali but very few women can afford them, as they are private businesses.

On the other hand, I think that this is a gender issue that needs to be resolved at the family level not at the university level. Men and women should equally see things to the extent that when the wife is not around, the husband can handle everything without any problem and vice versa.

I There are suggestions that universities that have enough facilities to address some specific women's issues are likely to have more women with better performance. Are facilities at KIST conducive enough to encourage women's participation?

W We have a problem of accommodation at KIST and this has more impact on women than men. For example, a girl who is staying in a family will be confronted with two main challenges: passing her academic programs and fulfilling family requirements. These family requirements do not apply to men the same way they apply to women. Our society does not tolerate a girl who comes back home in late hours. Implications of this are that women will go back home after class, mostly around 5:00 pm if they are full-time students, and will spend the whole evening doing domestic activities. This means that back home, women students have very little chance to concentrate on their academic assignments. This does not apply to male students who are culturally allowed to go home late in the night. They can use evening hours to study with their colleagues at campus. So, I think that there is a pressing need to construct enough residences for female students at KIST.

W We have been discussing issues apparently of married women who have babies but even those who have mature children are faced with number of problems. My point is about husbands who should understand that once their wives are engaged in academic matters they should assist them in the sense of doing those other activities that were normally done by their wives. Think, for example, of taking care of children. A married woman should feel released whether she is at home or at campus and the husband's contribution at this level is very much needed. Here, I mean that husbands should be more responsible if they want their wives to further their studies and finish with good academic results.

- I Is there anything KIST can do to help those husbands to be more responsible in their families for better academic performance of their wives?
- W If KIST can design regulations saying that married women should stay in the residences as it is the case for girls in the boarding schools, then this can help those husbands to be more responsible. But since men are used to that culture thing that says that “a woman is the heart of the family”, they can’t do anything when they see their wives around.
- W KIST can also help those women by designing a timetable that matches their availability. By this, I mean a time table that is flexible to accommodate some of women’s issues.
- M I think KIST can help in establishing a sort of gender department or kind of gender desk aimed at sensitizing men and women on how things should be done in a more gender balanced way. Because, I think that those men are victims of ignorance: they think that what they are doing is correct but once sensitized, they can change positively.
- M KIST should start teaching gender courses because these courses would reach men students who are future husbands. Thus, they will find it easy to apply what they would have learned from class into their families. That is the way I see KIST can contribute to the change of mentalities, which is actually a process. Lucky enough this is encouraged by our Government as it transpires in the policy of good governance.
- I It appears that you agree that women are faced with family or societal problems that are hindering their academic performance. Does it mean that you agree with the policy that would exactly base on these problems to facilitate women’s access to higher education by lowering the cut-off point for them?

- M That would not be assisting women. Let them have the challenge of accessing university but at the same time concerned authorities should work on programs, policies and strategies aimed at changing the mentalities of men and women. This would allow access to higher education for women in a sustainable manner as backed up by positive atmosphere in their families.
- M Starting with changing things at the top, would not help women. I think it would be better to start from the very beginning (in the families, primary school and secondary school) to prepare the ground for a successful change at the top.
- I Counseling centers are said to be conducive to the improvement of students' performance in general. Do you agree with that statement? If yes, how can they impact on women's participation in science and technology?
- W Personally, I agree with that statement and I think that a counseling center is very necessary. Here at KIST we have a counseling center, which is dealing with general cases not specifically women's issues. But, I think that we need somebody who should be involved in addressing specific issues for women. For example, one of our classmates got married and had to abandon her studies, because of family related problems. May be if there was somebody to counsel her she would have secured her studies.
- W It is true that we need a counseling center to handle our problems but I foresee a major problem here. How can somebody assist me in resolving my problems when I have not talked to him/her? Students have problems but they prefer to keep them for themselves. So how can they open up to somebody else?
- I Students are not talking about their problems and the issue here is how they can open up. Your colleague has said that KIST has a counseling center that is handling general cases; are at least those general cases reported?

- M I am not sure whether KIST has a counseling center. Otherwise, it should have organized a meeting of married women students because it is known that they have problems.
- I You are not sure whether KIST has a counseling center but apparently some of your colleagues here are informed about it. Can somebody tell us about the KIST counseling center?
- W OK, I have never been in that center but I know it is there. The problem with students here, they don't read notices and therefore they don't know what is happening in the Institute. So, if something has not been advertised enough they won't know about it. I remember when we were in the first year or may be in the second year; a lady was touring in classes telling us that she is a specialist in counseling, and that she can help us to resolve various problems that are affecting our performance. That lady is a counselor but she is also a lecturer in the School of Languages. So, may be for those who are here I can tell them where the counseling center is located: it is next to the park line between the Dining Hall and the *Inkingi* Bank.
- I Apparently, there is a common agreement that a counseling center is needed. To what extent can that center help women in science and technology?
- W Counseling is very important not only to women doing science but to everybody, I mean men and women. However, as women are faced with more problems than men it is clear that counseling would be more beneficial to them. Those who are doing science and technology can benefit a lot as they are expected to face more problems related to the nature of the academic programs they are involved in.
- I There are views that women are failing at universities, because of two main factors: firstly, culture does not encourage them to do higher education and secondly, universities are playing a bigger role than culture in failing women. What are your comments on this?

- W I think that culture has more impact in failing women than universities because there are things that women learn from culture that hinder their advancement at university.
- I What are those things?
- W (Laugh) culture tells you that a woman has to be at home when it is dark otherwise she has to be accompanied by somebody preferably her husband. Besides, culture tells you that it is not good to face somebody who is talking to you especially when it is an important person. Culture contains many things that are not helping you when you reach university.
- W I agree with my colleague that culture is the one playing a bigger role in failing women at universities than universities themselves. Culture trains women to feel more attached to their families than it does with men. This affects women to the extent that when a woman is in class or elsewhere, she is there physically but her heart is always at home. So you see you are like duplicated and for that you can't concentrate on your studies; you are rather trying to focus on several things. The same situation is verified to unmarried women or girls. If something happened in her family all her focus is there. Yet this does not happen the same way to boys or men. So, our culture is creating more problems than it resolves.
- I Any problems that are originating from universities?
- W Personally, I don't see any problem with universities. It's culture that causes our failure at universities.
- I Other comments?
- M I think the problem is at universities because if those who have managed to reach there can't continue it's not culture but university. So, I think that universities should find mechanisms of keeping them so that those who are still behind can have role models.

- M I find our culture as the major source of problems and as long as we are still cherishing our culture, those problems will remain. So, I am of the view by the previous speaker that universities have no problems. Actually our universities are doing their best given the means they have. If we were in a developed country then things would have changed but we are in developing country that is putting culture before everything. We are in a country where a woman is seen as the heart of the family and therefore when something is wrong it is to be blamed on a woman not on a man. So, the way I see it, in our studies, we are more bound by our culture than we are, by any other thing else. You know in science there are realities that culture does not accept as such, but which are guiding revolutionary ideas.
- I What should universities do then to resolve those culture related problems?
- W I think I had alluded to it. Universities should develop a curriculum that is geared towards positive change of our mentalities. You know, as I do that young men and women at universities are the husbands and wives of tomorrow. If universities manage to train good future husbands and wives, then those who would not be lucky enough to reach there would learn from them as their role-models.
- I You are somehow advising universities to develop programs that are addressing the imbalances between men and women, which is actually gender program. Do you think that such a program can be taught at an institute of science and technology?
- W My thinking is that institutions of science and technology like KIST should not focus on science and technology alone. Other programs, including gender, that are deemed to contribute in training men and women who are useful to our society, should be integrated in their curriculum. Otherwise, our institutions may end up producing people who are good at science and technology but who might be dangerous to their society they are supposed to protect and develop.

- W (Laugh) sorry, umm, there are other important things that are somehow forgotten despite the instrumental role they play in our lives. I mean reproduction related issues. I think that this is a youth's concern. So programs linked with those issues should be designed and taught to students because reproduction issues are part of the key problems that students and especially women are faced with and which cause majority of women students to abandon their studies.
- M May be gender courses, but not at degree program level, should be introduced because the way I see it, those finishing in gender may not get jobs. I think that programs here are developed depending on the need at the market. Even if gender is still a new area but it seems we do not have high demand of qualified people in gender. It is something that will come progressively and in the meantime depending on the need of the country pioneers in the field of gender can train abroad until we reach a very high demand of them then our academic institutions can start offering degree courses in gender. That is how I see things.
- W I agree with him that KIST does not need to develop degree programs in gender since its focus is science and technology. However, gender courses are needed because I see them as something that can facilitate good relationships between men and women, be it at universities, be it in families or elsewhere. Otherwise, having strong knowledge in science and technology with a gap in gender relations is it going to help us?
- W I would suggest gender to be part of the combinations we have here at KIST. If say somebody wants to major in science or a given technology but with a minor in gender, I think it would be more interesting than majoring purely in science or technology. So, in the same line of thought I would encourage creation of department of gender to cater for those who want to take gender as minor or a major course.

APPENDICE H

INTERVIEWS WITH UNR LECTURERS

Interviewer (I): **Augustin Kimonyo**
 Researcher, Master's Student, University of Cape Town

Respondent (R₁): **Anastasie Gasogo**
 Associate Professor, Department of Biology

Respondent (R₂) **Laure Bitetera**
 Assistant Lecturer, Department of Biology

Respondent (R₃) **Charles Ntaganda**
 Senior Lecturer, Department of Biology

Respondent (R₄) **Egide Kayitare**
 Lecturer, Department of Pharmacy

INTERVIEW WITH RESPONDENT R₅

I There are views that women are not made for science and technology. What are your comments on that statement?

R₁ I don't agree with that statement. Women like men can do science or any other area but it's only the environment that influences them and then there is that myth that women cannot do science, otherwise, they are capable as men are.

I How do you explain the poor representation of women in science and technology?

R₁ I think it's a question of mentality that causes a lot of women not to invest in science and technology. We have been trained to believe that women cannot do long term studies, that science is tough and therefore it is for men, and when you add this to the question of marriage then you find that women are discouraged and give up doing science that way.

I When you look at statistics it appears that the higher you go in terms of studies the poorer the women's representation. How do you explain that scenario?

R₁ I think that the main reason behind that phenomenon is marriage. When a woman finds somebody who can meet her needs she prefers to get married rather than continue her studies.

I There are suggestions that women don't do science because they are not self-confident. Do you agree with that assertion?

R₁ I fully agree with that assertion because our culture does not encourage women to be self-confident. So, anything that requires self-confidence you will find that women are not well placed for it.

I Do you think that this university can do something for those at least who have managed to be here, for them to have that confidence and continue their studies?

R₁ I think it would be much better to take measures encouraging women to do science at the lower levels. These measures should be taken at the family, primary, and secondary levels by educating women to embrace science and technology. However, I have seen something interesting with the University of Ruhengeri: they have recruited more women than men and I don't know how they managed to do it but it appears that they are making efforts to recruit more women, which is very positive.

- I The education sector policy states that measures aimed at encouraging women to do science and technology should be taken at all levels. Are there measures that the National University of Rwanda has taken to encourage women's participation in science and technology?
- R₁ I am not aware of those measures, but here we have more women in biology and Chemistry than we do in other science subjects such as Physics and Mathematics. I don't know what to do to address those issues, but I think that science should be demystified so that people can understand that women can make it.
- I How can science be demystified, if not by universities themselves?
- R₁ I think this should involve all teachers including the primary, secondary and tertiary levels. At each level students should be sensitized and taught that science is not more complicated for women than it is for men.
- I Some people argue that children with a family background of science are likely to invest in the same area. Are you of that view?
- R₁ I think I am not well placed to answer that question given that I am from a farmer's family background. When you look at the figures at this university, you will find that most of those students doing science are from rural areas where majority of parents are farmers. However, I think that there is a certain influence of parents on their children. Myself, I have two children, both of them have done Bio-Chemistry at the level of high education. My husband has done Chemistry so I think we played directly or indirectly a role in that.
- I There are views that students with good performance at secondary school have good performance at higher education level. Does this apply to women in science?

- R₁ I do believe that brilliant students at secondary level are also expected to be brilliant at the tertiary level. However, you should not lose sight of the tender age those young ladies have when they come to university, which is likely to bring them in difficulties and hence some of them may end up having poor performance.
- I Do you think that the lack of role models in the hierarchy of the universities is a factor contributing to the poor representation of women in science and technology?
- R₁ Definitely, yes. If there were women in the structures of our universities then women would be stimulated.
- I Teaching methods are also seen as one of the factors influencing students' performance. Have you ever thought of changing or improving your teaching methods as a way of encouraging women to do science or technology?
- R₁ So far we have no complaints with our methods unless we are shown different methods to compare. Otherwise, you cannot tell such and such method is good when you are not comparing it to a different one.
- I Good interaction between students and teachers has been supported by number of educationalists as a way of boosting students' participation and performance as this reduces the gap between students and teachers. What are your comments on this statement?
- R₁ I am of the same view given that students fear teachers, which is likely to produce a climate of hidden hostility, if I can put it that way. If that gap between students and teachers was bridged this would lead to a better participation and performance exactly.

However, there should be a limit in those relationships. I foresee cases of female students and male teachers or male students and female teachers who might go beyond what they are supposed to do. Otherwise, I fully support the idea that good interaction between students and teachers should be improved since it seems there is a wall between them. If that wall was destroyed that would put an end to the current situation whereby students are at their teachers' mercy.

INTERVIEW WITH RESPONDENT R₆

I There are views that women are poorly represented in science and technology because they are not made for science. What are your comments on that assertion?

R₂ I am not supportive to that statement. The question is rather more of interest than of natural abilities. If women were interested to do science they would do it as well as men. However, the problem is not only in science but it is a general problem: you will find that women are not interested in higher education though the trend has changed a bit in a positive way. I don't know why but I think that reasons are historical or cultural. Women were culturally meant for marriage and home activities, and may be that is why there are not interested in long term studies leave alone science and technology.

I What do you think this university can do to help women to get interest in science?

R₂ Well, I think that women who have done science can serve as role models for them. Another thing that is important is that they should be encouraged to avoid situations whereby they are envying those who have done other areas such as law or economics, which appear to be more remunerating than pure science. We have also to go down at the secondary level to see how we can sensitize those who are still there to help them understand that they can make it as well.

I There are other views that women are poorly represented in science and technology because of lack of self-confidence. Do you agree with that assertion?

R₂ Well, umm, yeah, especially for those who are still at the secondary school level as they are not used to see women who have done science they may be blinded by the cultural ideas that science is made for men. However, for those who are at university, I think they have a different view.

For them, it is a question of interest. They want to know what they will gain once they finish. But, I believe that with time will end up realizing that there are some who managed to do it, and then they will make it as well.

I The education sector policy states that measures should be taken to encourage women to do science and technology. Are there any measures that the National University of Rwanda has taken in compliance with this policy?

R₂ Umm, I am not sure, I don't know any measures or strategies that the university has taken to encourage women to do science and technology.

I There are suggestions that students from a family background of scientists are likely to become scientists, as well. What do you think of this view?

R₂ Well, it's possible but this should not be over-generalized. I think there is an important element of environment. I know many women who did science but whose parents are uneducated. Myself, I was influenced by one of my teachers whom I admired a lot.

I Some people argue that teaching methods are impacting on the participation of students. Have you ever thought of changing or improving your methods as a way of encouraging women to participate in science?

R₂ Not really as such, but I support the idea of orienting science towards a more practical world. A lot of theories don't help students. They need to be taught how the theories they are learning are going to be beneficial in their everyday life. I think this can help more women who are used to more practical things.

I Good interaction between students and teachers are suggested as a possible way of encouraging women to do science and technology, as this reduces the gap between students and lecturers. What is are your comments on that?

R₂ Yeah, if the gap between students and teachers is reduced significantly that can help the students a lot. The narrower the gap the better communication is between students and teachers, which is conducive to good performance and success especially for women who culturally don't open up easily. This can also help women build self-confidence.

INTERVIEW WITH RESPONDENT R₇

I There are views that women are poorly represented in science and technology because they are not made for science. Do you share the same view?

R₃ I don't agree with that statement. My feeling is that women are not naturally weaker than men in terms of intellectual capacity. Their poor representation is based on the fact that very few women do science in secondary school, which is the one training candidates for universities. So, I think that the question of knowing why women are poorly represented in science and technology should be asked at the secondary school level.

I Do you think that something should be done at the university level to maintain those who manage to reach that level since it appears that the number decreases as you go up?

R₃ Umm, given that men and women are supposed to be equally treated, I am not of the view of giving favors to any category of students while leaving behind the other. I would suggest that the few women in science should be sensitized at the level of high school while they are preparing for university for them not to fear competition with men.

I There are suggestions that women are poorly represented in science and technology because they are lacking self-confidence. They are said to be very reluctant because they are not sure of themselves. What are your comments on this assertion?

R₃ Umm, yeah, I fully support that point of view for two main reasons. Firstly, there are that cultural elements that dictate women to accept that they can't do the same activity with men. Secondly, she has no reference ahead to show her that she is investing in an area where things are possible for women.

So what needs to be done here is to sensitize women by making them understand that science is not as complicated as it is commonly believed.

I You are suggesting cultural elements that prevent women from investing in science with confidence, which is not the case for men. Do you think it would be fair to treat women on equal footing with men?

R₃ Well, that is a very controversial question and some people support the idea that women should be facilitated access to higher education and other people don't see it that way. Personally, I think that if we want to show women that intellectually speaking they are not weaker than men, then they should accept competing on equal footing with men. If we give them favors that would be another way of telling them that they are inferior to men, which is not helping them.

I There are views that if you are from a family background of scientists you are likely to become a scientist. Do you think that this is applicable to women?

R₃ I think this is a difficult question to answer maybe we have to look at the history of human societies, what experience shows us, see people like Marie Curie and other prominent scientists and see if this is verified. But I think that there are talents that a child inherits from parents but there is also environment, which plays a key role in that. So you can establish the relationship between the capacity of the child, the activities by the parents and his performance.

I In the same line of thought there are views arguing that a student who is brilliant at the secondary school level is likely to be brilliant at university. Is this the same for women doing science and technology?

R₃ My Dear, I don't like taking women as beings with problems. I do rather take them as human beings. So, if a boy who is brilliant can maintain a good performance at university, similarly, the same thing will happen to a woman of same potentials except cases whereby the woman may be faced with problems that are of more social nature than academic.

I You are suggesting that naturally women can do science as well as men, how do you explain the women's drop out rate that is higher than that of men as observed among others in the science subjects?

R₃ Apart from marriage which is a visible fact affecting women, I don't know whether the drop out rate of women is higher than that of men. As I know, so far, no research has been conducted to compare the drop out rates of the two categories. So I am not sure about it.

I Do you think that this university can do something to help women address academic difficulties that may be caused by marriage?

R₃ Well, training at university level is universal thing. So, taking a social problem say, a problem resulting from marriage, and seeking to resolve it by giving some favors to women would be creating precedents that may not help them. In fact, that would reduce the degree of competition that women need, as well as men, to face today's life which is a life of competition. So, if a woman chooses to go to university she should be prepared enough to face the challenges that higher education imposes to those who are doing it.

I Teaching methods are said to be one of the factors affecting the performance of students. Have you ever thought of changing or improving your teaching methods as a way of encouraging women's participation in science or technology?

R₃ Even if I am not supporting any measure aiming at creating differences between men and women, I do concur that women have frustrations that are deeply rooted in her society and which are behind the fear or reluctance women have to do science. So, in order to help them break that kind of cultural chain that prevents them from doing science they need appropriate teaching methods for them to get more confidence, which would further participation of women in science subjects.

I Good interaction between students and teachers is said to be another factor that impacts on students performance, as it reduces the gap between students and teachers, which is conducive to good performance of students. What are your comments on this view?

R₃ Yeah, that is another thing that needs to be given a thought. Yes, umm, you will find that a teacher is in the position of the master and the student the receiver of knowledge who has nothing to contribute. Participatory methods are currently encouraged as they are conducive to better communication between the teacher and students. Thus, they improve participation of students in general and women in particular. So, these are good methods as they allow the students to approach the teacher who becomes accessible and therefore communicating knowledge becomes easier, which facilitate better results on the side of students.

INTERVIEW WITH RESEPDENT R₈

I Women are said not to be made for science or technology. In your capacity as a lecturer in these areas do you share this view?

R₄ I don't agree with that statement because I don't see any difference between men and women in terms of intellectual capacities. The results they obtain after the various assessments do not show us that difference. So, I believe that women can do science without the same difficulties or facilities as men.

I How do you explain then the poor representation of women in those areas?

R₄ The poor representation of women is not caused by the lack of potentials in women in science. It is rather a problem of recruitment of students. When you look at statistics you will realize that women's representation decreases from primary school through secondary school till university. So, it is not caused by weakness of women.

I Some other people think that women are poorly represented in science and technology because of lack of self-confidence. Are you of the same view?

R₄ In the past years many people feared science because they thought that science was something very tough. However, with the current's government policy that is encouraging people to take science related subjects you will see that the number of students taking science has increased. Coming back to your question, women are hesitating because they fear failure, which causes them to take academic fields that are perceived to be less challenging.

I Do you think that women's fear of science is something natural?

R₄ Personally, I think it's natural. Umm, you know women like keeping good image of themselves. If, say she is a wife of an important person she wants to stay important and a failure in that context does not help her. Women like praises and complements and if something is likely to take this away from her, she is ready to use all means at her disposal to avoid it. That is why they don't like to venture in science because they think science is tough.

I Education sector policy sustains that measures encouraging women to do science and technology should be taken further participation in these areas. In compliance with this policy, what are the measures you have adopted at the National University of Rwanda?

R₄ I have no idea about that policy but what I know is that at the level of recruitment in the Faculty of Science and Technology, the pass mark is very low but this applies to both categories: men and women. I don't know any measure that has been specially taken for women to encourage them to do science and technology.

I If that measure was taken do you think that it would be sound?

R₄ I think that giving them favors would not help them because this would minimize them. They should rather understand that they have the same capacities with men and therefore, what universities should do is to provide them with enough information or knowledge they need and let them compete with men with no discrimination whatsoever. Giving them favors will minimize them instead of allowing them to reach the intellectual maturity they need.

I Teaching methods are said to be one of the factors that contribute to students' performance. Have you ever thought of changing or adapting your teaching methods as a way of encouraging women to do science and technology?

- R₄ As I mentioned my view is that men and women are not potentially different in terms of intellectual capacities. So, what I think matters is to treat all students equally and show them that they can make it regardless of their sex. This applies even to their performance. You just avoid any source of frustrations related to sex or whatever by treating them equally in transparency.
- I Some of your colleagues said in the previous interviews that women join universities with a lot of frustrations from families, society or culture, which men don't have. Do you think that this would be fair to treat them on equal footing with them?
- R₄ I do understand what my colleagues say but I think those frustrations can be treated differently. Personally, I can break them by showing those women other women who have succeeded and lucky enough we have a lot of them in decision-making within our government, and elsewhere, who can play as role models for those women. You tell them look so and so have made it, why not you? I think it would be better to help them dissipate their frustrations by telling them that they can also make it because after all they are capable.
- I Other views argue that good interaction between students and teachers is another factor that is said to be influential to students' performance. For example, there is a big gap between students and lecturers, it seems this will have a negative impact on students' performance. On the contrary, the lesser the gap the better becomes students' performance. What are your views on this?
- R₄ I fully agree that there should not be a big gap between students and teachers but my thinking is that students should be treated equally without reserving favors to some and not to others. Otherwise, you will be creating a kind of segregation, which does not help at all.

I How do you explain the bigger attrition rate that is observable on the side of women than on the side of men?

R₄ I think you are not focusing only on science and technology with this question because it applies to other faculties as well. My thinking is that women are faced with two major problems, which might be the main causes of their higher drop out rate compared to men. Firstly, there is marriage which a university lady cannot ignore as an important element in her life. You find she is emerging and potentially men see her as an interesting partner not only as future wife but also as somebody who would assist in addressing number of financial issues in the family. Once she is married, before she completes her studies, a woman is faced with family responsibilities that she may not be able to handle together with her academic matters. Secondly, there is lack of discipline, if I can put it that way. At university ladies get more freedom than they were used to at their homes and if they are not careful enough they may suffer as a result of lack of discipline. As they are sexually active at that level they end up getting pregnant, which brings in new problems that mostly are not easy to address. This is mainly what is behind the high drop out rate of women. So their failure is rather based on external factors.

I What do you think the university should do to help women address those external factors?

R₄ I think that university should help them by providing them with material means. You know women have more needs compared to men and they have to use all means to meet those needs. In the process of addressing these needs they may go through sexual relationship which ends up in failure. So, to answer directly your question the university should give enough financial means to women for them to be able to cope up with their situation.

I What about those who get married before they complete their studies, do you think the university should do something to help them complete their studies with a minimum comfort?

R₄ I don't see what the university should do to help those women. You know the university cannot prevent women who want to get married to do it as it considers them mature people who are responsible of their acts. However, there are students' women associations may be through them women can be sensitized about the problems facing them and how to address them. Otherwise, I don't see what the university should do for them.

APPENDICE I

INTERVIEWS WITH KIST LECTURERS

- Interviewer (I):** **Augustin Kimonyo**
 Researcher-Master's Student, University of Cape Town
- Respondent (R₅):** **Coretta Ruhamya**
 Assistant Lecturer, Department of Civil Engineering
- Respondent (R₆)** **Sylvie Ribora**
 Senior Instructor, Department of Workshops
- Respondent (R₇)** **Donate Ngarambe**
 Lecturer, Computer Engineering
- Respondent (R₈)** **Philbert Nsengiyumva**
 Assistant Lecturer, Department of Electrical Engineering

- I There is a view that women are not doing science or technology because they are lacking abilities to do those areas. What are your comments on that statement?
- R₅ Umm, women are not lacking abilities to do science or technology but probably I mean, they are not willing to do it for different reasons. For example, here you will find some ladies when they come for the first year they are registered for engineering but as the time goes, they change to the faculty of management. When you ask them they will tell you that “you see the faculty of technology is complicated with mathematics”, but you come to realize that probably there are some people influencing them. Probably they are in relation with men and then you hear them saying “ah, it will take long time” and as a lady grows up she wants to relax and I cannot deny that science subjects are tough. So, those are some of the reasons I can mention.

- I According to you the question is not the lack of abilities but the reality is that even those who start in science, they end up shifting to management. Do you think that universities or say KIST can do something to encourage those women who start in science or engineering to pursue their initial subjects?
- R₅ What I have come to realize is that, umm you find sometimes if they start comparing, you find some people who are graduates in science subjects or technology, they are paid probably not well, then when they look at those who did other courses even the simple ones they are paid well!
So, as they grow up then they say “why should I take those subjects very demanding, very difficult and I will end up probably not paid well”? So government should put some motivations or incentives.
- I You will find some other people saying that women are not taking science subjects because they are not confident, you know they are hesitating, they think they cannot make it. Do you think that the so-called lack of confidence has to do with the poor representation of women in science and technology?
- R₅ It might be the reason, umm probably that’s nature if it cannot change but there are some who are able and have that ability but because of the environment they are living in they think they are not probably accepted. They think doing those subjects very demanding probably you are involved in hard work, things like that, they start to shift and go to other courses.
- I Other statements highlight that women are not interested in science because science and technology are traditionally male areas. Do you think that women doing science are comfortable when they find themselves in an environment dominated by men?

R₅ To me, I think that also can be the factor. Because you can find especially in an African culture, they really regard science and technology as a field for men! So that why you can find few ladies are involved in those areas. In another way you find there are some problems because of getting married, when you have kids, then you start focusing on the future: if am pregnant, I am going to be able to move far, you see, In the fieldwork or things like that. So, you find most of the women they say, why should I be involved in things which will be probably costing me much time and not looking after my family?

I You are alluding to an important point that has been emphasized in the discussions, I had with your colleagues and that is marriage. The latter was stressed as one of the major constraints hindering women's participation in higher education. If you agree with this view to what extent does marriage constrains women to do science and technology?

R₅ Umm, anyway I don't have, I mean a clear answer to that but what I was thinking probably if there were some incentives to encourage or to make women feel that anyway, if I am in this position I feel proud of it, yeah. I don't know which kind of incentives now I can suggest, but I mean there should be kind of incentives and here I think a research should be conducted to see which kind of incentives should be put in place to encourage women to do science and technology.

I Okay, since we are talking about incentives there are views that affirmatives actions should be taken to encourage women to do science and technology. One of the affirmative actions policies that have proved to be successful in some countries is to take women with lower pass marks compared to men, to boost their access to higher education. Do you think that can work here?

- R₅ To me I don't think affirmative action will help. If somebody cannot perform well at the lower level I don't think he/she will manage at the university level. So, what I was thinking, incentive for those who are able, who have I mean the minimum requirements to join the first year, anyway we are talking at university level, yeah the first year. Then to fix some incentives so to say that when I finish here I can say that yeah, I have something more than someone who is doing probably other course.
- So, you find she will do what she can to make sure, I mean, she is progressing well and achieve what people wants her to achieve.
- I Students from parents who have done science are said to be likely to take the same subjects their parents took at higher education level. Do you find that this kind of family influence visible here at KIST?
- R₅ Umm, in some areas I have seen where this can work. But there are some areas where you find I am talking for example, medical doctors. They study for a long time and they end up, for example in our country, not paid well. So, you find a Medical Doctor saying "my child should not follow my studies". You see he is now discouraging his child to be a medical doctor. So, you see he has been a Doctor, he suffered but he is not even motivated for the work he is doing. You find the parents now will limit their kids to do those subjects. Yeah, because he suffered and he is not even earning much. So such a parent will not encourage his kids to do those subjects.
- I It is said that students who were brilliant at secondary school are likely to be brilliant even at higher education level. Does this apply to women in science and technology, as well?
- R₅ Umm, I can't realize in that matter, umm sometimes she can make it as she used to be. But some as I mentioned when she starts getting involved in relationship, then she starts deteriorating in her capacity because she is now involved in many things; she does not have that much time to concentrate as I said before.

Science subjects require working very hard and when she is involved in many things, she does not have that time to concentrate as she used to do. So, the consequence will be dropping out. However, some who are capable they also still do well.

I Teaching methods are said to be one of the factors that contribute to good performance of students. You as a lecturer, have you ever thought of changing or adapting your methods as a way of encouraging women to do science and technology?

R₅ The methodology, umm, as now I am lecturing at higher learning institution where I have found you see the problem, it might be also the methodology. You find you have no equipment in the lab, that is a limit but I can't say that this is specifically for women; it applies to all students. Umm, I don't really see how teaching methods can hinder the participation of women in science and technology, Yeah, I don't see.

I It is said that when the gap between students and teachers in terms of interaction is reduced, this can have a positive impact on students' performance. Is this philosophy applied at KIST?

R₅ Umm, I think there is a good interaction between students and teachers at KIST because if a student wants to ask anything, you give him/her room. Yeah, probably what I don't know is how that interaction can encourage women to do science and technology because I don't see it as something special for women it is for both men and women.

I The idea of good interaction between students and lecturers may give an insight of the opposite which may lead to things like sexual harassment. Have you ever heard of cases of sexual harassment between students and lecturers or between students themselves?

- R₅ As far as KIST is concerned I haven't heard any case especially in our Department or in our Faculty; I don't know about other faculties. But I haven't heard any complain or things like that but I know in some institutions it does occur. Yeah, it does happen.
- I Some people think that given the fact that science and technology are traditionally male areas, the content and the language used for the programs of those subjects may reflect concepts that are more male than female, which may have less interest for women. What are your comments on that assertion?
- R₅ To me, I don't think that involving women in the designing of programs or teaching methods would change anything because I think that the lack of interest in science on the side of women is not caused by the content of the program or the methodology. I think that the question is in what they would gain when they finish rather than in what they are studying.
- I You were a student in technology before you engaged in the profession of teaching. So, as a woman who has experience from both sides as a former student and currently as a lecturer what are other difficulties that women doing science are faced with apart from the ones you have mentioned?
- R₅ Umm, I think I have mentioned them. Yeah. When I was a student at master's level, I had kids already, so you find sometimes you have to attend lectures, you have to attend laboratories, you have also to look at your family and all that. Yeah, and I have seen it also here. You find most of the ladies in our departments they miss classes, they miss tests, they miss exams. Some are pregnant they deliver during examination. You find things like that it is not easy for somebody to cope up with all those difficulties and do well in her subjects.
- I Given what you have just described what would you advise, say to the Rector of KIST, to help women advance smoothly in science and technology?

- R₅ Umm, I really don't know exactly but I think he should see or look at some incentives so that when someone is sacrificing things on this side she knows she is earning other things. Ladies should also be sensitized when they are at secondary school level. Yeah, so that when they join universities they know already what they are going to do not just spend some three months and then start shifting to other subjects. I am sure women can make it but since they are involved in other activities, issues and what; some they want to work when they are at school, they don't attend classes and you see science is difficult subject if you don't attend classes you can't do it on your own.
- I What about the structure of the university, think of for example who is the Rector, who is the Vice-Rector, who is the Dean, etc. Do you see women's representation in the higher echelons of universities as an "incentive"?
- R₅ Yeah, that is important in one way especially. If there are women at the top management as you say, you know women know the problems women are facing, OK, so even if there is any problem that women are faced with, the women understand it more than men. Because the men are being told but they are not feeling it. On the contrary, women do know the weight of it and they can discuss it more openly. Yeah, and they will say at least we have somebody who understands. So, I think women's representation in the top management can be an important incentive.

INTERVIEWS WITH RESPONDENT R₆

I There are suggestions that the poor representation of women in science and technology is due to lack of abilities from the side of women to do science related subjects. What are your comments on that statement?

R₆ (Laugh) I don't agree with that assertion because even if they are poorly represented in those areas but women are potentially as able as men to do science and technology.

I How do you explain then the poor representation of women in the areas of science and technology?

R₆ I think that women are culturally trained to feel inferior to men. This is what I have noticed at least in Congo and Rwanda, the two countries I know well. So because of that cultural aspect, women have come to believe that there are things or fields that are meant for men including science and technology and those that are meant for women.

I Do you think that universities can contribute to address that issue?

R₆ I believe that universities can give their contribution especially at the lower level, first and second years. For example I always encourage those women who are attending my classes in the workshops by telling them that they have made a good choice and that they can make it.

I even give them from time to time more assignments compared to men as a way of giving them more opportunities to familiarize themselves with machines. I see men laughing when I do that but I am sure it is helping them to some extent.

I You are encouraging women to do science and technology but this is something you are doing on individual basis. How can that encouragement be done at the institutional level?

R₆ I don't see exactly what universities can do. You know there was that kind of affirmative action that is suggesting that universities should reduce the passing mark for women to allow them more access to higher education but personally I don't support it. I think that women should be able to compete with men and then they will feel proud of themselves otherwise that affirmative action will be creating kind of inferiority complex among women. However encouragements should be given to women at the primary and secondary levels.

I Do you see any problems that are specifically faced by women and that can hinder their performance?

R₆ I think that any woman who accesses university by merit cannot face any particular problem impacting on her performance.

I Some people argue that women are not well represented in science and technology because they are reluctant to take those areas. They are said to be lacking self-confidence. Do you agree with that assertion?

R₆ I don't think so, the fact is that when a woman reaches university most of cases it is because she wants to make a difference. I remember myself as a top student; I always enjoyed seeing men behind me. This was an opportunity to show them that I too can make it. You can't do that when you are lacking confidence.

Generally women who are doing science are women who have ambitions and are doing whatever it costs to achieve them. So that kind of behavior cannot be in a woman who lacks self-confidence.

I Do you see any difficulties that are specifically faced by women when you are giving your workshop courses?

- R₆ Yeah, and actually here I am contracting myself. Umm, I think that women are naturally in constant need of somebody. Yes, somebody to help them doing this and that and I think that this situation can affect their performance. For example in workshop courses you see them hesitating to climb up a ladder to get some things down, you know those kind of practical tasks, which are very important in workshops.
- I There are arguments that children whose parents have done science or technology are likely to do the same subjects once they reach university. Is this assertion verified for women doing science and technology here at KIST?
- R₆ I am not sure I have not checked whether that is the case with women in science and technology at KIST but I think that there is some truth in it because for example my children none of them has done humanities. All of them have majored either in Chemistry or in Mathematics. May be there is kind of family influence, as my husband has done Metallurgy and myself Electronics. However I don't remember any single day where we told them that they should do this or that.
- I It is said that students with good performance at the secondary school are likely to have good performance at the university. How do you explain the high attrition rate on the side of women?
- R₆ I think the main reason behind that is marriage. You know unlike men who decide when they are going to marry women do not like to miss an opportunity of marriage.
Once married, a woman is confronted with a lot of responsibilities as a mother, a wife and a student. It is not that easy to assume those heavy responsibilities, and when the woman is not assisted she can fail or postpone her studies to a later date.
- I Do think that time will come when a woman will decide her date of marriage?

R₆ Well think yes, that time will come but so far it is the man who decides and there is a strong family influence on the side of the woman who is pressurized to marry rather than to spend a long time doing her studies. I don't know it is still hard to realize in our country.

I Do you think that universities can do something to assist women who get married while they are still studying?

R₆ Well I don't know about here but in Congo where I was before, married students were encouraged in various forms. For example, they were given free accommodation and they were buying food from university's shops at less expensive prices. So I think if the same can be done here that would be a good thing for married students. Another thing is that married students should be given training in the area of family planning for them to be able to control their reproduction system as a big number of children would affect their performance. Counseling is also a service that would help them to address number of they are faced with.

I Teaching methods are said to be contributing to the good performance of students. Have you ever thought of changing your methods or improving them as a way of encouraging women's participation in the workshop courses you are giving?

R₆ So far I have never thought about it but I think that yeah, it is something to be given a thought.

I Do you think that there is a teaching method that can contribute to a more active participation of women in science and technology?

R₆ I would not support a teaching method that is aimed at focusing more on women than on men if any. However I think that a teaching method that is looking at a class as a whole with an emphasis on the participation of men and women would be good. Here I am thinking for example of the participatory methods. It seems that at higher education level lectures are more given in form of presentations, which is not triggering the participation of students.

Personally I would go for any teaching method that is conducive to the interaction between the class and the lecturer. That one I believe would encourage women's participation.

I Positive relationships between teachers and students are said to be an important factor for the good performance of students. Is this assertion verified here at KIST?

R₆ I think that side is not exploited enough here at KIST, though it would be very beneficial to students. In actual fact if you don't call a student you will never see him coming to your office. So I think that we should make an effort to establish or say improve that kind of relationship between students and lecturers.

INTERVIEW WITH RESPONDENT R₇

- I There are views that women are not made for science and technology because they are lacking abilities for these areas. What are your comments on that assertion?
- R₇ Umm, well I don't agree that they lack ability but I think that it's a question of preferences or lack of encouragement. It's not lack of ability I think.
- I How do you then explain the poor representation of women in science and technology?
- R₇ Well, I think getting involved in science and technology is a question of interest and sometimes interest comes from getting encouraged from the beginning because there are subjects that are well, let's say involving and demanding. So, I think that if they are encouraged from the start they can equally participate as men.
- I If you look at the poor representation of women at the level of higher education, do you think that universities can do something to encourage their participation?
- R₇ Well, I think that at university level it would be too late, because there you've got people who have made up their mind from the domain they are going to pursue. I think something should be done at the lower stages so that at the university you have equal representation.
- I Some people think that women are poorly represented in science and technology because they are reluctant to take those areas. What is your view on that assertion?

- R₇ Yes, I think there is some reluctance because if the foundation in science and technology is not well strengthened then the student might lose interest. So, they may become reluctant because the failing rate of these courses at certain examination level is higher than other subjects. So, they might be reluctant to fail.
- I If you focus on higher education it appears that the number of women who join science and technology decreases as they go up. Do you think that institutions of higher learning can do something to help at least those women who have not been reluctant to continue their areas of specialization?
- R₇ Well, once they have got an access to university, I think that the idea of affirmative action really is not very necessary because, at that level they are subjected, especially those who are boarders, to the same conditions from both sides. From my experience, I don't see a woman student performing much less than a man student just because of her womanhood. So, I think that affirmative action should be done at lower levels to encourage them to develop interest and once the interest is there they can proceed. I don't believe that most universities are carrying that program out and there is not necessarily evidence that there are higher rates of women failing in science than of men. So, at the university level it is not necessary.
- I If these affirmative actions are taken at the lower level as you are suggesting, do you think that this will resolve the problems that women are facing at the higher education level?
- R₇ Umm, yeah! Because definitely the number of women accessing higher education is going to increase.
- I From your experience as a lecturer in computer engineering, do you see specific problems that women are facing just because they are women? If yes, what are they and what do you suggest as a solution?

R₇ Umm, not from pedagogical point of view, but from social point of view, yes. There are some elements that affect women by nature of their differences. Probably they need more health attention than men do and that of course can account to some degrees for their education performance. In the approach of training I don't know if there is any approach that should be considered that is more suitable for women than it is for men.

I Do you think universities can do something to help women address those issues they are specifically facing?

R₇ Yes, I think universities should really look at those issues that are specific to women especially those affecting their attendance. For example, most of women get very weak when they are in periods. They can't attend, when men have no problem. So, if that is put into consideration, I think that would bring something of benefit to female students.

I There are indications that students with strong family background in science or technology are likely to take the same subjects when they reach higher education. Do you share this view?

R₇ I don't have statistics but it seems possible. Yeah, because people who really end up doing science, it is more of interest than ability. So, if someone has parents who are involved in this field he has the opportunity to get involved in the same field from the very early stages of his/her life. He/she is inclined to be involved in that area. So, I think it is most likely true.

I Another view is given on performance and it says that if a student is brilliant from the lower level, he is most likely to be brilliant at the higher education level. What is your view on this statement?

R₇ Umm, if he is performing well at the lower level, I would expect the same student to perform well at the higher level.

I Is this the case for women in science and technology?

- R₇ Umm, let me take an example of our university here. The female student that have been participating my classes, I don't see them necessarily weaker than their men counterparts or becoming weaker as they proceed in the higher levels. So, I think it applies to both men and women
- I How do you explain then the high rate of drop outs on the side of women?
- R₇ Well, I think this is on more social side than the intellectual side. Female students for example, who get married in the course of their training are definitely facing family responsibilities that may affect their performance. Depending on the weight of those responsibilities or problems then the student may continue or discontinue her studies.
- I Teaching methods are said to be part of the factors that are impacting on the good performance of students. Have you thought of changing, adapting or improving your teaching methods as a way of encouraging participation of women in your classes?
- R₇ Yeah, I think it needs to be thought of. I have already said that I don't see any methods that is supposed to be meant for women. I think that every student differs. However, what seems to work generally for most students is to make the teaching more interactive. Because women are good communicators, when that atmosphere of equal interaction between students and lecturer is encouraged then they will benefit more.
- I The idea of class interaction is leading us to the question of knowing whether good relationship between students and lecturers is another factor contributing to the better performance of students. If you agree with this statement does it apply to women in science and technology?

R₇ Yeah, I think it applies: giving science a social approach in an interactive sense. But socially speaking it can also have a counter effect. If relationship between teachers and female students is encouraged it can have negative impact where it might actually indulge more in social interactions, which might have a negative sense.

I How then can the good relationship between teachers and students be maintained but at the same time avoid the negative effects that are likely to emerge from that relationship?

R₇ I think that is of more ethical. The teacher should be aware of that possible dangerous move and avoid it. But at institutional level, I don't know what could be put in place to prevent the interaction from diverting to a negative extent on the side of the female student. I think it would be more of individual teacher himself. That is on the social aspect but when it comes to the pedagogical aspect of course it should be framed up to produce a context that involves equally both men and women. Sometimes, even women are shy; so the teacher should encourage an atmosphere that is helping those shy women to get rid of that shyness. So, a good teacher will exploit more the pedagogical aspect than the social one although it also bears fruits when handled well.

I How is KIST encouraging the aspects discussed above?

R₇ These aspects have been exploited in the reviews of our curriculum that have taken place here. They were taken into consideration and it is actually an ongoing process, as the programs need to be adjusted or upgraded after a certain period of time.

INTERVIEW WITH RESPONDENT R₈

I Teaching science or technology to women seems to be challenging as they are said to be lacking abilities for those areas. What are your views on this assertion?

R₈ I fully disagree: women are not lacking abilities for science and technology as some people tend to believe so. My experience has allowed me to see that women can do these areas without any hindrance pertaining to their nature.

I How do you explain then the poor representation of women in science and technology?

R₈ I think that what causes them to be poorly represented in these areas is society, as women are believed to be more suitable for domestic activities.

I Women are also said to be reluctant to take science and technology related subjects, which might explain their under-representation in these fields. Do you share the same view?

R₈ Some of them are reluctant but there others who are committed enough to do them. So, I think this reluctance has nothing to do with their nature as women.

I Affirmative action policies aimed for example, at lowering the pass mark for women are believed by some academic authorities that they can serve to further their participation in higher education. Do you think that this can apply to science and technology as well?

R₈ Probably that can increase the number of women but it would not help them in long run. Women need to be encouraged for competition. You know with globalization, you have to think globally and facilitating women's access to higher education would not be preparing them for that kind of life.

So, I think that women need a fair treatment that is a treatment deprived of any form of discrimination. However, concerned authorities should make sure that they are not being unfair to men by being fair to women.

I It is said that students with better performance at lower levels are likely to continue with the same performance at higher education level. What are your comments on this assertion?

R₈ Logically speaking, that is how things should happen.

I So, how do you explain the poor representation of women in science and technology while women involved in science are said to be generally brilliant?

R₈ There are many factors that come into play including culture or say, society that encourages women to get married after they finish high school.

I Are those who get married after high school enrolling for higher education?

R₈ Majority of them do not continue because of social issues mostly related to their new life, as married women.

I What about those who have reached university; are they studying comfortably or do you see major problems facing them because of their womanhood?

R₈ I think they are studying well, no major problem I can see that is pertaining to their nature as women.

I It seems however, that very few of them are finishing their studies.

R₈ Probably yes, because those social issues may follow them at universities.

I How do they follow them at universities?

- R₈ As you can imagine, some women do not have enough financial means to support their families and fund their studies. Another thing is that higher education is demanding. So, doing it in addition to family responsibilities becomes problematic.
- I Do you think that institutions of higher learning can do something to further women's participation in higher education, and particularly in science and technology?
- R₈ Well, I think the problem lies at the lower levels of education; I mean at primary and secondary school levels. Other wise, I think that at higher education level, higher learning institutions are doing their best to help both men and women do their studies.
- I Interaction between students and teachers is viewed as one of the ways to boost students' performance. Do you share the same view?
- R₈ Definitely, yes; the more interaction between students and teachers is the more participation from both sides of students and teachers.
- I How do you find the level of interaction between students and lecturers at KIST?
- R₈ The level is good but I think there is a need for improving from both sides.
- I How do you think women can benefit from that interaction especially in the are of science and technology?
- R₈ Women are generally good communicators. If they are encouraged to communicate with their teachers, I believe that can contribute for more active participation from their side.

I Adjusting teaching methods is said to be one of the strategies to boost students' performance. Have you ever adjusted your teaching methods as a way of improving women's participation in science and technology?

R₈ No, so far I am comfortable with the teaching methods used here. However, if new methods are introduced I think we can always look at their efficiency.

I Thank you.

APPENDICE J

INTERVIEWS WITH GOVERNMENT OFFICIALS

Interviewer (I): **Augustin Kimonyo**
 Researcher, University of Cape Town

Respondent (R₉): **Hon. Jacqueline Gahondogo**
 Executive Secretary of Rwanda Women
 Parliamentarians Club

Respondent (R₁₀): **Ann Gahongayire, Secretary General, Ministry of Gender**
 and Family Promotion

I Most assumptions attempting to answer the question of poor representation of women in science and technology are culture or society related. As a policy maker; do you think that Rwandan women are covered enough at policy level to study in those areas?

R₉ My feeling is that the problem does not lie at the level of policy-making but rather it is to be found elsewhere. When you look at the government's achievements you find that it is in the area of education where the issue of gender imbalance has been addressed. It is a fact that when you go to primary school you will find a very good representation of women but the number decreases as long to the upper echelons. So, to me that reduction is not due to lack of policy but to house chores that constrain the girl-child to stay at home helping her mother and doing other things at home. It is good that we are advancing but to be honest, the Rwandan woman is still faced with a lot of difficulties especially the house chores which to me are the first reasons why women are not well represented.

There is an idea that women are abandoning their studies because of marriage but, personally, I don't agree with such a statement. The house chores constitute the reasons why women are leaving their schooling unfinished.

I remember in 1995, I was a lecturer at the National University of Rwanda and I could see a very big turn up of women. When I checked in classrooms, I found that those women were gone. So, I tried to inquire what was wrong since the boys had become the majority and I came to realize that those women were gone back home because they were the ones heading families, to look after the kids, prepare food, clean the house, etc. So, when you look at the general situation you find that the big problem is those house chores and to address that issue, you don't need a policy. It's a question of mentality that changes with time. We are lucky because the government has actually started to resolve that issue as it is involving women in decision-making, which should be accompanied with social measures to support them. Some measures have been taken already and I am a bit worried about them because I don't see exactly where we are going with those measures: women are given food as a way of encouraging them to go to school. The whole idea around that measure is that parents will let the girl child go to school because they see there something she is bringing at home. So you see this is an indication that the girl child is still chained, which means there is still a long way to go.

Coming back to your major concern of science and technology, KIST has brought in new ways of seeing science, which I have found good. At KIST at least, women are represented but at the National University (laugh). I remember it was 1995, I was appointed among the team to conduct a research on why students in general were not doing science. Some of the responses students were giving us were that doing science is very tough and they said that they didn't want to suffer for nothing. They added that leaders are not those who have done science only. You know if you look at that closely you will find that those were actually the major reasons. Obviously, there are some other reasons like lack of facilities at the secondary school level and shortage of qualified teachers. To have students in science the Ministry took a decision of no longer allowing students to enroll in the faculties they want. Students were sent to the various fields on basis on their marks. It was somehow kind of forcing them to science. Even boys were few in science let alone women. And why women were very few it was because they were few at the secondary school level.

Even those who had done science at the secondary school level could shift to other options such as economics and law where they were sure to pass. I think that there should be new innovations to present science as something that is useful to women especially in their everyday life. If science is presented in a way that allows women to handle their house chores, then they will feel more attracted. Science and technology should be practical in the eyes of women. There is still a long way to go but as people have started looking at things under gender lens, definitely, there will be improvement in the sense of making all programs gender sensitive.

I What are your views on the question of affirmative action policies aiming at lowering the pass mark for women to allow access of bigger numbers entering higher education?

R₉ The notion of affirmative action has become a very controversial issue. Personally, I don't support it. If you reduce the cut-off point for women as a way of pushing them to higher education that may affect them psychologically as they may think that they went there not by merit but by pity. So, I think that they should be encouraged in a different manner like reducing the house chores and other constraints, rather than reducing the pass mark, which is likely to cause some psychological damages. I have a friend in America who told me, on this issue of affirmative actions for women to do higher education, that boys went to court accusing university of treating them unfairly and I hear they won the case. So, I think that this would be a sort of social injustice not to consider students on equal footing. It would even be difficult to make it a policy as it is based on kind of inequality. Personally, I don't support it.

I Given the difficulties that you have described facing women, do you think that universities can do something to help them work on their academic matters more comfortably?

- R₉ Yeah, I think that universities should build more residences for women. It is a big problem for women who stay outside the campuses as they are subjects to various difficulties including unwanted pregnancies, which affects their performance seriously. Some of them even end up abandoning their studies. This is for example, an affirmative action that I fully support. I've just remembered (laugh), I was going to say that if their scholarship could be increased I think it would be fair as they do have more needs than men do.
- I Apart from the issue of accommodation which is still unresolved have the National University or KIST facilitated women's access by addressing some other issues facing women?
- R₉ I am not sure about KIST or any other university but at least at the National University where I have been teaching for ten years nothing that is specifically aimed at facilitating women's access or life at campuses has been done. The women students' association (WSA) had prepared a project for the construction of a women's residence, which shows how this is really one of their major concerns but that initiative was not supported as that kind of project is not to be done by students. It falls under the responsibilities of the university itself.
- I How is the parliament working with the higher learning institutions on women's participation in science and technology?
- R₉ The parliament is working with the universities through the education commission. If say, there is a policy that needs to be worked on or if it is a government policy or program to be implemented by universities, this commission is the one that has the responsibility of making a follow-up with the universities.
- I Marriage has been highlighted in the previous interviews as one of the major problems that women are faced, which prevents them to further their studies. How do you think tertiary institutions should address this issue to sustain women's participation in higher education?

R₉ Well I, think that the question here to ask is how to allow women to study and take care of their children. I am not sure about the universities means but I think that universities should think of availing crèches for their students' children. Again, this would be another affirmative action for women in higher education.

**INTERVIEW WITH SECRETARY GENERAL, MINISTRY
OF GENDER AND FAMILY PROMOTION (MIGEPROF).**

I The Ministry of Gender and Family Promotion has been implementing the national gender policy for some years, to address among other things, the discrepancies between men and women in higher education. What have been the successes and failures both at formulation and implementation level of this policy?

R₁₀ Thank you. Umm, we have recorded various achievements and we definitely still have some challenges. Some of the achievements, I can mention, umm, we are noticing a very positive trend. In access to education if we are talking about the participation of women and men particularly in high institutions of learning, we are noticing an increase of participation of girls and women in these institutions, and this is very positive. We are noticing, particularly, the awareness that is also increasing amongst the universities and institutional leaders and administrators, lecturers you know at different levels of administration and also among students, themselves. We have been working with students associations, as particularly, to create the awareness and to see that at this level the environment is conducive for the girl. So it's one of the measures that existed especially at high institutions of learning.

As I am talking about the few girls that have access to those institutions, we are noticing a significant drop out, we were noticing poor performance, but now the trend has changed and we are noticing good achievement and the drop out has stopped. We still have lots of challenges because when we are talking of high institutions of learning you remember that education is a kind of psycho-interchange. You have to start all the way from the bottom. So you cannot just change things at the top. Now, umm, to have for instance girls' access in various faculties and institutions of learning you have to start all the way from down.

Umm, we have been working with the policy, which you have mentioned has played a big role because it clearly articulated the problem, the situation, and when of course, you have identified the issues. Umm, people have guideline of what needs to be done. So, that policy identifies the gaps, issues and we have been working with the government, with civil society, private sector to see that these gaps are bridged.

Umm, the process is not going to be very short, because as you have realized it's a problem that has existed for a long period of time and it is something to do with attitude, to do with socialization that doesn't change over night. It also has to do with poverty levels, which are still quite high in the country, and so we are still struggling but I have to mention that the kind of awareness and commitment by policy-makers have been extremely high and that has facilitated the achievements that I have mentioned, and it is also impacting on the population, and parents themselves and students: young and adults. So, that is a very important achievement that we have to mention in our country.

What is left is implementation. It has to continue and that means that we have to have the resources, we have to lay out clear strategies, we have to continue reviewing these strategies to see those that have worked and to see where to improve. As I said earlier, we have to work together as kind of partners, be it with the civil society, be it with the parents themselves, students, the school administration, development partners, everybody. We are doing a kind of round approach to this problem because every one has something to do about it.

- I So, when you look at the tertiary institutions, are you satisfied with what has been done in the sense of encouraging women's participation?

R₁₀ A lot need to be done because as I mentioned, you know the traditions, attitudes there are things that take long to break or to change. Actually, we may be talking about gender issues but just look at the kind of program, the relevance of what is being taught. Some of them are very old programs that we inherited from the colonial masters. We have never really adapted them to the needs of our country, to the needs of our communities, so that the people who are educated at those institutions are taught, or are learning things that are relevant to their development.

So, I just want to relate that to gender issues. With respect to gender issues, we had traditionally low numbers of girls accessing these institutions in all fields. In science, hardly any existed, very few indeed. Umm, so now to change this kind of trend it requires a lot. It even requires the infrastructure itself. You will notice that even at secondary school level, before you reach the high institutions of learning, they hadn't provided for facilities for girls because they were not there. So, now you have to look at all those issues: the sanitary facilities, the dormitories, they have to put up those that were not catered for. And, as I mentioned this is linked with the availability of resources to put them up. So, you find that girls are accessing these institutions but challenges are extremely enormous. A lot need to be done in regard to awareness and understanding by concerned authorities themselves, by students also because you know when you understand a problem at least, it helps you to deal with it. So, they are meeting these problems but they don't understand the causes and the real situations they are involved in so as to be able to deal with it properly. A lot needs to be done, I have to mention that here is something that has been achieved but we still have a lot undone.

I It's an interesting general picture of women's representation in higher education that you are giving but let us now focus our attention on women in science and technology as this is the core of our topic.

It appears that the gap between men and women in terms of representation is more significant in these areas than in any other field though men's representation remains almost overwhelming in other areas. Are there any specific measures you have taken to address the issue of poor representation of women in science and technology?

R₁₀ Yes, we have first of all identified the gap that does exist and it is very wide, and we have made it a point to put it clearly to everybody to see. The authorities are very much aware of this gap and the impact it has on development, and I have to mention at least few things if you listen to the President's speech he'll talk about the girl in science. That is extremely important for everybody because if the President talks about it, the way he is telling everybody "look this has to be done". If you see the statistics these institutions are producing, you will realize that they are gender desegregated. So, they are also aware that they have to observe clearly: "are we going backwards are we going forwards?" So, this is also helping in planning and in doing something. Umm, we now have gender desegregated data: how many girls are doing this course and how many boys are doing it. So, at that level of data and information we have reached there.

Now, we have a problem which you need to understand: to go to a higher learning institution you need to have taken a relevant subject at secondary school level. You don't just take it suddenly. So, it has to come all the way from down as I mentioned. So, we've been working with FAWE, we've been working with the Ministry of Education, to see if this issue is also addressed in the policies at secondary school level: that sector policy. We have observed that there is something being done. For instance, I've got just few initiatives there.

The Ministry of Education has identified what they call “centers of excellence” whereby they are going to train the teachers and give all the facilities for science and I think they have of these a girl’s school. So, that’s extremely important and these are going to feed into high institutions of learning and it is going to narrow down these gap.

Not only in these centers of excellence which are actually one by province, if I remember well, I will have to check properly, we also have a kind of affirmative action policy by the Ministry of Education to equip the girl school with science equipments as a way to attract them to doing science because, you know one of the reasons why they don’t do it is attributed to the lack of equipment and proper facilities.

Another reason of course is attitude because it’s been known, it’s been advertised that girls cannot manage in science, which is completely wrong. So, we have associations like FAWE, which are working very closely with the Ministry of Education and with communities to create that awareness and remove those stereotypes and biases. So, they are encouraging the girls to do science, they are telling them it’s possible. We have a program of role models whereby young girls who are capable, who have done science are going to these school to tell these girls that it is possible; do not believe that you cannot do science.

There is also another approach of training the teachers; you know a teacher is a very important person. He or she can baize children as can motivate them. So, creating that awareness among teachers has been a focus of FAWE and the Ministry of Education, which are working very closely with us. Those are few initiatives to see that girls are attracted to do science. I have also to mention ICT, the information technology, also we had these information equipment sent to girls’ schools to encourage them to do good use of them. So, that is an other example, I had forgotten to mention, which is going to impact on the number of girls accessing higher education.

I As you are talking about affirmative action policies in terms of equipment to encourage girls to do science, you may be aware that in some countries like Uganda, Ghana to name just a few, they have lowered the pass mark for girls to facilitate them access to higher education. Do you think that this same affirmative action policy should be taken to increase the pool of girls going to tertiary education particularly in science and technology in Rwanda?

R₁₀ Well that level of affirmative action has not worked quite well here because you know affirmative action is sometimes something very sensitive: you may create another problem if you don't have kind of dialogue and discussion to see that this is understood clearly. So, we've had some of affirmative action on a small scale. I give you an example: for instance at the entrance of secondary school level from the primary level. We've had some years where girls really did badly at such a tender age. They have done badly because of lots of reasons and some of the girl schools actually failed to get candidates to enroll. We were defeated and I was still working with FAWA, and we worked with this ministry and the Ministry of education to see that the pass mark for girls is lowered, and it was lowered and then we got the girls to go up.

You definitely know that sometimes it's not because these girls are not bright, it's because of lots of reasons and problems. When you give them that chance they perform very well. So, it was done at secondary school level but we hadn't managed to do it at high institutions of learning. For one reason: you know the capacity of high institutions of learning in this country has been extremely low, very small. And to do that kind of affirmative action usually it would create a very big problem. Because it's too narrow you are not saying that even for the boys it is OK. It's only that you have that gap but we didn't want to approach it that way because of the narrowness of high education sector.

We first needed it to expand and create enough room and in the mean time we have done quite a number of things I have described already, to see if we can raise the number of girls and if the gap still really exists. I think it can now be considered. Because the capacity has been raised a little bit may be it can now be negotiable if the huge gap still remains. But it was not going to work before because even the number of boys accessing higher education was very small indeed.

I So, when you look at the situation holistically, what do you find as major contribution of the academic institutions for a successful implementation of the national gender policy especially with regard to improvement of women's participation in science and technology?

R₁₀ I think I would try to be positive considering that people and attitudes take quite a while to change. I have observed really positive change: if you can talk about the Rectors themselves, at least the majority I have worked with, they're really positive. They think it is a great achievement to have an increase of the number of girls accessing their institutions. Now, here I am talking about the government institutions. All of them are very positive at that level. What remains is kind of revolutionizing the institutions themselves because it actually requires a lot. It requires a lot and if I can give an example of KIST, we have been trying to work on the kind of the KIST gender policy; you know whereby they can do their own audit. Yeah, they audit their own institutions and see what is encouraging the girls, what is not encouraging them, what can be done, that kind of thing. So, that's already a very positive trend, which I can quote.

So, umm, if we can really try to be positive, I would commend that the university authorities are doing a good job but as I mentioned earlier, we still have a long way to go. Because attitudes by some lecturers their views, examples given, the facilities that exist, the beliefs and attitudes by students themselves, the girls inclusive who actually should be the main agents of changes but whose attitudes leave a lot to

be desired. So, you see it's a whole chain of things. You cannot say that this person is the one who should do everything but everybody. Umm it's the whole system that needs to be kind of audited but we are on a positive trend that's what I would mention.

The National University of Rwanda is the same. Umm, it's the same but one of the main problems we have there is lack of facilities which is creating a very big problem. Umm, you know the university was very, very tiny and all of a sudden it is expanding but without considering facilities. Now the girls who are going there don't have places to reside. They've got to really sleep with these same boys in the same rooms or to go out to look for some other places and it's becoming a real problem. Umm, and considering the kind of community we still have and attitude that we need to change, girls are facing a lots of problems and those who are not strong enough are becoming victims. Yeah, umm but I know that there are some effort to rectify the situation.

I Yeah, as you are saying changing mentalities and attitudes is a long process and therefore there is really a long way to go but in the meantime, what are the Ministry's future prospects to further women's participation in science and technology?

R₁₀ OK, concerning the prospects of the Ministry, the way we are working, we first emphasize issues at policy level. So, here we work with the Ministry of Education. We are looking at the policy they are developing, what they are doing to encourage more participation of girls and women in high institutions of learning, etc. We are working with the Ministry to see the situation, to kind of advise strategies to deal with the situation and then, we have to work with the high institutions of learning. We have to work with the civil society to motivate the girls and to mobilize them, to encourage them and boys as well because it is kind of partnership process and parents as well.

Because if parents don't believe that girls have to do this thing you know, they may not encourage them, they tell them you are old enough you have to be married. So, it's whole chain.

We are working at policy level. As I mentioned we are working with the civil society to remove all the barriers, the blockages, and we are working with development partners to identify resources. I hope we can work within the region, as well. We can work with African institutions to see that umm, we learn from each other.

This awareness, I mentioned sometimes you need skills. You need to build skills but at the same time you need to see who are the people going into training and the gender training and alike. So, we hope also to get out and build alliances and partnership with other institutions and other governments to enhance what we are already doing. That is our kind of vision.