



**THE CURRENT STATUS OF WOMEN
SCIENTISTS
IN SRI LANKA**

**Science and Technology Policy Research Division,
National Science Foundation,
47/5, Maitland Place,
Colombo -07**

2010

NA-326



**THE CURRENT STATUS OF WOMEN SCIENTISTS
IN SRI LANKA**

Compiled by

**P.R.M.P. Dilrukshi Ranathunge Ph.D
and
Seetha I. Wickremasinghe Ph.D**

**Science and Technology Policy Research Division,
National Science Foundation,
47/5, Maitland Place,
Colombo -07**

2010

Copyright @National Science Foundation (NSF), Sri Lanka 2008.

No part of this report may be reproduced, photocopied or distributed in any form or by any means without prior written authorization from Director, National Science Foundation, Sri Lanka

All enquiries and suggestions should be forwarded to:-

Director

National Science Foundation

47/5, Maitland Place

Colombo 7

Tele: +094 11 2675841

Fax: +094 11 2694754

e-mail: dir@nsf.ac.lk

URL: www.nsf.ac.lk

THE CURRENT STATUS OF WOMEN SCIENTISTS IN SRI LANKA

Contents

	Page
Abstract	1
01. Introduction	2
01.1 Trends in S&T education attainment of women in Sri Lanka	2
01.2 Objectives	5
02. Research Methodology	5
03. Results	
04. Discussion	12
05 Conclusions	16
Acknowledgments	19
References	19

List of Tables

	Page
Table 1: Percentage literacy rate by sex	3
Table 2: Educational attainment of the population (30 yrs. and over)	3
Table 3: Distribution of R&D Scientists by Sex and Sector 2004-2008	4
Table 4: Distribution of R&D Scientists (Head Count) by Discipline and Sex 2008	4
Table 5: The distribution of sample according to age and academic qualifications	7
Table 6: Participation at seminars and workshops (during past 3 years)	10

Abstract

A study was conducted to investigate the current status of women scientists in Sri Lanka along with the problems and constraints faced by them in their career development. A postal questionnaire survey and the direct interview method were used to collect the necessary information. The study sample consisted of 1,628 women scientists and 65 per cent of the sample responded (1,058) to the survey. 26 per cent of the sample investigated had Ph.Ds as their highest academic qualification. There was a significant ($p < 0.001$) association between the age and the highest academic qualification of the women scientists. The most productive age duration for achieving the Ph.D. qualification was within 41-50 years followed by 31-40 years. The research productivity in terms of the number of publications was significantly ($p < 0.001$) high in the women scientists of age group 31-40 followed by the age group 41-50. The designation level of women scientists also showed a significant association ($p < 0.01$) with number of publications they produced. 68 per cent of the women scientists work under a male as their immediate superior while 81 per cent of the S&T sector institutions are headed by a male CEO. The analysis also showed that there is no gender bias or discrimination when selecting for rewards and recognition or when selecting for higher administrative positions in the S&T sector. However, indirect discrimination seemed to appear in the recruitment of women for science careers ($p < 0.001$). Further, the respondent sample of the Sri Lankan women scientists who have participated more in training programs, seminars, and other extracurricular activities and produced more publications well acknowledged the fact that the support of the spouse in equally sharing family responsibilities has assisted them towards their career development and achieve its goals.

KEY WORDS: *Women scientist, Science and technology, Research and development, Science careers, Gender gap*

01. Introduction

The gender gap reduction in scientific career and achievement is an ongoing policy and a scholarly debate. Nevertheless, the occurrence of gender gap in the employment of Science and Technology (S&T) careers may be seen due to several reasons. The gap in the educational attainment of women compared to men in the area of S&T could be one of the main reasons for this disparity. Another aspect can be the lack of suitable career prospects for women in the field of S&T. The studies conducted in fields as diverse as engineering and biology have found that women scientists suffer from an attainment gap along with at least three important dimensions: productivity, recognition, and reward (Cole and Cole, 1973; Long and Fox, 1995). The study done on differences in promotion according to sex have had mixed results. Some studies have found that the promotion of women takes longer than that of men (Tesch *et al.*, 1995; Wallis *et al.*, 1981; Kaplan *et al.*, 1996; Dial *et al.*, 1989). Others have found that within academic departments' women and men advanced at the same rate or that sex differences in promotion rates disappear in younger cohorts (Tesch *et al.*, 1995; Nickerson *et al.*, 1990; Wilkinson and Lindae, 1986). However, the status of women in the Science and Technology careers in Sri Lanka has not been well reported despite the fact that the general economic and education indicators available in the country reveal a gradual increase in the participation of women in scientific careers.

1.1 Trends in S&T education attainment of women in Sri Lanka

With the introduction of free primary, secondary and tertiary education including university education in 1945 and the change in medium of instruction from English to the local languages Sinhala and Tamil, there was a rapid expansion of educational opportunities in Sri Lanka (ADB, 1999). With the above changes, the educational attainment of Sri Lankan women showed a marked improvement within past 40 years (Table 1).

Table 1: Percentage literacy rate by sex

Sex	1963	1981	1990/91	2001	2006
Male	85.6	91.1	90.1	92.2	93.5
Female	67.3	83.2	83.1	83.1	90.5
Average	77.0	87.2	86.6	90.7	91.5

Sources: Census of population 1963, 1981, 2001&2006; Household Income & Expenditure Survey 1990/1991

The data collected by the Department of Census and Statistics (DCS) within the period of 1963-2000 revealed that the number of females not attending school decreased from 44.7 per cent in 1963 to 12.2 per cent in the year 2000 and the number of girls who attended secondary level education increased from 14.7 per cent in 1963 to 35.3 per cent in year 2000. The number of females passing G.C.E ordinary level examination also showed marked improvement from 2.6 per cent in year 1963 to 16.9 per cent in year 2000. Similarly, women achieving a degree or higher level of educational qualifications increased from 0.1 per cent in year 1963 to 2 per cent in year 2000 (Table 2).

Table 2: Educational attainment of the population (30 yrs. and over)

Educational attainment (%)	1963			1994			2000		
	T	M	F	T	M	F	T	M	F
Not Schooling	29.1	16.2	44.7	9.6	5.4	13.7	8.7	5.0	12.2
Primary	39.7	46.5	31.4	25.2	25.8	24.7	26.3	26.9	25.8
Secondary	20.3	24.9	14.7	40.2	42.8	37.8	37.2	39.3	35.3
G.C.E (O/L) /S.S.C.	3.7	4.6	2.6	17.2	17.5	16.8	17.5	18.2	16.9
G.C.E. (A/L)/ H.S.C	1.3	1.5	1.2	5.9	6.1	5.7	7.9	7.9	7.9
Degree or Higher	0.4	0.6	0.1	1.9	2.4	1.5	2.3	2.7	2.0
Total	100	100	100	100	100	100	100	100	100

T=Total; M= Male; F= Female

Sources: Census of Population, 1963; Demographic Survey 1994; Demographic & Health Survey 2000

Though the number of females achieving degrees in the area of science and engineering showed a marked improvement, their contribution to the professions in various fields of Science and Technology remain comparatively low. According to the national R&D survey 2008, women represented 41 per cent of the total scientists' population in the country. Of this number, 45 per cent of total scientists represented by women scientists in the Research Institutes and other Science and Technology related Institutions in the country followed by 41 per cent in Higher Education sector and 16 per cent in Business Enterprises and Private Non Profit organizations (Table 3).

Table 3: Distribution of R&D Scientists by Sex and Sector 2004-2008

Year Sector	2004		2006		2008	
	Total	Female%	Total	Female%	Total	Female%
Higher Education	2,920	40	2,839	43	2,466	41
State	1,413	36	1,479	42	1,187	45
Private	269	26	202	22	384	16
Total	4,602	39	4,520	41	4,037	40

Source: R&D Survey National Science Foundation Sri Lanka, 2004, 2006 & 2008

Table 4: Distribution of R&D Scientists (Head Count) by Discipline and Sex 2008

Discipline	Head Count of R&D Scientists					
	Male		Female		Total	
	No.	%	No.	%	No.	%
Natural Sciences	634	26	391	24	1,025	25
Agriculture	522	21	417	26	939	23
Engineering	661	27	266	17	927	23
Medical Sciences	385	16	383	24	768	19
Social Sciences Humanities	156	6	111	7	267	7
Other	70	3	41	3	111	3
TOTAL	2,428	100	1,878	100	4,520	100

Source: R&D Survey National Science Foundation Sri Lanka, 2006 (NSF)

According to the same survey, when investigated on the distribution of women scientists across different disciplines it showed that female participation was higher in the areas of Agriculture sciences (26 per cent) followed by Medical sciences (24 per cent), Natural sciences (24 per cent), Engineering and Technology (17 per cent), Social science and humanities (7 per cent) and other S&T related fields 3 per cent respectively (Table 4).

Since the attainment of higher educational qualifications of women in the country is increasing gradually in the country, it is important to investigate the existing status of women scientists, their career achievements and the constraints faced by them. Such an approach will help in taking necessary steps to eliminate or reduce the barriers and encourage more women participation in the S&T careers. Since this area has not been investigated in Sri Lanka so far, the Science and Technology Policy Research Division (STPRD) of the NSF identified this subject as an important issue that need to be investigated.

1.2 Objectives

The main objective of the study was to find out the issues pertaining to career prospects of women scientists and highlight policy recommendations to improve the women participation in S&T careers in the country. The specific objectives of the study were:

1. Investigate the career status of women scientists in the country
2. Investigate the education level of women scientists in the country
3. Investigate the constraints and problems associated with their careers
4. Investigate the contribution of women scientists to S&T sector in the country.

02. Research Methodology

Women scientists in the country are employed in universities, R&D institutions, S&T service sector institutions, Industries and Non Government Organizations (NGOs). The primary source of data for the study was collected by contacting relevant institutions.

The data collection was conducted by employing postal questionnaire survey method and the direct interview method. To minimize the sampling error non- respondent survey was conducted by selecting randomly 30 per cent of the non-respondent sample and conducting direct interview. The secondary data were obtained from records and reports on the higher education sector, Department of Census and Statistics, newspapers and many other reports on gender issues pertaining to the country.

Data entry was done using Microsoft Access data base and statistical data analysis conducted using SPSS data analysis Software Package.

03. Results

The survey sample consisted of total of 1,628 of women scientists as recorded in the national R&D Survey 2004. Out of the sample, 65 per cent responded to the questionnaire (1,058). The responded sample consisted of 27 per cent of scientists working in the fields of agricultural sciences followed by 27.8 per cent in natural sciences, 6 per cent in engineering and technology field and 26.1 per cent in other scientific fields including the social sciences and humanities. The survey sample comprised 13 per cent women scientists of age below 30 years, 46 per cent between 31-40 years, 31 per cent 41-50 years and 10 per cent above 51 years (Table 5). 26 per cent of the sample investigated had Ph.Ds as their highest academic qualification and this represented the 87 per cent of the women scientist recorded for having the Ph.Ds in the country. The survey covered 53 per cent of the women Professors working in the higher education sector in the country.

Table 5: The distribution of sample according to age and academic qualifications

Highest Degree Qualifications	Age				Total
	<30	31-40	41-50	above 50	
Bachelor Degree or related degree	64	221	93	29	407
M.Sc./ M.Phill or related	76	192	76	29	373
Ph.D. or upper or related degree	0	70	156	52	278
Total	140	483	325	110	1,058

The data collected through the survey was analyzed from various angles to understand the current status of women scientists and the progress made in their careers at academic levels as well as professional levels.

The analysis conducted to investigate the association between age and academic achievements of the women scientists showed significant ($p < 0.001$) association between age and attainment of the highest academic qualification. Accordingly, the most productive age for achieving Ph.D. was within age of 41-50 years. However, most women scientists were able to achieve postgraduate qualification at Master level within 31-40 years of age. The outcome of the interviews conducted with the women scientists revealed different perspectives on the subject. The marital status of the women scientists has direct impact on the attainment of postgraduate degree.

The most common reason given for the slow progress in the career development was that they need to devote more time for the wellbeing of their children and spouse. Hence the women scientists are compelled to delay their academic achievements until such time that the children start schooling and they do not need constant attention of the mother. The other reason given for the said delay was the lack of opportunity for women to do a Ph.D. degree compared to men as most superiors prefer to have male research students than female research students due to extensive field investigations involved in most S&T subject areas. The

women scientists working in S&T institutions other than the higher education sector institutes had mentioned that when they were young recruits, it was very difficult for them to obtain duty leave or funding sources to seek postgraduate education. However, when they are senior and are promoted to higher grades, they are allowed to do postgraduate degrees to fulfill the requirement compulsory for the next promotion. Nevertheless, this barrier could be a common issue applicable to male scientists as well.

Another factor investigated for measuring the productivity of women scientists was the number of publications produced by them. The number of publications depends on the amount of research activities undertaken and their findings. The ability to do direct research depends on the independent ability to design and plan a research project, to obtain facilities needed to carry out the same and the wherewithal to execute the research programme. To obtain the necessary funding and infrastructure facilities, the scientists have to devote time and energy to compete successfully with the peers. Most women scientists at the onset of their careers find it very difficult to achieve these targets as they have to divide their time between their family and their career and, also, they have limited experience. However, the study revealed that some young women scientists who were fortunate to get the advice and constant guidance from their senior counterpart had been able to secure necessary funds and successfully execute their research projects. Once the funding is secured the next step is to conduct research and publish the outcome in peer reviewed journals or filing for patents. The investigation done on the rate of publications by women scientists in different age groups showed that the number of papers published in the local and international journals was significantly ($p < 0.001$) high for the scientists of age group 31-40 years followed by age group 41-50 years. The study revealed that women scientists who are fully involved in academic or research activities produce more publications than the ones involved in engineering and technology activities or administration and management activities. The designation level of women scientists also showed a significant association ($p < 0.01$) with the number of publications they produced. The reason could be that the number of publications is also used as a criterion for promotions in the scientists working in

the academic and research sectors. Therefore, most scientists in 31-40 years pay more attention to producing more publications to meet their promotional requirements. However, a comparison with their male counterparts in the same age group showed that there is a marked difference in the number of publications produced. The female scientists produced less number of publications than their male counterparts. The main reason for this difference would be the time devoted by both groups for research activities.

The interviews conducted with different female scientists on the issue of publications revealed that it takes more time for female scientists to complete the tasks as they are more duty conscious compared to male scientists. Hence, they seem to devote more time than males to fulfill the other duties and obligations assigned to them such as academic activities, administration etc. as well as looking after their families.

The other constraint mentioned by the female scientists was the social barriers. Accordingly, their male counterparts have more freedom to move in the scientific community and, therefore, they can easily form links with other parties that assist them to climb up their social and career ladder, while a large proportion of women scientists lack this opportunity. Women scientists happen to do it in their own time and the hard way, taking a longer time to reach the same level. Some traditional and cultural ethics also hinder them in taking part in some research projects that involve extensive field work and laboratory work in late hours. However, women scientists stated their desire to work in these projects if certain facilities such as proper transport or accommodation or flexible working hours etc. are provided to them. The less involvement in research activities as well as giving low profile in other external activities (e.g. contribution to social and professional bodies etc.) lessen the opportunities for young women scientists to receive awards or other academic achievements that are secured by their male counterparts of the same age. However, most female scientists in late 40s mentioned that they were able to achieve these targets only in late 40s when they have less family responsibilities and more experience in their life.

Another criterion that was used to measure the productivity of the women scientists was the participation in local or international seminars and workshops at the capacity or resource person and participants. The rate of participation was observed in different categories as age groups, marital status and number of children. The analysis showed that women scientists with two or more children participate more at seminars/workshops and work after hours compared to those with only one child. This interesting outcome may be due to the fact that women scientists with a number of children may be confident that the children have company in the absence of the mother. Most of these women scientists mentioned that their spouse and family were very helpful and assist them in taking part in these activities. A significant association ($p>0.01$) was seen in the age of the scientist and the participation in seminars and workshops (Table 6).

Table 6: Participation at seminars and workshops (during past 3 years)

Age categories (years)	Participation (%)		
	Yes (%)	No (%)	Total
below 30	38	62	100
31-40	33	67	100
41-50	42	58	100
51 above	80	20	100
Total	40	60	100

The scientists above age 50 years had participated more frequently in the workshops and seminars than the women scientists below 40 years of age. The designation level of the women scientists and getting opportunities to participate in the seminars or workshops also has a significant association ($p<0.005$). This is because the scientists in the senior category with more responsible roles and authority receive more chances to participate in workshops and seminars than the junior or middle level scientists. However, such opportunities are still less for women scientists in comparison with the males in the same category. Some women scientists having children mentioned that, there are occasions when selecting for foreign training and

participation in seminars etc., that their heads do not bother to consult them but had decided that married female scientists would not possibly participate or undertake the task because of children or spouse. Therefore, the superiors tend to give the opportunity to someone else in the institution. Due to this reason, the married women scientists usually miss the chance of participating in workshops or seminars very often. However, they could have participated at such functions, if they were given the opportunity to choose. It has also been expressed that it is not possible to protest due to the fear of being misunderstood by the seniors even though the protest is justifiable. According to the survey, this type of interference seems to be rare but still exists in the sector and may consider as indirect sex discrimination.

Women scientists above 50 years showed a tendency to get involved in academic activities more than research activities ($p < 0.001$). There was also a positive correlation between age and involvement in administration activities. The reason for these phenomena is that when scientists get mature and reach the highest grades in their designation, they tend to get involved in administration work and other activities more than research activities.

The productivity of women scientists in relation to the gender of their superior was analyzed. Accordingly, 68 per cent of the respondents work under a male as their immediate superior while 81 per cent of the S&T sector institutions are headed by male CEOs. This clearly shows that the high rank job categories in the S&T sector are still dominated by male scientists and technologists in the country. The analysis showed that time devoted for research activities and extension field work was significantly higher for the women scientists working under female heads or superiors while the time devoted for meetings or attending seminars etc. is significantly higher for women scientists working under male superiors.

When looking at the recruitment procedure of the S&T institutions in the country it showed that there is no gender bias in the officially stated recruitment policies and norms in Sri Lanka. However, like in many other countries, there is some degree of indirect

discrimination in recruiting women for science careers ($p < 0.001$), especially in the private sector organizations and also for some job categories such as IT, engineering and technology etc. This is because many employers still believe that women are not capable of handling technical work and/or field work.

However, no significant pay discrimination has been reported in the survey but some women scientists in the private sector institutions reported that the male counterparts in their organizations receive pay hikes more often than women scientists due to the reason that such benefits are decided on the merit base.

The analysis also showed that there is no gender bias or discrimination when selecting for rewards or recognition or when selecting for higher administration positions in the country. The qualifications, experience and the achievements requested are equal for both male and female scientists. The women scientists were of the view that their achievements are affected by family responsibilities, cultural and social values etc., and such hindrance reduces their chances of being successful when competing with men who are not very much affected by said issues.

04. Discussion

The information gathered by the questionnaire survey and interviews conducted using women scientists at various levels of careers indicated that a number of factors affect the career prospects of women scientist in Sri Lanka. This can be investigated by looking at the problem in different levels. According to Sonnet and Holton (1996), the status of women in Science and technology career depends on various factors that can be explained by two models in the Social-science literature. The one called 'deficit model' is based on structural explanation of scientific careers. According to this model, women scientists as a group receive fewer

opportunities along their career path due to structural obstacles like legal, political and social that are in current practice or existed in the past that affect all women in general in the area of science leading to less career prospects. The second model called 'difference model' describes the deeply ingrained differences in behavior, outlook and goals between women and men. In this model the root cause for the gender disparities in career achievements is internal to the individual.

The survey results indicated that the status of women scientists in the country too can be explained by using these two models. The importance that women scientists give to their career prospects and to sustainability of their family life varies and this is also influenced by external factors such as social values, family background, institutional culture etc. as well as individual goals and views. These factors, in different magnitude, affect the productivity of women scientists and the selection of scientific professions by females in the country.

The studies conducted by the National Science Foundation of America revealed that women scientists, particularly at the doctoral level, regardless of the employment sector, fare less than men in terms of status or rank, salary and promotion, although there is some lessening of all these differences among younger scientists and engineers today (Vetter,1981). Equal opportunities for male and female citizens are recognized by the Sri Lankan government in its constitution and therefore there is no direct discrimination in recruitment for careers or selection for training, education, etc. like in some other countries. As there is no gender-based positive discrimination for employment, women would be expected to compete with men for employment, funds for projects, positions in scientific organizations on equal terms. Since women who are qualified to work in the area of S&T are nearly equal in proportion to male, one should expect that the number of women scientists in the country is more or less equal to male scientist. However, the situation in the country differs by having a comparatively low number of women in these positions. The numbers of women representing and chairing professional scientific bodies, Institutional Management Boards etc. are still low. For example,

in the university sector, of the total number of professors, 22 per cent are women. Similarly, the majority of the higher administration level positions in research institutions and other S&T organizations are chaired by men. Therefore it is evident that there is some cause for this gender disparity in the S&T sector in the country.

When analyzing the responses of the women scientists of Sri Lanka, it is clear that there is no salary disparity on the basis of gender in the country. However, the interviews conducted with some selected groups of scientists revealed that there are many other money earning avenues for financial benefits such as consultants, tutors, researchers that are open to men but not to women. Further, male scientists get more opportunities to work outside the country compared to women scientists. Since men are not very much concerned about the lack of proper transport or accommodation facilities, and therefore, they have more opportunities to work in the projects that need extensive travel or need working in extra hours etc. that widen their career path. When considering the current working setup in the local S&T institutions, it is difficult for women scientists to work after hours. Transport problems at night, distance to their working place from their residence, personal safety, family responsibilities including caring children and family etc., make it more difficult for women to get fully involved in their career than men. Other than the above physical difficulties, the existing traditional beliefs and practices also somewhat restrain women to get involved in some career related activities to their full capacity.

In the society of Sri Lanka today, most women marry in their late twenties and the decisions about childbearing and child rearing mostly fall into the hands of the women. In this context, ambitions of women to pursue a career take secondary importance with women taking leave to attend family needs and other concerns, at least until children start primary schooling. As a result, the most productive period of women's career will get delayed and this delay conflicts with traditional tenure clocks (Grosz *et al.*, 2005). In subsequent years, this barrier gets translated into having poorer professional achievements than men at the same age and basic

qualifications. This also affects the academic development of women with most of the women scientists obtaining their postgraduate qualification after the age of 41-50 years, while most of the men of the same age complete their post graduate degree during their thirties. Therefore, fewer women may be able to compete successfully with men for the same post (BAL, 2005). If steps are taken to make allowance for the time gap and making awards for career development independent of the number of years, it will allow women scientists to have equal participation in career activities and make it easier for them to get into scientific activities after the break in their career. Some women scientists expressed their concerns that they have gone backward several years from their career compared to the men recruited in the same year with them, due to maternity leave etc.

Apart from having postgraduate degrees or other academic qualifications, there are other certain specific steps and goals which are essential for career advancement in Science and Technology sector. A proven record for achievement in the form of publications in reputed journals and patents are some of the major criteria for selection when competing for promotion, receiving foreign training, selecting for rewards, having administrative positions, nomination for various reviewing bodies or election to prestigious institution or professional bodies (Sonnet and Holton, 1996). Several studies were conducted to explore the basis for the gender gap in Scientists working in different disciplines (Yedida and Bickel, 2001; Carr *et al.*, 1992). Accordingly, constraints in the traditional sex roles, manifestation of sexism in the institutions, and lack of effective mentors affect the achievements of women scientists. Carr *et al.* (1992) reported that female academics who had children published less and received institutional support less than male colleagues who had children. Some studies also showed inequity relative to the allocation of resources, space, salary, outside professional activities, and positions of influence (<http://web.mit.edu/fnl/women.html>). In the present survey a significant number of women scientists working at junior level positions complained about the lack of opportunities, space and allocation of resources which make it difficult for them to work at their full capacity. Due to their social status in the country, women do not get very much

involved in political activities and, therefore, when competing for higher management positions in the government institutions, they find that they are at a disadvantage for the selection.

Certain aspects of institutional culture and policy too, may pose challenges for women. Success as a scientist needs long working hours and time commitment that for many is incompatible with raising children (Benze *et al.*, 1998). Many surveys done in different countries documented that woman in scientific fields work on average fewer hours than men (Bal, 2005; Carr *et al.*, 1998; Tesch *et al.*, 1995). As mentioned earlier, the analysis done in the present survey showed that time devoted for research activities and extension field work was significantly higher for women scientists working under female heads or superiors while the time devoted for meetings or attending seminars etc. is significantly higher for women scientists working under male superiors. The main reason for this difference, as explained by many, was due to the fact that women as heads are more concerned about the safety and family issues of the other women scientists and make provisions/facilities to overcome such issues that allows the subordinates to work after hours and get involved in their research and extension activities (personal interviews).

It is also obvious that the assistance of the spouse and sharing family responsibilities equally will assist wives to get more involved in their career and achieve its goals. This has been well acknowledged by the Sri Lankan women scientists who have participated more than others in training programs, seminar etc. and who have done more publications.

5.0 Conclusions

Though regulations indicate equal opportunities, the data collected and the interviews held with a number of women scientists revealed that, in general, most of the women scientists are not very happy with the current situation prevailing in the various scientific organizations. Most of them are of the view that there is indirect discrimination for women when recruiting

for employment or selecting for higher positions in the institutions. They feel that most of the administrators prefer to work with men rather than women because they are of the view that women are not capable of handling administrative positions compared to men. However, it was noted when looking at the opportunities for research activities, the university academics are generally happy with their positions in the universities, while women scientists working in research and other scientific institutions and private sector organizations are dissatisfied with the opportunities they receive. It is mostly at the level of administration positions in universities and other institutions that women scientists have a grievance in relation to gender discrimination. Therefore, policy initiatives should be taken to investigate this phenomenon and eliminate the barriers that prevent women scientists entering into more administration positions. Also, it is necessary to improve the research culture in Research Institutions and other S&T organizations.

Since women have to balance their careers with their family life, the necessary policy initiatives should be taken to compensate women in these aspects and make some provisions to assist them to cope with the situation. To help them with small children, it is necessary to establish child caring units and nursery schools in the universities, research Institutes etc. Creating Science Park and establishing various interlinked scientific organizations in one place would also help to create such facilities more effectively.

Assurance of priority for women scientists when offering transport facilities or residencies will also help them to work after hours or in their free time. Giving flexible working hours also would help women scientists to adjust their working time with their family activities. Special attention should be made when selecting for awards or positions in the institutions. The study revealed that the women's participation was very low in the professional bodies and institutional management bodies. Therefore some places should be created in these government bodies for women.

Finally it should be recognized that the number of women who enter to the labour market every year with qualifications in the area of science and technology is almost equal to men and, therefore, planning authorities in the country should take immediate initiatives to workout suitable policy planning measures to encourage active participation of women in scientific careers. Such approaches will increase the contribution of women through science and technology towards the socio-economic development of Sri Lanka.

Acknowledgments

The cooperation given by the women scientists and Institutional heads in data collection is gratefully acknowledged. The service provided by Mrs. Ajantha Kanthi, and Mrs. Chamdima Samerasinghe , Computer Management Assistants in dispatching letters & questionnaires and data entry are thankfully acknowledged. The National Science Foundation is gratefully acknowledged for providing necessary funding and all the other facilities provided to conduct the survey.

References

ADB, 1999. Women in Sri Lanka: Country Briefing Paper, Asian Development Bank, Programme Department West.

Bal, V., 2005. Women Scientists in India: Nowhere near the Glass Ceiling, *Current Science*, 88 (6), pp. 872-78.

Benze, E.J, Clayton, C.P., Costa, S.T., 1998. Increasing Academic Internal Medicine Investments in Female Faculty. *American Journal of Medicine*, 105, pp. 459-63.

Carr, P.L., Ash, A.S., Friedman, R.H. 1998. Relation of Family Responsibilities and Gender to the Productivity and Career Satisfaction of Medical Faculty. *Ann. Intern. Med* 129, pp. 532-38.

Cole, J.R., Cole, S., 1973. *Social Stratification in Science*, University Chicago Press Chicago.

Dial, T.H., Bickel, J., Lewicki, L.M., 1989. Sex Difference in Ranking Attainment among Radiology and Internal Medicine Faculty. *Acad. Medicine*. 64, pp. 198-202.

Grosz, B., Dulca, C., Dymecki, S., 2005. Report from the Task Force on Women in Science and Engineering, Cambridge Mass: Harvard University.

<http://web.mit.edu/fnl/women.html> (accessed November 27, 2008). A study on the status of women faculty in science at MIT, The MIT faculty Newsletter, March 1999 Vol. XI (4).

Kaplan, S.H., Sullivan, L.M., Dukes, K.A., Phillips, C.F., Kelch, R.P., Schaller, J.G., 1996. Sex Difference in Academic Advancement: Results of National Study of Pediatricians. *New England Journal of Medicine*, 335:3, pp. 282-9.

Long, J.S., Fox, M.F., 1995. Scientific Career and Particularism. *Annual Review of Sociology* (21), pp.45-71.

National Research and Development Survey 2004, National Science Foundation, Maitland Place, Sri Lanka.

Nickerson, K.G., Bennet, N.M., Estes, D., Shea, S., 1990. The Status of Women at one Academic Medical Centre: Breaking through the Glass Ceiling. *Journal of American Medical Association*, 264, pp. 1813-7.

Sonnet, G., Holton, G., 1996. Career Pattern of Women and Men in Sciences. *American Scientist*, 84, pp. 63-71.

Tesch, B.J., Wood, H.M., Helwig, A.L., 1995. Promotion of Women Physician in Academic Medicine: Glass Ceiling or Sticky floor. *Journal of American Medical Association*, 273, pp. 1022-25.

Vetter, B.M 1981, Women Scientists and Engineers: trends in Participation. *Science*, Vol. 214 (18), pp 1313-1321.

Wallis, L.A., Gider, H., Thaler, H., 1981. Advancement of Men and Women in Medical Academia: A pilot study. *Journal of American Medical Association*, 246, pp. 2350-3.

Wilkinson, C.J., Lindae, H.W., 1986. Status of Women Academic Anesthesiology. *Anesthesiology*, Vol. 64, pp. 496-500.

Yedida, M.J., Bickel, J., 2001. Why aren't there more Women Leaders in Academic Medicine? The views of the Clinical Department Chairs. *Academic Medicine*, Vol. 76, pp. 453-65.