ECLAC
Economic Commission for Latin America and the Caribbean

WOMEN IN STATISTICS:
THE PROFESSION SPEAKS

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ABSTRACT

Statistics are the building blocks of empirical analysis and statistics professionals are its practitioners. The quality of global analysis in general, and the economic, social, environment and other analyses carried out by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), depends upon the practice of statistics in countries and internationally.

The mandate of the International Statistical Institute (ISI) is to foster international statistical work and interchange among countries. Women are very under-represented in the ISI and this situation is a cause for concern of the Institute and its membership and the ISI Committee on Women in Statistics.

The representation of women in statistics is low in the statistics profession in virtually every country, a pattern of generations. What impact does this have on the practice of statistics? On their use in society? On the public's understanding of the statistics that are presented? What are the diverse realities among countries? What is the broader context of women in the scientific professions? In senior decision-making roles nationally and internationally? What does the future hold?

This paper examines these questions and taps into the reservoir of first hand professional experience of eminent practicing statisticians from a range of countries who are active members of the ISI, its Sections, and the ISI Committee on Women in Statistics.
“Statistics, the most important science in the whole world: for upon it depends the practical application of every other science and of every art: the one science essential to all political and social administration, all education, all organization based on experience, for it only gives results of our experience.”

_Florence Nightingale_

_Statistician_

“Women have been contributing to the development of statistical science ever since Florence Nightingale pioneered the recording and analysis of hospital data during the Crimean War, almost a century and a half ago. Today, women statisticians are entering the profession in increasingly large numbers, and they continue to work productively in all theoretical, applied and instructional areas of the discipline. Yet, by and large, women remain minor players in the field and rarely attain positions of prominence or leadership. In the International Statistical Institute (ISI), where membership is by election, only 9.2% of the members are women.”

_Mary H. Regier, Ph.D._

_Chair, ISI Committee on Women in Statistics_
I. INTRODUCTION

At the dawn of the third millennium, why are women participating in exceedingly low numbers in the statistics profession? Why are women under-represented in the scientific professions? The current impetus for these questions arises from an ongoing debate among statistics professionals about the low number of women elected to the International Statistical Institute and a longstanding concern by women in the ISI to turn this situation around. In part, the low number of women in the ISI led to the establishment of the ISI Committee in Statistics (CWS). This paper is an outgrowth of the work of the Committee.

The discussion among the membership of the ISI about women’s representation has gone on for some time with the ISI leadership seeking to implement practical solutions. However, the solutions are not so simple because the problem is not simple. It first requires examining just what is the makeup of the 9.2% women’s membership, in regional and country terms, and then setting these realities into the context of the distribution of the overall membership.

In part, the difficulty in identifying qualified and interested women appears to result from the larger problem of low representation of the developing regions in the ISI and therefore the inadequate network for recruiting outstanding male and female members on a global scale. In some countries and regions, statistics is a relatively new academic area of study and so has not developed a body of professionals in proportion to their populations; in some countries it is a profession that has not had much demand until the present and so remains a small discipline. Relatively speaking, participation in meetings and membership dues are costly and potential professionals from developing regions may find it difficult to meet these costs and may not see the value of gaining membership because the network may not be perceived to be sufficiently useful for local professional purposes or personal self-fulfillment. These factors have come up, for example, in trying to interest more colleagues in Latin America to participate.

In effect, the ISI situation is only the tip of the iceberg in a much larger issue. A major reason for low representation of women in the ISI from the USA and Canada is the very low number of women statistics professionals working in the USA and Canada. The ISI hence is a reflection of a longstanding larger reality as will be seen in Billard’s historical analysis of academic careers in the United States, which has been included to provide some context for what is occurring in the ISI. Consequently, to change the ISI situation it is, at least in part, necessary to improve the low participation of women in the statistics profession and to do that it is necessary to understand what underlies the condition of low participation. Answers to these questions can lead to concrete remedies.
It is useful to examine women’s participation in statistics within the overall context of women in the scientific professions since they have similar patterns and it would appear that the explanations for the current and longstanding situations have similar origins. While the hard data on these questions are difficult to find, this lacuna has been complemented by some innovative qualitative research. The serious lack of data led in the last few years to several large international studies which will be explored further. These, together with investigative reports, begin to give shape and form to the underlying causes and contexts for the low participation of women in statistics and the sciences. It will be seen that it is not a uniform condition and we have much to learn from the varying realities across countries.

The work of the ISI Committee of Women in Statistics and the role it is playing are discussed. Special attention is given to the meeting organized by the CWS in Aguascalientes, Mexico, at the Conference on statistics for economic and social development on “The Role of Women in Statistics”, and to the views presented by the four speakers, representing distinct realities from diverse countries and cultural contexts in which statisticians practice their professions.
II. THE INTERNATIONAL STATISTICAL INSTITUTE

The International Statistical Institute (ISI) is one of the oldest international scientific associations functioning in the modern world. It was established in 1885 and celebrated its centenary in 1985. The Institute is an autonomous professional society which seeks to develop and improve statistical methods and their application through the promotion of international activity and cooperation.

The ISI has nearly 2,000 elected members who are the world’s leading statisticians. The membership is drawn from over 90 countries and their accumulated experience represents a vast store of technical knowledge, which covers the entire range of official, applied and theoretical statistics. Leaders of national and international statistical agencies are ex-officio members of the ISI. This reservoir of expertise is supplemented by that of the members of the Institute’s Sections.

The five Sections of the ISI reflect the diversity of the association, the wide range of professional application and the distinct interests of the membership. The sections are the International Association of Statistical Education (IASE); the International Association of Survey Statisticians (IASS); the International Association for Official Statistics (IAOS); the International Association of Scientific Computing (IASC) and the Bernoulli Society for Mathematical Statistics and Probability. In total, there are more than 5,000 individual members. The ISI and its Sections provide a forum for the international exchange of knowledge between members, and also aim to bring in their members’ expertise to assist in the practical solution of various problems.

The ISI has as its objective “the development and improvement of statistical methods and their application throughout the world, all this in the widest sense of the words”, according to its statutes. In particular it seeks:

- to encourage international cooperation and association between statisticians and the exchange of their professional knowledge and findings;
- to further the international integration of statistics by developing world-wide relations between statistical societies and other official and unofficial organizations having statistical interests;
- to advance the study of statistical theory, to appraise statistical methods and practices, to encourage statistical research and to further the application of statistical methods in all relevant fields;
- to promote the use of the most appropriate statistical methods in all countries; and
- to promote the international comparability of statistical data.
III. WOMEN’S REPRESENTATION IN THE ISI AND ITS SECTIONS

How well are women represented in the ISI and its Sections? According to data supplied by the ISI in April 1999, the ISI had only 183 women members out of a total membership of some 2,000, as shown in Table 1.

Table 1 shows that in this last year of the twentieth century only 9.2% of the global ISI membership are women. Low as this figure is, it is still a considerable improvement over the situation ten years ago. In 1989 there were only 95 women in the ISI, representing 6.4% of a total membership of 1,490. In the intervening ten years there were 506 newly elected members of the ISI of whom 88 were women, i.e. 17%. The female membership of the ISI has doubled in the last ten years but the pace of change during the past decade will not significantly alter the sex ratio in the short to medium term. An increase in representation of nearly three percentage points is a move in the right direction but spread over ten years the movement is clearly not fast enough. It is important, however, to examine the low membership rates in the context of the representation of women in the statistical profession as a whole. This is examined later with respect to statisticians in academia in the United States, and women in science in all regions of the world.

Table 1
MEMBERSHIP OF THE ISI: 1999

<table>
<thead>
<tr>
<th>Region</th>
<th>Women ISI Members</th>
<th>Men ISI members</th>
<th>Total ISI members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>World</td>
<td>183</td>
<td>9.2</td>
<td>1,813</td>
</tr>
<tr>
<td>USA &amp; Canada</td>
<td>58</td>
<td>9.9</td>
<td>529</td>
</tr>
<tr>
<td>Europe</td>
<td>92</td>
<td>9.9</td>
<td>835</td>
</tr>
<tr>
<td>Western Mediterranean*</td>
<td>46</td>
<td>18.3</td>
<td>206</td>
</tr>
<tr>
<td>Rest of Europe</td>
<td>46</td>
<td>6.8</td>
<td>629</td>
</tr>
<tr>
<td>Japan</td>
<td>1</td>
<td>0.9</td>
<td>109</td>
</tr>
<tr>
<td>Australia &amp; New Zealand</td>
<td>4</td>
<td>7.3</td>
<td>51</td>
</tr>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>11</td>
<td>18.6</td>
<td>48</td>
</tr>
<tr>
<td>Africa</td>
<td>6</td>
<td>3.8</td>
<td>46</td>
</tr>
<tr>
<td>Rest of Asia</td>
<td>11</td>
<td>5.3</td>
<td>195</td>
</tr>
<tr>
<td>Industrialised Regions</td>
<td>155</td>
<td>9.2</td>
<td>1,524</td>
</tr>
<tr>
<td>Developing Regions</td>
<td>28</td>
<td>8.8</td>
<td>289</td>
</tr>
</tbody>
</table>

* France, Italy, Portugal and Spain.

Source: B. Carlson, based on data supplied by the ISI.
When one looks at the regional distribution of ISI membership it can be seen that more than four fifths (84.7%) of the 183 women ISI members come from the industrialised regions, a fraction more than for male ISI members. Only 28 women ISI members come from the developing regions of Latin America, Africa and Asia. The region with the highest proportion of women ISI members is Latin America and the Caribbean where 18.6% of the ISI members in the region are female, double the global average. It is also very interesting to see that the largely Catholic western Mediterranean countries of Italy, France, Spain and Portugal have a similarly high proportion of women ISI members (18.3%) compared to only 6.8% for the rest of Europe. The figure for Europe as a whole is 9.9%, the same as for the USA and Canada. Possible explanations for this “Western Mediterranean phenomenon” are discussed further in the section on Women in Science, and appear to be strongly linked to a higher proportion of all-girls schools in these countries.

The higher proportion of female ISI members in Latin America is partly the reflection of the exceedingly low number of male ISI members in Latin America and the Caribbean (48)—almost the same as Africa (46)—but it also reflects the same Mediterranean phenomenon found in Spain and Portugal. By far the largest difference in male-female membership occurs in Japan where only one member out of the 110 Japanese ISI members is female (0.9%). Surely this cannot reflect the proportion of women working in statistics in Japan? Where are Japanese female statisticians working and how do we find them? In the rest of Asia, the proportion of women members is also very low at only 5.3%. Similarly, the proportion in Africa is very low at only 3.8%.

There are 49 countries in the world which are represented in the ISI by one or more women members but the 11 women members in Latin America and the Caribbean account for only six of these countries—Argentina, Brazil, Mexico, Panama, Peru and Uruguay. Surprisingly, the ISI has no women members in Bolivia, Chile, Colombia, Costa Rica, Cuba, Ecuador and Venezuela, and there is a complete absence of Caribbean countries.

If one adds the membership of the ISI Sections, there are 85 countries in the world, which are represented in the ISI or its Sections by one or more women members. The Latin American and Caribbean region accounts for 14 of these countries—Antigua, Argentina, Brazil, Chile, Colombia, El Salvador, Jamaica, Mexico, Nicaragua, Panama, Peru, Trinidad, Uruguay and Venezuela. Not represented in either the ISI or its Sections are Bolivia, Costa Rica, Cuba, Ecuador and Paraguay.
Table 2
MEMBERSHIP OF THE SECTIONS OF THE ISI: 1999

<table>
<thead>
<tr>
<th>ISI Sections</th>
<th>Women ISI members</th>
<th>Men ISI members</th>
<th>Total ISI members</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>International Association of Statistical Education (IASE)</td>
<td>112</td>
<td>26.7</td>
<td>307</td>
</tr>
<tr>
<td>International Association of Survey Statisticians (IASS)</td>
<td>268</td>
<td>21.5</td>
<td>976</td>
</tr>
<tr>
<td>International Association for Official Statistics (IAOS)</td>
<td>89</td>
<td>17.1</td>
<td>432</td>
</tr>
<tr>
<td>International Association of Scientific Computing (IASC)</td>
<td>73</td>
<td>10.2</td>
<td>644</td>
</tr>
<tr>
<td>Bernoulli Society for Mathematical Statistics and Probability</td>
<td>164</td>
<td>10.1</td>
<td>1,463</td>
</tr>
<tr>
<td>All ISI Sections</td>
<td>706</td>
<td>15.5</td>
<td>3,822</td>
</tr>
<tr>
<td>ISI</td>
<td>183</td>
<td>9.2</td>
<td>1,813</td>
</tr>
</tbody>
</table>

Source: B. Carlson, based on data supplied by the ISI.

The representation of women is much better in some of the Sections of the ISI with over 700 women members of the various Sections, as shown in Table 2. Women’s representation is highest in the International Association for Statistical Education (IASE) at 26.7%, the International Association of Survey Statisticians (IASS) at 21.5%, and the International Association for Official Statistics (IAOS) at 17.1%. By contrast, the International Association for Statistical Computing (IASC) and the Bernoulli Society for Mathematical Statistics and Probability are just marginally above the main ISI position of 9.2%. These differences in women’s participation among the sections show a strong tendency for women to belong to the “applied statistics Sections” with proportionately fewer women in the “hardcore” statistics, mathematics and computing Sections. Taking the five Sections together, the percentage of women members is 15.5%, two-thirds higher than the percentage for the ISI itself. The ISI has fallen behind all five of its Sections in recruiting women members. This disparity needs to be investigated further.

The main difference between the ISI and the Sections is that membership in the ISI is by election of members of the ISI while membership in the Sections is by application by interested professionals. It could be that while women are taking the initiative to join the Sections, ISI members who are overwhelmingly men have not taken sufficient initiative to recruit women. (Five existing members of the ISI are required to propose the election of a new ISI member.) Again, this needs to be examined in the context of the representation of women in the statistical profession as a whole, both in regions and countries, where women’s representation is often very low and the low
ISI membership is simply a reflection of low numbers of women in the statistics profession.

The regional and country figures are a good starting point for understanding whether the low number of women members indeed represent a special ISI gap, e.g. the extreme situation in Japan (0.9%) or the low percentage in Asia as a whole (3.8%). Decision-making members of the ISI tend, more often than not, to come from the industrialised world and they would have a better network for recruiting outstanding women into the ISI. The question is how to discover the outstanding women in the regions that have very low representation, e.g. Asia. Furthermore, there is the equally important issue of the overall low representation in the ISI of both men and women from developing countries, the reasons for it and how to change it.

It is not a question of women having to reach the very top of the statistical profession to be nominated for the ISI. Most men members of the ISI are just in the upper echelons and there are certainly many first class women statisticians at that level who could contribute to the ISI. It is a matter of finding them, attracting them and sponsoring them to join the ISI. Such a campaign would definitely mean a personal commitment on the part of its existing members. The ISI Permanent Office as a focal point of action, working with the ISI and its Committees and Sections, could be successful in finding good women statisticians who have been overlooked and take the necessary steps to get them nominated. The ISI Permanent Office could also serve an important monitoring and reporting function through publishing regular reports on the progress of the recruitment of women.

The Italian National Statistical Institute has established an Equal Opportunity Committee and the President of the Committee asserts that when women have equal opportunity they are successful more often than not (Sabbadini. 1998). Over the last eight years the representation of women in the Italian National Statistical Institute has improved consistently because a great deal of recruitment and promotion was subject to public competition. Between 80 and 90% of the winners of the public statistics competitions were women. For her Committee the best positive action was open competition. Many national statistical agencies have established a similar body —Nanjamma Chinnappa, President of the International Association of Survey Statisticians, had a similar responsibility in Statistics Canada— and those that have not yet established such bodies would benefit from doing so.
IV. WOMEN IN STATISTICS TEACHING

An important factor in the current limitations of statistics on women and the low participation of women in the statistical profession could well be the inadequate representation of women in the teaching of statistics. It is notable that the ISI, with its low representation of women, is still better off in gender terms than tenured statistics faculty in US universities. It is surprising to realise that, in the United States, the teaching of statistics at the university level is almost exclusively a male profession, (Loftsgaarden 1998). The latest data on this situation, as shown in Table 3, reflect the situation in the statistics departments of US colleges and universities in 1995.

Table 3

FACULTY IN UNIVERSITY DEPARTMENTS OF STATISTICS, UNITED STATES OF AMERICA: AUTUMN 1995

<table>
<thead>
<tr>
<th>Category</th>
<th>Ph.D. Courses</th>
<th>MA Courses</th>
<th>Ph.D. and MA courses combined</th>
<th>Total faculty</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tenured</td>
<td>Tenure eligible</td>
<td>Other and part-time</td>
<td>Tenured</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>36</td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td>Women</td>
<td>617</td>
<td>135</td>
<td>128</td>
<td>73</td>
</tr>
<tr>
<td>Men</td>
<td>649</td>
<td>171</td>
<td>178</td>
<td>81</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women as</td>
<td>4.9%</td>
<td>21.1%</td>
<td>28.1%</td>
<td>9.9%</td>
</tr>
<tr>
<td>% of total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


It can be seen that in the autumn of 1995, there were only 40 tenured women statistics faculty teaching Ph.D. and MA courses in US universities and only another 38 who were tenure eligible, out of over 921 possible tenure or tenure eligible positions. Women made up only 5.5% of full-time tenured statistics faculty in the United States meaning that nearly 95% of tenured faculty who were teaching statistics were men. This condition will not have changed very much in the few years since that inquiry. Even including tenure-eligible and other faculty including part-time teachers, women statistics teachers in universities accounted for only 12.2% of the total faculty.
This amazing disparity raises many questions. Why is this so? Why are not more women teaching statistics? Is this a recent phenomenon or a longstanding one? In fact, the age distribution of tenured and tenure-eligible women faculty tends to lean toward the younger age cohorts but even then the female representation is still very low. Especially with the evolution of the information age, where statistics and data are central to many professions and appear everywhere in the public dialogue, in newspapers, on television, in magazines, etc. one would assume that more women would be seeking statistical careers. There is nothing inherent in a statistics career that might account for the low participation of women, unlike careers that are very time demanding, take women away from their families, are labour or travel intensive, etc.

What does the almost non-existence of women in the teaching of statistics mean for statistical production? Are statistics gender-biased because teachers of statistics are almost exclusively men and so the female perspective is not sufficiently reflected in university statistical research, curriculum design, role models and statistical production? And do the “statistics in society” that we produce and read about reflect this gross distortion in statistical faculty teaching in colleges and universities? This surprising phenomenon surely warrants a follow-up study to discover the reasons. The gender gap is just not what we would have logically thought to be the case.

The race/ethnicity of statistics teaching in US universities is also worth noting (Loftsgaarden, 1998). As one might expect, three quarters of statistics teachers were white (non-Hispanic), but nearly 20% of statistics teachers were Asian. Only 5% were Hispanic, including Puerto Rican, and 1% black. Among the minority of women statistics teachers, the white (non-Hispanic) figure was a little under three quarters and the Asian figure stayed at just under 20%, but the Hispanic figure went up to 9%. The same series of gender questions could be raised with respect to the ethnicity of teachers of statistics.

The leading question is what is the impact of the highly skewed distribution of gender and ethnicity on the teaching of statistics in colleges and universities in the United States? And what is the comparable situation in other industrialised and developing countries? Is this a unique US situation or is it common to most universities in the world? We need to undertake further enquiries.
V. ACADEMIC CAREERS FOR WOMEN

In general, regardless of country or type of tertiary institution, the status occupied by academic women has been consistently below that enjoyed by men. This is particularly true in countries that have not yet enacted anti-discrimination legislation. In all countries prior to such legislation, and even in some disciplines in countries that have passed such laws, there is little real documentation on the status of women faculty or the data are relatively meaningless because of the very small numbers involved. The greatest volume of data available exists for the United States where legally sanctioned discrimination ended in 1972. A few studies elsewhere exist, such as the Cass et al. (1983) investigation of academics in Australia, Farley’s (1985) discussion of women workers in 15 countries, Hedman’s (1988) look at academics in Sweden, and Jogan’s (1992) study in Slovenia. Where these studies have overlapping results, the results are not dissimilar from those for the United States at a comparable stage.

Given the paucity of data from other countries as compared with the relative richness of the United States data, the focus here is on the US. Trends there can be viewed as precursors of what might be expected elsewhere. The movement of women up the promotion and tenure ladder as well as salary issues is examined. Since each of these is determined in part by faculty productivity, evaluation and performance measures as applied to women are also considered.

1. Education and Employment

Women have performed better than men at all levels of education and in all fields (Hornig 1987). Yet, except for fields such as nursing that are dominated almost exclusively by women, a higher proportion of doctorates has been awarded to men. The proportion of doctorates awarded to women remained steady through the 1920s and 1930s, averaging about 15% over all fields, then declined substantially through the 1940s and 1950s, returning to their pre-war values for most fields by the early 1970s. The percentages (though not necessarily the number) of doctorates awarded to women then increased steadily throughout the 1970s until a levelling off during the 1980s but with a small but perceptible increase in these percentages being evident by the turn of the decade into the 1990s. By 1992, 37.2% of doctorates overall were earned by women, ranging from 9.6% in engineering to 59.7% in psychology (Billard, 1994, gives the complete figures up to 1987).

In a major study of matched individuals of all those receiving doctorate degrees over the period 1940 to 1978, Ahern and Scott (1981) found that the proportion of women in full-time employment was lower than the proportion of their male counterparts, regardless of field. This was the case even for those who had graduated since 1972, and in general there were

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1 Lynne, Billard, University Professor and Professor of Statistics, University of Georgia, USA, in: International Encyclopedia of Education (3rd ed.) 1997.
approximately two to three (depending on the field) more women non-employed than men. The data of Hornig and Tidball (1983) and Zuckerman (1987), covering the sciences and engineering fields, and of Chamberlain (1988), for the humanities, indicate that the proportion of women being appointed to starting assistant professor positions was, by the 1980s, approximately equal to the proportion awarded doctorates for the respective sub-fields. Nevertheless, these appointments still seem to be clustered in the lower ranked institutions rather than at the more prestigious institutions, though there is a shift with a slight increase in appointments at the higher ranked institutions.

2. Promotion and Tenure

Progress for women up the promotion and tenure ladder has not matched the intentions of the anti-discrimination legislation. The study by Ahern and Scott (1981) provides an excellent detailed overview of the situation as it existed by 1979. The Billard (1994) work briefly considers what further progress occurred during the 1980s. Ahern and Scott (1981) conducted a matched triad study of all (approximately 50,000) doctorates awarded in the United States since 1940, grouped into triads of two men and one woman matched by year and field of degree, type of institution at which the degree was earned, and race. Some results included further matching by years of full-time work experience and type of employment. Career attainments as of 1979 were measured and compared for four cohorts: those who graduated in 1940-1959, 1960-1969, 1970-1974, and 1975-1978 respectively.

The percentages of the men (M) and of the women (W) in each rank are shown in Table 4 for each cohort for several specified fields. Despite the fact that the men and women started out with equivalent credentials, the men have progressed up the ranks at a much faster rate than have the women. This applied as much to women who might have expected promotion some time after the 1972 legislation year as for those before that date. For faculty in the 1940-1959 cohort, no substantial change in attained rank could be expected. Faculty from the 1960-1969 cohort would, by the prevailing standards at the time, have reasonably expected promotion to the full professor rank by 1979. However, although varying by field, men overall were about 1.5 times more likely to be full professors than were women and about 3 times less likely still to be assistant professors. Over all fields, 91% of the men and 76% of the women were tenured, with the differential ranging from 5% in the other humanities to 27% in the biological sciences. On balance, the results for this cohort suggest that the social sciences and all the humanities had the best record while biological sciences, chemistry, and psychology had the poorest.
## Table 4
DOCTORATES AWARDED IN THE UNITED STATES SINCE 1940:
RANK PERCENTAGE DISTRIBUTION

<table>
<thead>
<tr>
<th>Graduating cohort and field of study</th>
<th>Full professor</th>
<th>Associate professor</th>
<th>Assistant professor</th>
<th>Instructor</th>
<th>Non-faculty /other</th>
<th>Median salary deficit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M  W</td>
<td>M  W</td>
<td>M  W</td>
<td>M  W</td>
<td>M  W</td>
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<td>1940-1959 Graduating Cohort:</td>
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<tr>
<td>All fields</td>
<td>87 64</td>
<td>7 20</td>
<td>1 3</td>
<td>0 0</td>
<td>5 14</td>
<td>11</td>
</tr>
<tr>
<td>Biological sciences</td>
<td>83 49</td>
<td>11 27</td>
<td>1 6</td>
<td>0 1</td>
<td>5 16</td>
<td>14</td>
</tr>
<tr>
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<td>77 47</td>
<td>17 23</td>
<td>0 3</td>
<td>0 0</td>
<td>7 27</td>
<td>14</td>
</tr>
<tr>
<td>Physics</td>
<td>.. ..</td>
<td>.. 21</td>
<td>.. 0</td>
<td>.. 0</td>
<td>.. 17</td>
<td>12</td>
</tr>
<tr>
<td>Mathematics</td>
<td>90 83</td>
<td>5 10</td>
<td>0 2</td>
<td>0 0</td>
<td>5 5</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Psychology</td>
<td>90 62</td>
<td>2 23</td>
<td>2 4</td>
<td>0 0</td>
<td>6 10</td>
<td>8</td>
</tr>
<tr>
<td>Social sciences</td>
<td>97 72</td>
<td>2 16</td>
<td>0 0</td>
<td>0 0</td>
<td>2 12</td>
<td>13</td>
</tr>
<tr>
<td>Language &amp; literature</td>
<td>91 67</td>
<td>7 22</td>
<td>0 2</td>
<td>0 0</td>
<td>2 9</td>
<td>10</td>
</tr>
<tr>
<td>Other humanities</td>
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<td>2 15</td>
<td>0 0</td>
<td>2 0</td>
<td>2 17</td>
<td>2</td>
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<tr>
<td>All fields</td>
<td>53 34</td>
<td>35 37</td>
<td>4 13</td>
<td>0 1</td>
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<tr>
<td>Biological sciences</td>
<td>42 20</td>
<td>41 34</td>
<td>9 22</td>
<td>0 1</td>
<td>9 24</td>
<td>16</td>
</tr>
<tr>
<td>Chemistry</td>
<td>51 22</td>
<td>31 34</td>
<td>3 12</td>
<td>0 5</td>
<td>16 28</td>
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</tr>
<tr>
<td>Physics</td>
<td>32 20</td>
<td>44 30</td>
<td>4 14</td>
<td>0 4</td>
<td>20 32</td>
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</tr>
<tr>
<td>Mathematics</td>
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<td>38 44</td>
<td>6 13</td>
<td>0 1</td>
<td>5 5</td>
<td>11</td>
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<tr>
<td>Psychology</td>
<td>58 31</td>
<td>30 44</td>
<td>4 15</td>
<td>0 0</td>
<td>9 10</td>
<td>12</td>
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<tr>
<td>Social sciences</td>
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<td>26 32</td>
<td>1 5</td>
<td>0 0</td>
<td>3 10</td>
<td>9</td>
</tr>
<tr>
<td>Language &amp; literature</td>
<td>51 42</td>
<td>38 36</td>
<td>4 11</td>
<td>0 0</td>
<td>7 11</td>
<td>2</td>
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<tr>
<td>Other humanities</td>
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<td>35 42</td>
<td>2 5</td>
<td>0 1</td>
<td>2 7</td>
<td>10</td>
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<td>33 39</td>
<td>1 2</td>
<td>14 21</td>
<td>5</td>
</tr>
<tr>
<td>Biological sciences</td>
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<td>41 49</td>
<td>2 4</td>
<td>20 27</td>
<td>9</td>
</tr>
<tr>
<td>Chemistry</td>
<td>5 0</td>
<td>35 28</td>
<td>38 35</td>
<td>0 2</td>
<td>23 35</td>
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</tr>
<tr>
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<td>30 17</td>
<td>28 40</td>
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<td>40 40</td>
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</tr>
<tr>
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<td>68 43</td>
<td>21 46</td>
<td>1 3</td>
<td>7 5</td>
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<tr>
<td>Psychology</td>
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<td>56 36</td>
<td>18 32</td>
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<td>Social sciences</td>
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<td>47 42</td>
<td>30 32</td>
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<tr>
<td>Language &amp; literature</td>
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<td>50 41</td>
<td>39 40</td>
<td>0 1</td>
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<td>Other humanities</td>
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<td>32 32</td>
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<tr>
<td>Psychology</td>
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<td>3 3</td>
<td>53 71</td>
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<td>19 9</td>
<td>63 58</td>
<td>5 9</td>
<td>10 22</td>
<td>7</td>
</tr>
</tbody>
</table>

The results for the 1970-1974 cohort, which spans the critical 1972-legislation year, and the 1975-1978 cohort, which follows it, show no real progress from the earlier cohorts. By 1979, most in the 1970-1974 cohort should have reasonably expected to have been tenured and promoted to associate professor. Yet overall, 52% of the men but only 35% of the women had been tenured. For all fields, twice as many men as women overall had been promoted to full professor. With the exception of the social sciences and humanities, whose record was again the best, there are 1.5 to twice as many (depending on the field) men as women who had been promoted to the associate professor rank. Psychology and mathematics had the poorest records. In a detailed analysis of this cohort, Ahern and Scott (1981) found that perceptions that women were adversely affected because they lost time to childbearing, were more likely to be in teaching rather than research positions, or were less mobile, were not supported by the data.

Those women who do move up the promotion and tenure ladder take longer than men. From Ahern and Scott (1981), men in the 1960-1969 cohort averaged 5.9 years to receive tenure while women took 6.3 years. In a regression analysis of those matched triads who received the doctorate since 1958, the average time in each rank before promotion to the next rank was always longer for women. For the doctoral institutions only, the closest differential was in the humanities at 8.4 years for men and 8.6 years for women, and the worst record was in the biosciences at 7.9 years for men and 11.1 years for women. The figures for the mathematics and physical sciences and engineering were 8.2 and 10.3 years, and for psychology and the social sciences 8.6 and 9.5 years, for men and women respectively.

No substantial movement has occurred through the 1980s (Billard 1994), nor the 1990s so far, despite seemingly firmly held beliefs that equity prevails. The percentage (28.3%) of faculty positions at all institutions occupied by women in 1991 was only starting to match Roby’s (1973) pre-war figure of 28%. By 1996, 32.3% of all faculty over all institutions were women. The percentage of men and women tenured at doctoral institutions remained essentially unchanged at 72 to 73% and 44 to 48% respectively during the period.

However, the percentage of science and engineering women faculty in the 50 top related institutions steadily increased from 6.8% in 1973 to 16% in 1987. In 1983, 26% of the humanities faculty were women. In general, two to three times as many men as women in the sciences and twice as many in the humanities were full professors, and twice as many women were assistant professors. Men in the sciences filled almost 13 times as many positions at the full professor rank than did women, and 6 times as many in the humanities. Thus, while the overall proportions are unchanged, there is a shift in the proportions of women appointed to the more prestigious institutions, but their progress up the promotion and tenure ranks is still very slow. The most recent data suggest that women are being hired into starting assistant professor positions at about the same proportion as in the Ph.D.’s in that corresponding field. However, promotion and tenure figures have barely changed, and salary gaps have widened.
3. Salaries

The data of Vetter (1987) and the National Science Foundation (1990) show that the deficit in women’s average salary as a percentage of men’s average salary for all science and engineering fields (except the life sciences) actually increased from 1973 to 1987. Billard (1994) in examining ranks observed that for the doctoral granting institutions, the 1987-1988 salary deficit for women in the full professor, associate professor, assistant professor, instructor, and lecturer ranks was 10.6, 6.4, 10.0, 11.1 and 13.5% respectively, but when taking all ranks into account the deficit was 24.8%. This larger latter figure reflects the fact that women are concentrated in the lower ranks.

These figures are essentially unchanged in the intervening years through to 1996. Vetter (1989) demonstrated that the gap widened with years of experience and that while men’s salaries continued to increase throughout their career, women’s salaries ceased to climb after 25 years’ work experience. Fox (1981) observed that the higher the proportion of women in a field the lower was its average salary for both men and women. Finally, the matched triad study of Ahern and Scott (1981) described earlier looked at women’s deficit of median salaries by discipline for each cohort (see last column of Table 4). The evidence of a real difference even for those in the 1975-1978 cohort who have only one to four years’ experience is disturbing.

4. Performance and Evaluation

Since salaries and rank decisions are based on productivity, it is of interest to see how these records are established and evaluated. The traditional measure of research output is the quantity and quality of publications. Although there are numerous studies demonstrating that women publish fewer articles or books than do men (e.g., Cole 1979), there are several other studies which suggest the rate is similar once extraneous factors, such as institutional affiliation (e.g., Astin and Bayer 1973, Persell 1983), situational factors, such as field (Blackburn et al. 1978), or doctoral advisor characteristics (Over et al. 1990), and so on, are taken into account. Numerous studies confirm the conclusions of those such as Cole (1979) that women’s work is perceived to be of lower quality and of less importance than that of men.

This phenomenon is best illustrated by Paludi and Bauer’s (1983) study which demonstrated that papers believed to be written by a man received much more favourable ratings than did those thought to be written by a woman; and male authors received a better rating from men than from women reviewers. Although not the intent of their study, these differential ratings are perhaps evidence that these biases are cultural, thus explaining why gender bias has persisted so long after the anti-discrimination legislation had been passed. That these biases can be partially controlled has been demonstrated by the humanities fields where, once double-blind refereeing was introduced, the proportion of accepted papers and publications authored by women matched the proportion submitted (Lefkowitz 1979).
5. The Future

Although inequities still exist in the 1990s, real gains have been made. Unfortunately, these gains are statistically small and do not yet match the prevailing perceptions that parity has arrived. However, not until a woman’s work is evaluated without bias will her movement up the promotion and tenure ranks and her salary match that of men. The data demonstrate that persistence and vigilance must be maintained. But as more women join academic ranks, their very presence will ensure that the parity legislated will prevail. Certainly, women starting out in the 1990s should expect to enjoy greater progress faster than their predecessors of earlier years.
VI. WOMEN IN SCIENCE

The participation of women in science, much like that in statistics, is not only an issue of equity but is crucial to the development of a healthy science and technology sector and the direction and implementation of appropriate science policy and research. Available information on the actual participation and experiences of women in science is surprisingly sparse as it is in the field of statistics. This was acknowledged in a special 1994 issue on “Women in Science” (Science 1994). The special issue compared the representation of women in various scientific fields among some 40 countries. Industrial and developing countries, as well as countries in transition where the status of female scientists and their participation in science had been traditionally very high, much higher than in the richest market economy countries, were included in the international comparison and country analysis.

Figure 1 shows the percentage of women working in university physics faculties for 31 countries based on a survey sent out to 1,000 university physics departments throughout the world by Jim Megaw, Chairman of the Physics Department of York University, Ontario, Canada.

Figure 1.
PERCENTAGE OF WOMEN IN UNIVERSITY PHYSICS FACULTIES: 1991

The results were unexpected, showing that some of the most industrialised countries had the smallest percentage of women physics faculty, and seemed to contradict stereotypes about national cultures and how they treat women. The 10 countries with the largest female physics faculty percentage included three Mediterranean countries, Portugal, Italy and Turkey (with Spain and France in 11th and 12th place); three Asian countries, Philippines, Thailand and China; three Eastern European countries, Hungary, USSR, Poland; and Brazil. By contrast, the countries with large physics establishments, high levels of industrial development, and strong women’s rights movements provided six of the 10 countries with the smallest female physics faculty percentage: Canada, Germany, Norway, USA, UK and Netherlands. Clearly, data like these indicate that culture is a powerful influence on how well women do in science in general as well as in statistics in particular. The Mediterranean phenomenon of higher percentages of women ISI members is also observed in the scientific professions. What do these statistics tell us?

A similar finding came out of a survey that was undertaken by the International Astronomical Union about its percentage of women members. Figure 2 shows the comparable data for 24 countries. The third of the countries with the largest women’s participation consisted again of three Mediterranean countries, this time France, Italy and Spain; two East European countries, Russia and Ukraine (with Poland in 9th place); but in this case as many as three Latin American countries, Argentina, Mexico and Brazil. The “worst” eight countries included five of the highly industrialised, large scientific community, strong women’s rights movement countries, Germany, Sweden, Australia, Canada, UK (with Netherlands and Denmark just behind).


Both surveys show that Mediterranean and Latin American countries have a higher female participation in the scientific professions than the Northern European and Anglo-Saxon countries. Interestingly enough, Latin America and the four Western Mediterranean countries had the highest percentage of women ISI members of any region. In this connection, university enrolment data in UNESCO’s World Education Report and the UNESCO Statistical Yearbook show that the female enrolment in the natural sciences, mathematics, etc. is proportionately higher in the Mediterranean countries of Portugal, Spain, France and Italy than it is in Northern Europe or North America. A priori one would expect that women’s participation in science professions would be higher in the countries in which these professions are considered world leaders; in which these professions were developed and where they have existed for a longer time, e.g. in North America, Northern Europe. However, the facts are otherwise as is illustrated in the findings in Figures 1 and 2. What is behind these surprising differences?

A Portuguese researcher, Beatriz Ruivo, found that in newly emerging economies in Latin America and Eastern Europe women made up 20 to 50% of the scientific researchers as opposed to fewer than 10% in the United States and Northern Europe (as reported by Baringa 1994). Her speculation was that the large entrenched systems in advanced countries had been established when women were not in the labour market in large numbers and that men had become accustomed to a workplace without women and actively blocked them from coming in. Personal experience confirms this. I liked chemistry and physics in secondary school and thought seriously of pursuing a career in chemistry. I happened to have a family friend who did
professional recruiting for the chemical industry and his advice was to forget chemistry because “the men didn’t like women in the labs; it made them feel uncomfortable” (I took his advice). Countries like Portugal and Spain and countries in Latin America were building their science sectors at the same time as women entered the labour market in large numbers and Ruivo posits that there was therefore more acceptance since the profession had not had time to become entrenched.

Surprisingly, science is a low-status and low paying profession in many countries, for example, Eastern Europe and the countries of the former Soviet Union (Carlson, 1995). Shobhana Narasimhan, a physicist at Brookhaven National Laboratory saw this situation when she was growing up in India. While women are well represented in Indian science, there are few women in engineering, which is a more prestigious and higher paid profession than basic science.

In Latin America the evidence is mixed. Engineering and hard sciences remain predominantly “male” professions, while women often choose professions which are extensions of their traditional domestic roles, like university teaching (Rico, 1997) and in Latin America the “feminization of universities” has been observed. Others attribute the concentration of women in academia to lower university salary structures while male counterparts have more access to higher paying private sector jobs (Katz, 1999). Although women have entered the labour market in huge numbers in the last 25 years, in general terms wage gaps persist which are higher at higher educational levels (Arriagada, 1998). On the other hand, social class often counter-balances gender among Latin American elites. Elite class networks give women access to high positions and prestigious jobs. Women are sensitised through their upbringing and their education in all-girls schools to believe that they can achieve whatever they want in society, including entrance to the scientific professions. “In certain countries the pecking order is rich men, poor men, rich women, poor women; and in other countries it’s rich men, rich women, poor men, poor women. (Oey, 1994)”.

Whatever the cultural pattern or class privilege, the education system has to be able to deliver qualified prospects, be they men or women. This means taking a lot of science and mathematics courses at school. A lot of exposure to science and mathematics at school not only prepares girls for the possibility of a scientific occupation; it gives them sustained exposure in a non-competitive setting to these subjects, providing a chance to discover them. Owona Sakrejda, a Polish-born physicist now working in the United States, supports this view and thinks that the high number of women researchers in former communist countries is in part due to educational policies requiring both boys and girls to study mathematics and science through secondary school, which gives students the chance to see whether they like the subjects and excel in them, and meanwhile they learn them. In the United States, by contrast, mathematics and science are not compulsory subjects but optional. It is easy to get out of them and peer pressure, from both girls and boys, can persuade girls to stay away from mathematics and science because they have a reputation for being tough courses and are not considered girls’ subjects in some schools. Countries in which mathematics, science and foreign languages are compulsory courses throughout secondary school, with science subjects being taught in progressive courses at every grade
level, have been able to attract more girls and women to science than countries in which these courses are elective.

A major reason given for Italy's excellent record in awarding advanced degrees in science and mathematics to women is the educational policy in Italy of mandatory mathematics and science classes combined with a policy of teaching all science subjects every year. Another reason put forward is the higher proportion of all-girls secondary schools in Italy and Megaw has argued that all-girls schools benefit the attitude of girls to science. All-girls secondary schools in Catholic countries as Italy, Spain, and Portugal, as well as in Latin America, are more common than in non-Catholic countries. Megaw's international survey (1991), of over 400 physics departments confirmed that women were better represented as both students and faculty in predominantly Catholic countries, meaning an advantage for southern European and Latin American countries. A 1992 survey of the British Institute of Physics found that nearly 60% of its women members had attended all-girls schools compared to a national figure of only 13% of women having attended all-girls schools. It is much harder for a scientific subject to get a reputation for being unfeminine if the only pupils in the school taking the scientific subjects are girls.

Once in the workplace, family-friendly societies help women to manage the demands of science and the demands of family responsibility and keep women in science. Whereas in the United States childcare is a major problem for working mothers in highly demanding professions, in other cultures—Latin American, Southern Europe, China—working women are much more likely to have childcare and other support from family members, household help, still traditional in many countries, and affordable daycare. In North America and Northern European countries extended daycare is often prohibitively expensive and family support systems are less common since the extended traditional family is less common, families are dispersed, and other female family members are more likely to also be out in the workplace. Another factor, at least in the United States, is the notion of self-dependence, independence where families feel that family responsibilities are kept within the nuclear family and where mothers of working women do not feel automatically obliged to look after the grandchildren. By contrast, in China where the work demands are also intense, families often leave their child in the hands of the parents, sometimes not only a daycare situation but as a permanent arrangement.

The European Union International Workshop on Women and Science in 1993 concluded that three rules govern the distribution of women in science, and these rules would seem to apply equally to the distribution of women in statistics. First, the number of women pursuing careers in scientific and technical disciplines is small in relation to the number trained in such disciplines. Second, there is a disproportionate presence of women among disciplines: more women are in the biological sciences than in mathematics and physics. Third, the higher one goes in any scientific hierarchy the lower is the percentage of women. The Mediterranean phenomenon, already touched upon with respect to women in statistics professions, was also noted within the European Union in science where it was observed that there was a "North-South" divide with the South countries having higher percentages of women at all levels in the scientific profession. Furthermore, in Northern Europe the absolute figures for women scientists had remained static whereas in USA, by contrast, the figures had increased.
VII. WOMEN AND DECISION-MAKING AT SENIOR LEVELS

In preparing for the European Preparatory Conference and the Fourth United Nations World Conference on Women held in Beijing, in September, 1995, it was important to understand the post-transition situation of women in the 27 countries of the Former Soviet Union and Eastern Europe. Since data were not available, a questionnaire on women and decision-making at senior levels was designed and issued, aimed at characterizing women’s participation in these countries as part of the overall analysis of women and gender in countries in transition (Carlson, 1995).

It was recognised that the political and economic transition that was taking place from communism and centrally planned economies to more democratic political systems and market-based economies had generated new problems for women. Although each of the countries was undergoing transition differently the general impact of transition on the status of women in most of the countries was clearly negative with growing rather than narrowing gender disparities.

A key factor in the empowerment of women—both directly and indirectly, through their decision-making roles—is their holding senior decision-making positions in public and private life. Many countries in the region had seen sharp decreases in the number of women in national parliaments (formerly the highest proportions in the world) and in politically appointed leadership positions, now that gender quotas had been discarded. This was a critical element of the Framework of Women’s Equity and Empowerment endorsed by the UNICEF Executive Board at its 1994 session.

With the exception of the number of women in national parliaments, data on these issues had not previously been collected and analysed in the region. This was a first effort in taking an objective look at the degree to which women were actively participating in senior national decision-making positions and in the senior ranks of professional life. Table 5 and the related analysis is based on the country responses. It can be seen the women are under-represented as well in key decision-making at senior levels. Statistics on women play an important role here: gathering, monitoring, and analysing statistics on the proportions of women holding key decision-making roles puts this important policy issue on the map and provides a concrete portrait of the low participation of women, underlying the urgent need for change. Having more women in key decision-making roles in the statistics profession could certainly affect the production of statistics on women and gender.
### Table 5
WOMEN AND DECISION-MAKING AT SENIOR LEVELS

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percentage of women in each category</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ALBA</td>
</tr>
<tr>
<td>Government ministers</td>
<td>0</td>
</tr>
<tr>
<td>Senior civil servants</td>
<td>-</td>
</tr>
<tr>
<td>Members of Parliament</td>
<td>5</td>
</tr>
<tr>
<td>Mayors</td>
<td>0</td>
</tr>
<tr>
<td>Judges</td>
<td>21</td>
</tr>
<tr>
<td>Directors of enterprises with more than 100 employees:</td>
<td></td>
</tr>
<tr>
<td>State owned</td>
<td>0</td>
</tr>
<tr>
<td>Privately owned</td>
<td></td>
</tr>
<tr>
<td>Heads of national banks</td>
<td>0</td>
</tr>
<tr>
<td>Manager of local banks</td>
<td>0</td>
</tr>
<tr>
<td>Senior members of the professions:</td>
<td></td>
</tr>
<tr>
<td>Legal</td>
<td>14</td>
</tr>
<tr>
<td>Medical</td>
<td>22</td>
</tr>
<tr>
<td>Scientific</td>
<td>6</td>
</tr>
<tr>
<td>Full university professors</td>
<td>28</td>
</tr>
<tr>
<td>Members of national academies of science</td>
<td>5</td>
</tr>
<tr>
<td>District heads of government departments:</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>8</td>
</tr>
<tr>
<td>Health</td>
<td>5</td>
</tr>
<tr>
<td>Social Security</td>
<td>35</td>
</tr>
<tr>
<td>Labour</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: B. Carlson, "Women and gender in countries in transition: a UNICEF perspective".

* Included within Social Security.

It was possible to construct a comparative table on the proportion of women holding senior decision-making positions for seven countries in the region although replies to broader questions were received from all 27 countries. The countries that are included in the table are Albania, Azerbaijan, Kyrgyzstan, Macedonia, Slovakia, Ukraine and the Federal Republic of Yugoslavia.
There was a fairly strong, consistent pattern among these countries. Presumably, this pattern would have been repeated in other countries in the region. It was one of very low participation of women in parliaments and in the top decision-making ranks of national administration; much higher judiciary participation; low financial and industrial management participation; high legal/medical/scientific professional participation; and, usually, a low participation in the management of local social services.

On the political side, only in Slovakia did women represent more than 10% in any of the three categories of ministers, members of parliament or senior civil servants. Similarly, only Kyrgyzstan showed more than 10% of mayors are women. However, in the case of judges, there was a completely different pattern: women made up more than 10% in every country, and in Macedonia, Slovakia and the Federal Republic of Yugoslavia, more than 50%. The high female participation in the judiciary and in the professions was a very valuable resource for empowering women in the region.

On the financial and industrial management side, the data were rather thin. It indicated a very low women’s representation among directors of enterprises and of national banks, but a little higher representation in directorships of local banks (where two of the four countries reporting showed women’s representation at above 20%).

On the senior professional side, representation of women in the legal, medical and scientific professions was strong. In only 2 of the 15 categories shown in the table, scientists in Kyrgyzstan and in Albania, was the representation of women below 10%, and in only four categories was it below 20%. On the contrary, in nearly half the categories it was above 40%. With full university professors, the percentage often dropped, but only in Azerbaijan did it fall below 10%. In three countries, Albania, Slovakia and the Federal Republic of Yugoslavia, it remained at around 30%.

As social services at the district level are concerned to a great extent with meeting the needs of women and children, it was surprising that women were not holding more of the senior administrative positions in these services, although the data were again limited. In education services, only Kyrgyzstan had more than 20% women. In health services, only Slovakia had more than 20% women. In labour services, no country had more than 20% women. Women’s representation was highest in social security services: the proportion of women holding these positions in Slovakia was above 80%.
STATISTICS RELATING TO WOMEN: HISTORY AND AIMS

1975. Mexico. First United Nations World Conference on Women; it established the necessity of improving the statistics relating to women.


1985. Nairobi. World Conference. This defined 39 key statistical indicators regarding the conditions of women in 172 countries.


1995. Copenhagen. The conferring of power on women is a crucial element of each strategy, which tries to resolve social, economic and environmental problems, and these should be regularly monitored.

VIII. ISI COMMITTEE ON WOMEN IN STATISTICS

"Women have been contributing to the development of statistical science ever since Florence Nightingale pioneered the recording and analysis of hospital data during the Crimean War, almost a century and a half ago. Today, women statisticians are entering the profession in increasingly large numbers, and they continue to work productively in all theoretical, applied and instructional areas of the discipline. Yet, by and large, women remain minor players in the field and rarely attain positions of prominence or leadership. In the International Statistical Institute (ISI), where membership is by election, only 9.2% of the members are women. There is no doubt that society’s traditional relegation of women to mainly domestic roles has contributed to this situation in the past. And the effect lingers on. Even in the academic arena, which has been a traditionally acceptable workplace for women and where I have spent my entire career, advancement in the profession was, and remains, a bigger challenge for women than it is for men. In fact, women’s inadequate representation in the ISI and its sections, which led to the establishment of the ISI Committee on Women in Statistics in 1995, is a reflection of women’s modest status in the profession as a whole. Over the past few years, the Committee’s contacts with statisticians around the world have provided an effective vehicle for the exchange of information, particularly with women statisticians in relatively isolated circumstances. As might be expected, this exchange has helped bring into focus various regional differences and issues, as well as common concerns—all being factors that continue to shape the Committee’s agenda. Above all, the Committee aims to bring about a better recognition of women’s potential in the field of statistics and lend support to qualified women statisticians in their bid for a more visible partnership in national, regional and international professional activities. We are convinced that, with enhanced participation of women at all levels of statistical activity, the profession will reap substantial benefits."

Mary H. Regier, Ph.D.
Chair, ISI Committee on Women in Statistics

The ISI Committee on Women in Statistics, which is a Committee of the ISI, was formally established during the ISI Beijing Session in August 1995 and held its first meetings at the ISI Istanbul Session in August 1997, under the chair of Professor Mary H. Regier of Case Western Reserve University, Cleveland, Ohio.
Initially, what had motivated the establishing of such a committee was concern among the ISI leadership over low female representation in the ISI and its Sections. The committee’s *Terms of Reference* reflect this concern and deal with a number of factors closely related to it:

- To promote and strengthen the representation of women statisticians in the ISI and its Sections.
- To help in providing opportunities for women members to assume active and visible roles in the ISI and other statistical associations.
- To collect information on women in the statistical professions in different countries and to facilitate the flow of information among women statisticians.
- To stimulate interest in statistics among women and encourage women in schools and colleges to study statistics.
- To support the compilation of statistics on women, with a view to generating relevant studies concerning women’s roles in the various activities in their countries.

The Committee members are:

*Barbara A. Bailar (USA)*, Senior Vice President, National Opinion Research Centre, Chicago, Illinois, USA.

*Lynne Billard (Australia/USA)*, University Professor and Professor of Statistics at the University of Georgia, Athens, Georgia, USA.

*Beverley Carlson (USA)*, Development Statistician, United Nations Economic Commission for Latin America and the Caribbean, Santiago, Chile.

*Lelia Boeri de Cervetto (Argentina)* Editor of the *Notas Sobre la Política Estadística en el Mundo* published by the Instituto Nacional de Estadística y Censos (INDEC), Buenos Aires, Argentina, former Director of Statistical Coordination, INDEC.

*Nanjamma B. Chinnappa (India/Canada)*, President of the International Association of Survey Statisticians (IASS) 1997-1999.

*Denise A. Lievesley (UK)*, Professor and Director, Institute for Statistics, United Nations Education, Culture and Science Organisation (UNESCO), Paris, France.

*Mary H. Regier (Lebanon/USA)*, Faculty member, Case Western Reserve University in Cleveland, Ohio, USA; Professor of Statistics, American University of Beirut, Lebanon.

*Susan R. Wilson (Australia)*, Professor and Head, Statistical Science Programme Centre for Mathematics and its Applications, Australian National University, Canberra, Australia.
At the 52nd Session of the ISI in Helsinki, Finland, the ISI Committee on Women in Statistics will present, for the first time, its own session of invited papers in the Scientific Programme, with an Invited Paper Meeting on “The Role of Women in Statistics in the New Millennium”. The following papers will be presented:

- *An Historical Perspective*, by Susan Wilson (Australia) and Lynne Billard (USA)
- *Increasing Women’s Participation in Statistics – Does it Matter?*, by Dennis Trewin (Australia) and Leonard Cook (New Zealand)
- Barbara Bailar (USA), Ivan Fellegi (Canada) and Pilar Martin-Guzmán (Spain) will be the discussants.

Following the committee’s first meeting in August 1997, work started on a new project whose aim is to arrive at what can be briefly described as "relative characterizations of women statisticians". This is a major study which is being carried out simultaneously by local teams in about 40 countries, and in which the characterizations are derived from information on both men and women statisticians in each country. At this stage, with very few exceptions, only members of the ISI and ISI Sections are included in the study, and the 40 countries currently participating in the project are among the 85 that have at least one woman member in the ISI family, and the only ones where the project coordinators have succeeded in setting up teams of volunteers.

Although a large number of variables can be recognized as relevant to a study of "characterizations", the information sought is being restricted - at least initially - to the following set of categorical variables: Field of Study, Sector of Statistical Activity, Level of Responsibility, and Income Scale. The information gathered is subsequently converted into 12 indicators in the form of ratios or proportions, thus protecting the confidentiality of information, and making it possible to eventually arrive at comparable country profiles. General information about each country is also being recorded and will be part of the country’s final report.

This ambitious project was initially proposed, and is being coordinated, by committee member Lelia Boeri de Cervetto. This General Coordination Group, functions entirely on a volunteer basis, as does the local coordinator in each country. Contact with local coordinators is maintained through the offices of Argentina’s Instituto Nacional de Estadistica y Censos (INDEC), which has provided the coordination group with office space, personnel assistance and communications facilities. Without this generous support by INDEC, and the dedication of the coordinators, this project would not have been possible.

An interim report on the project was presented to the committee at its business meeting in Mexico in September 1998. A fuller report, based on input from the participating countries through June 1999 and published by INDEC, will be presented at an open meeting of the CWS during the Helsinki session.
IX. COMMITTEE ON WOMEN IN STATISTICS MEETING ON
“THE ROLE OF WOMEN IN STATISTICS”

Why is it that women statisticians have a low participation in the ISI and its Sections and in the profession as a whole? What can the ISI family do to address this problem? The ISI Committee on Women in Statistics convened a Panel Discussion and Open Meeting on “The Role of Women in Statistics – Challenges for the ISI and its Sections” that was part of a global conference on Statistics for Economic and Social Development. The Mexican statistical agency, the National Institute of Statistics, Geography and Informatics, hosted the conference which was co-sponsored by the International Association of Survey Statisticians and the International Association for Official Statistics. The Conference took place in Aguascalientes, Mexico, in September 1998 and over 300 statisticians, representing some 70 countries attended. Latin America and the Caribbean was represented by participants from 15 countries: Argentina, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Guatemala, Jamaica, Mexico, Panama, Paraguay, Peru, and Uruguay.

The Committee invited a panel of distinguished statisticians to examine this question, bringing to it their respective perspectives, backgrounds, and experiences. Its panel of speakers represented diverse regions and statistical professions. The Committee was particularly concerned to focus on the role of women in statistics in the host region, Latin America and the Caribbean.

The speakers were:

- Dennis Trewin, Deputy Australian Statistician of the Australian Bureau of Statistics;
- Pilar Martín Guzmán, President of the Instituto Nacional de Estadística of Spain;
- Guadalupe Espinosa, Regional Coordinator of UNIFEM for Mexico, Central America, Cuba and the Dominican Republic; and
- Rosa Giaimo, Professor of Statistics, University of Palermo, Italy.

As a member of the Committee and co-organiser, I participated in the meeting and subsequently edited the contributions of the speakers, which appear below. These have been set into the broader context of a discussion on the current state of women in the statistical profession. We are also fortunate to be able to set the current situation into the historical context of the evolution of academic careers for women, over the last forty years, thanks to the work of Lynne Billard, another member of the Committee, who prepared a comprehensive assessment for the International Encyclopedia of Education (3rd ed.), 1997, which is presented earlier in this publication.
A. Barriers to Greater Participation of Women in Statistics

It is very important that we have diversity in the statistical profession if we are to make long term progress in the membership of the International Statistical Institute (ISI). We need diversity in a number of ways:

- We need broad geographic representation
- We should have diversity of age, with young as well as older statisticians
- We need statisticians with different interests and specialised skills including those who prefer to work on theoretical and research aspects and those who have a practical bent
- Gender is another important dimension of diversity and is the topic of this paper

We should realise that change in the participation of women in statistics will not happen very quickly. It must evolve. It is important, however, to establish the right direction and this is the purpose of my remarks.

I will first discuss women in the statistics profession, then women in the ISI. My comments are based on:

- My personal experience in both the Australian Bureau of Statistics (ABS) and Statistics New Zealand (SNZ)
- Studies commissioned at the ABS as to why we have lost too many professional women

I should add that my experiences are based very much on an Anglo-Saxon culture and may not translate to other cultures.

We have had considerable success at both the ABS and SNZ at increasing the number of women in the senior professional ranks.

- 40% of SNZ managers are women
- more than 50% of recent promtees to senior positions in the ABS have been women although overall they remain in the minority (but this will change over time).

The particular aspect that concerns me is barriers. There are four major barriers.

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2 Dennis Trewin, Deputy Australian Statistician of the Australian Bureau of Statistics.
The most important barrier is that there are not enough people in the feeder groups. When you analyse promotions by sex, women are now getting somewhat more than their expected share of promotions. However, they are still in a minority in senior positions because there are not enough women in the feeder groups. This goes back to schools and universities where there are still not enough young women taking the mathematics and statistics option. There is certainly scope for collaboration between the national statistical associations and the universities on the marketing of statistics as a career.

There is another aspect to the feeder group issue. We have put additional effort into helping young women already in statistical organisations to increase their promotion potential. Possibly, the most effective step to achieve this is to ensure they have a range of working experiences that accelerate their learning experience, and this should include work in high profile areas.

The second barrier is the problem of keeping women in statistics. In Australia, after a good grounding in statistics, too many women are leaving for alternative disciplines, albeit disciplines that make significant use of statistics. We have researched the reasons for their departure at the ABS and the predominant reason is a perceived lack of opportunities for promotion. They perceive a barrier of predominantly male managers which is unlikely to change. By and large, young women seem to be more ambitious than young men or more willing to change organisations. This requires management to be more inventive in finding new challenges for more of these young women in order to keep them in statistics, as well as ensuring that there are sufficient opportunities for promotion.

The third barrier is a lack of understanding of the differences between the way a typical man and a typical woman work. On average, studies have demonstrated that women have a greater mind for detail and are better communicators. This can often be seen to be threatening or unhelpful by male-dominated cultures. On the other hand, women should not exhibit these desirable behaviours to such extremes that they are seen as dogmatic or uncontrollable chatterboxes. This barrier can be overcome if we continue to explain and demonstrate the value of diversity in management teams.

The fourth barrier is that many organisations do not have family-friendly staffing policies that:

- Recognise that women need to work from home occasionally because of their greater caring responsibilities in most families
- Allow staff members to work part-time hours (e.g. school hours)
- Provide for family care leave in situations of family illness
- Ensure easy access to child care facilities (perhaps in the same building)
Turning now to the ISI, women are under-represented by several measuring sticks. Only 9% of ISI members are women. This is considerably lower than in the ISI Sections even though it appears that women are also under-represented in the Sections. The percentage of women ISI members is also considerably lower than the percentage of women in the national statistical associations with which I am familiar.

I suspect it is not a problem of positive discrimination. At least, I have not observed that, although I am not in a good position to do so. There may be a more subtle form of discrimination. ISI is dominated by males and statisticians of the same sex tend to associate more frequently with each other. As a consequence, women statisticians may not be sufficiently well-known to male ISI members and therefore are not being nominated in sufficiently large numbers for ISI membership or participation in other ISI activities.

ISI needs to actively seek more women members by:

- Looking for potential members from the Sections
- Looking at senior women in national and international statistical associations, universities and research institutes
- Developing a country network of “women-sympathetic” ISI members with the specific task of identifying potential women members

Such a country network should include males who are actively promoting diversity. There are distinct advantages in having diversity in such a network.

The ISI could also adopt more family-friendly policies by arranging child-care facilities at their ISI Sessions, which should increase the participation of women with children. These facilities do not necessarily have to be subsidised. It would be a valuable service simply to provide ready access to a quality service in an unfamiliar country.

In summary, I think we can and should do more to increase the participation of women in statistics. The statistical profession will certainly benefit from the increased diversity. In fact, it risks becoming a group of modern-time dinosaurs if it does not. We must expect evolution rather than revolution, but it will not happen if we sit on our hands and simply wait.
B. The Presence of Women in Key Positions in Statistics

My comments are based on the experience of a very particular country, which is Spain, and being a woman, I also have a personal experience in this process upon which to draw.

I was the first Spanish woman to become a Professor of Economics, the first Spanish woman to become an ISI member, the first Spanish woman to become the head of the National Statistical Office. Let me make clear that this does not mean that I am a particularly brilliant person, it simply means that I started the race 20 years ahead of the others, so it is no wonder that I arrived in good time.

As is well known, owing to its recent political history, Spain has been a more conservative country than the other neighbouring European countries around us, so the massive incorporation of women into the labour force did not take place until the 1980s. For the few that studied in the sixties, and this is my case, there have been lots of opportunities and I simply took a few of them. That means that I had the experience of being sort of a foreigner and being a foreigner means that you are very conscious that you owe your position, your career to the established majority, which consists of men.

There have been a few men in my life, a few exceptional men, that trusted me at certain times and told me: “OK go ahead. I am sure you are able to do it as well as a man”. And that has changed my life. What I want to bring up, as a first point is that our future, the future of women’s careers is mostly in the hands of men. Men are the ones that we have to convince and that we have to show we can do something interesting.

I think that the presence of women in statistics is increasing a lot all around the world. Since I took office, considering how late Spanish women have been incorporated into the labour force, I can see that the proportion is growing, and growing every year. This is not reflected in the ISI because the ISI is in many ways a senior statisticians’ organisation, more than a general statisticians’ organisation. We are not so well represented in the ISI because very few of us are at the top of the ladder. There are more and more senior women that are deputies in statistical offices, but very few of them are at the top. I have been reflecting on the reasons why this is the case. I put forward two hypotheses.

The first hypothesis is that we have a different leadership style from men, because we have been trained to raise a family, because we have been expected to create a good atmosphere around us, we hate being authoritarian, we hate being rough, we want to share leadership, and we put a lot of effort into creating a good working atmosphere around us. That is a sort of revolution and society is usually conservative and is afraid of revolutions. People say, “Oh, if we put a women here, and oh, what a mess she is going to create”. She will ask for opinions from everybody. She will take lots of time in meetings. She is going to turn everything upside down.

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3 Pilar Martín Guzmán, President of the Instituto Nacional de Estadística of Spain.
Well, this is something that has to be changed with time. The new theories on leadership say that participatory leadership is far more efficient than the authoritarian leadership, so maybe women are the leaders of the future. Let us hope so.

The second hypothesis is that, and this is my personal opinion, that men are more ambitious than women, and this creates a major difference. When a man is occupying a certain job or post he is trying to do well but at the same time he is looking at the next rung on the ladder. Men are constantly planning their careers, because they want to reach the top. I do not think that it is the general case with women. I think that, because women have been educated to service to the family, giving satisfactory service to society, giving a good service to society is more rewarding for women than climbing up the career ladder. When men plan their careers they are more successful than women in getting to the top.

What can be done? The solution is not one of revolution but of evolution. That is very clear to me. I should add something else. I am against any explicit or implicit quota. I think fixing a quota will mean that women will be promoted not because of their personal capacities, but because they are women and that I find extremely humiliating.

Well, what can we do? We can create a state of opinion. We can increase the number of exceptional men that trust women. We can say to men, “OK, we are good deputies”. We are working hard when we are given an appointment. In fact, we work twice as hard as men do because we know that to keep men’s standards we have to do even better than them. As we are not as ambitious, we are excellent deputies because we will never put your position at risk, we are not a liability to you. But we have some things to give. We have a new style of leadership to offer, so give us a try, give us the opportunity, let us show what we are worth.

The question is “Should we become more ambitious, should we become as ambitious as men?” I do not think so. I think it is no use to occupy men’s jobs, just to do the same as men. The interesting thing is that we can do something different so we should remain different. We should concentrate on our work and do it well and not think so much of promotion but of service. I think this is our opportunity to enrich the world for everybody.
C. Women Count: Making Gender Visible In Statistics

The drastic economic and social changes that have taken place in recent years have highlighted the need to reconsider the traditional way in which development processes have been viewed, and the new role being played by women. Relationships between men and women, both at the domestic and non-domestic levels, should be reconsidered and viewed from a different perspective. There is a need to plan policies within the new framework of relationships, based on statistical information on the different conditions facing women in comparison to men.

1. The role of statistical data in reflecting the reality of a situation

This need has led researchers to study the role that statistical production could play to reflect the changing situation, and see the differences that some indicators reveal when information is broken down by sex. For example, it has already been shown (Hedman, Perucci & Sundstrom) that an indicator such as illiteracy among women has a series of underlying causes that can also be measured and that reflect the circumstances in which illiterate women live. A study of the underlying causes could help in designing policies aimed at addressing specific problems and the problem of female illiteracy rates could be approached from a gender perspective.

In general terms, statistical production in Latin America has improved substantially. Some statistical sources have even reached a high level of sophistication, particularly in countries such as Mexico, Cuba, Brazil and Chile. Although some countries have undertaken a critical review of their statistical production, there is still strong resistance, however, in our region to carrying out a comprehensive critical revision from a gender perspective. Such a revision would enrich data production through the use of new indicators covering the specific conditions governing women’s lives in comparison to men’s.

2. Statistical production: a male framework?

The importance of reviewing the way statistics are produced is shown in the findings of a recent study by the ministries responsible for the status of Canadian women, which shows that commonly-used approaches to policy planning, especially as regards economic decisions, are based on male experience and male standards. At present, such standards are dominated by male-oriented value systems which often have little bearing on women’s experience and which maintain traditional economic and social divisions (ILO 1998).

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4 Guadalupe Espinosa, Regional Coordinator of UNIFEM for Mexico, Central America, Cuba and the Dominican Republic.
More than ten years ago, in her book “If Women Counted”, Marilyn Waring had already drawn attention to that issue: “... hand in hand with the dismissal of the environment, came evidence of the severe invisibility of women (in the system of national accounts) and women’s work. For example as a politician, I found it virtually impossible to prove —given the production framework with which we were faced— that childcare facilities were needed. “Non producers” (housewives, mothers) who are “inactive” and “unoccupied” cannot, apparently, be in need. They are not even in the economic cycle in the first place. They can certainly have no expectation that they will be visible in the distribution of benefits that flow from production”. It has now become clear that there is not only a need to make women statistically more visible, but also to draw up better overall indicators of women’s health, labour, education, etc.

A comprehensive revision of data generation methods requires the active participation of data producers and users alike. One user that is of fundamental importance is the government office in charge of women’s issues, since it is responsible for designing strategies and establishing priorities, as well as following up and evaluating policies aimed at improving women’s lives. Organising joint workshops for users and producers of statistics would therefore have the double advantage of sensitising data producers to gender considerations on the one hand while, on the other, training users to shape their information needs in keeping with data generation possibilities. However, including both statistics users and producers in the revision and sensitising process is largely meaningless without the political will needed to bring about changes in the way statistics are generated, and the corresponding investment in human and material resources.

By and large, statistical production is still based on the traditional models of society, and the current requirements of gender data respond to the need for a model of society based on different characteristics. Users’ demand for gender data is mostly motivated by persons who need information in order to promote changes in value systems in accordance with the new circumstances. But how this can be brought about when in statistics on households, for example, women are only partly visible: women “do not work”; heads of households are predominantly male, and everything else in a household is characterised on that basis. In many countries, all the questions in agricultural censuses are addressed to the male owner of a unit, (in Spanish, the question asked is “Who is the propietario” instead of asking “Who is the propietario o propietaria?”), and there are many other examples of this kind.

3. Required commitments

There is a need, above all, for political will to recognise the new role played by women in society. There must be a commitment to plan and design policies aimed at providing new opportunities for women, which must not only take into account the specificity of the new circumstances in which women and their families live, but must also promote their participation in the planning and decision-making process. Political will is also expressed by investing resources, both human and financial, in implementing the necessary measures; signing cooperation agreements within an institutional framework is of fundamental importance.
There is also a need for a commitment on the part of institutions that generate regular statistics to draw up administrative records of the factors that affect women’s and their families’ lives, e.g. health, education, housing, labour, political involvement, etc. The commitment of national statistics offices is the fundamental axis of a process of this nature, since a revision will be inconceivable if these institutions do not take the lead in examining the frameworks in which data are generated. Furthermore, the commitment will only be partial if women statisticians’ views —embodifying other women’s views as well— are not taken into account in generating data and designing instruments to measure the new circumstances affecting both women and men.

The proportion of women in executive and decision-making positions in national statistical offices in the region remains low. The area covered by the UNIFEM regional office in Mexico comprises nine countries: Costa Rica, Cuba, the Dominican Republic, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama. Only the Dominican Republic and Costa Rica statistical offices are headed by a woman.

Costa Rica, Cuba, and Mexico have provided UNIFEM with data on the participation of women in the national statistical office. In Cuba, women head 3 of the 7 departments reporting to the office of the General Director. The next decision-making level consists of area heads; 7 of the 14 areas are headed by women.

In Mexico, the Chairman’s office is in charge of 10 regional offices that provide INEGI services to different parts of the country, only one of which is headed by a woman. There are 7 general directorates, only one of which is headed by a woman; at the next decision-making level 8 of the 34 departments are run by women. The area that has cooperated the most in designing and following up policies aimed at women, the National Accounting, Socio-economic Studies and Prices Directorate, has 3 of its 4 departments led by women.

In Costa Rica, official statistics are generated by the Ministry of the Economy’s Statistics and Censuses Department, which is coordinated by a woman. The department is divided up into three areas (censuses and surveys, industrial statistics, and information dissemination), all of which are run by women.

It is no coincidence that women have been promoting proposals and following up the headway made by the national statistics offices that have made efforts, to develop a gender perspective. Hence the need to promote women with the necessary technical expertise in statistics to decision-making positions so that these efforts can be sustained and expanded.

A commitment from other information-producing agencies that generate regular statistics or keep administrative records is needed, since such records are of great value in understanding the specific situations in which women and their families live. It is important for these institutions to enter into agreements and conduct joint research to compare and standardise information, and disseminate and publish information.
A commitment from government offices that focus on women and government and non-governmental organisations devoted to improving women’s conditions is necessary, so that they can work together, in their role as users, with data-producing agencies. These organisations must accept that it is a mutual learning process. On the one hand, it requires an understanding of the characteristics, limitations and possibilities of statistical sources so as to draw up a rational demand for information. On the other hand it encourages criticism and the formulation of new concepts in order to broaden the possibilities of generating statistics with a gender perspective.

A commitment on the part of international organisations has already been secured, particularly from those involved in the Fourth United Nations World Conference on Women held in Beijing in September 1995. The Conference’s Action Platform included a commitment to improve information so as to provide a more objective assessment of women’s situations.

What is resulted from the commitments? Although they are still at a very early stage, the national statistical offices of Costa Rica, Cuba, and Mexico have tried, in conjunction with UNIFEM, to reach out to users that require information with a gender perspective and particularly those in government offices focusing on women. These efforts have taken the form of: users’ and producers’ workshops; publications containing indicators that highlight the most significant differences in gender conditions; the establishment of data banks for gender-based indicators; trials of methodologies that provide useful information for assessing household members’ activities, such as surveys on how women make use of their time, etc.

One specific effort that might serve as a model for cooperation that could be used in other countries is the “System of indicators to monitor the situation of women in Mexico”, which is being carried out with the cooperation of five United Nations agencies in Mexico under UNIFEM coordination. The aim of this project is to establish a system of indicators to monitor the situation of women on a regular basis. The system will be based on: existing information sources (censuses, administrative records and surveys); and documentary sources (reports, training programmes, etc.) that make it possible to follow up and assess the actions carried out by the National Programme for Women and present data in a format accessible to all kinds of users.

The main aims of the project are to: a) train PRONAM personnel in conducting the programme’s activities; b) sensitise statistics producers on the importance of including a gender perspective on generating statistics; c) train users of gender statistics to present a reasonable information demand; d) draft manuals for information producers; e) design the software needed to establish the information system; f) establish a set of indicators to follow up, analyse and assess the situation of women; and g) draw up a set of proposals to review and modify regular statistics that have a gender bias.

Although we are aware that similar efforts cannot be carried out in all the countries of the region, the most important aspect of this project has been to secure an institutional commitment, the investment of scarce financial resources, and excellent human resources —most of them women.
D. Stimulating Interest In Statistics Relating To Men And Women

This paper deals with the importance of statistics relating to men and women. Many factors have changed during the past twenty years and we are gradually advancing towards bringing the male and female world closer. Supporters of women’s rights have done much in this period to stir the conscience of people and to make them understand their importance. This growing awareness of women’s rights has provided a stimulus for a) the demand for better statistics; b) providing information about the way things are; and c) highlighting a global debate, especially in a series of world conferences.

The first World Conference on Women was held in Mexico in 1975, during which the necessity to improve the statistics relating to women was established. There were many discussions about women during the United Nations Conference on the Environment, in Rio de Janeiro in 1992. The Non-Governmental Organisations (or NGOs) exerted much pressure to underline the relationship between female issues and sustainable development.

In the Action Programme in the Conference on Population and Development, in Cairo in 1994, it was agreed that sustainable development is incompatible with a high rate of demographic growth, found in many regions in the world. This Programme indicated that women must participate on an equal footing as regards human development, economic growth and environmental development in order to arrive at a lower rate of demographic growth and sustainable development.

It was explicitly declared that giving power to women and improving their status are essential elements of realising the maximum potential of development. This transfer of power as an important aim in its own right has subsequently been confirmed. As women gradually acquire this status, the same opportunities and rights as man, including guarantees about reproductive health and protection from male violence, the welfare of mankind will be improved.

The conferring of power on women, which constitutes a crucial element of the strategy to resolve social, economic and environmental problems was confirmed at the Conference on Population in Copenhagen in 1995.

1. Europe

The European Union (EU) has been one of the driving forces of change as regards the condition of women in society through EU legislation and measures. Some of the more important moments in this process of change involved the European Councils of Essen (1994), Cannes and Madrid (1995), during which it was confirmed that the promotion of equal opportunities between men and women is one of the top priorities in the EU.

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Even though more males than females are born, women make up 51.3% of the population in Europe, according to 1996 data. This is due to the fact that women have a higher life expectancy, that is 80.5 years compared with 74.0 for men. Women seem to be less subject to tumours and cardio-circulatory problems, both of which are among the main causes of death in Europe. The number of elderly women is growing rapidly. Many of these live alone and in precarious economic conditions. Not only childcare, but also care for the elderly, lies almost exclusively with women. In terms of supporting children and/or elderly parents, men tend to give economic and bureaucratic help whilst women’s contribution is more personal in nature.

The economic and social condition of women in the EU has changed a lot during recent decades. Women have acquired an ever more important role in the world of work. Nuclear families with two incomes are on the increase as well as those defined as “nuclear families of workers”, in which all or the majority of members of the family are permanently active in the world of work. This obviously correlates with ever more wide-ranging social phenomena, such as the decrease in birth rates, the fact that families have become less numerous, an ageing population, etc. All these phenomena have strongly influenced the nature of the presence of women in economic life and vice versa. Women in modern times are less involved in assisting the family than in the past.

The condition of women in society varies widely in different parts of the EU, also depending on the type of social services which the state offers in supporting the family. Where provision for childcare is lacking, such as in the case in southern Europe, the number of working women is notably less.

Teaching posts throughout the countries of the EU are in great measure occupied by women, reaching 70% of the total posts in Italy and Portugal. Does this situation represent a free choice, which may reflect a possible “natural” predisposition by women to fill particular roles, or the lack of any alternative? Men and women do not work in the same sectors. For example, fewer women work in judicial, medical and accounting position. Female occupations are concentrated in the service sector (79%), and have decreased in both the industrial and agricultural sectors.

The rate of female unemployment is higher than the male rate in all member States of the EU, except in Austria, Sweden and the United Kingdom. The greatest differences in unemployment rates can be found in Spain (there is a 11.8% gap between the rate of male and female unemployment), Greece (9.4%) and Italy (6.9%). Concerning long-term unemployment, this is increasing both among women and men. In 1990, 41% of unemployed women had been without work for more than a year and in 1996 the percentage had already exceeded 50%.

These statistics are underestimates because only a small proportion of unemployed women enter their names on employment registers. Furthermore, many women undertake work of an irregular nature with variable hours and periods of work, all of which are not included in official employment statistics. A significant number are also engaged in unpaid work for the community or the voluntary sector, in work in the home and without a contract, and in family businesses.
Women are not well represented at the decision-making and management levels, and consequently receive lower salaries. Women occupy the lower part of the hierarchy in all sectors, even where they represent the majority of workers. In public administration, for example, women constitute 40% of the workforce but on average they hold only 10% of managerial positions and they are even less represented at higher levels. Amongst legislators and managers, women constitute a minority throughout the countries of the EU; this varies on average from between 20/30%, but in Italy the figure is barely 15%. Women may feel generally less motivated to assume well-defined roles of responsibility in top management, showing themselves instead to be more willing to taking a role in a more collective and pluralistic dimension. The truly female work model is mainly characterised by cooperation rather, than competition.

Another important current phenomenon is that of part-time workers. More than 30% of women in the EU work part-time as opposed to 5% of men, whereby permitting them to reconcile work commitments with dependants’ needs. Part-time workers often have to make do with badly-paid jobs which require minimal specialisation and unfavourable working conditions. The highest rate for part-time work is found in the Netherlands and the United Kingdom (67% and 44% respectively) whilst the lowest rate is found in the southern European countries.

There is no doubt that women are a key factor in the growth of the workforce. In the EU, about 40% of the workforce is female. Women tend to move among employment, unemployment and inactivity more frequently than men. Undeclared employment and undeclared unemployment, involuntary inactivity, underemployment, irregular and precarious employment are major characteristics of women’s economic conditions.

Women have made great progress within the EU in the field of education and training in recent years, both regarding secondary school (where 101 girls for every 100 boys was recorded for the 1993-1994 scholastic year) and university (99 women for every 100 men). Girls tend to opt for general education as opposed to training for a job, the latter being still preferred by boys. The number of girls is twice that of boys in the Faculties of Arts, Applied Science and Religion whereas boys in the Faculties of Engineering and Architecture outnumber girls by 4 to 1.

Women are still for the most part as far from decision-making circles in the world of politics as they are in the world of work. Female ministers make up between a third and half of the total in the countries in northern Europe, which is much higher than in other countries. However, ministries assigned to women do not vary; they are the Ministries of Social Affairs, Education, Culture, etc., with the sole exception of Finland.

Traditionally in the workplace, the family was considered a handicap for working women. Now, women are pointing to their skills and responsibilities in the family as a positive experience to bring to their jobs in the workplace, especially managerial jobs. Organisational, planning, and negotiating skills learned in the family are some important assets of good managers and are being increasingly recognised.
2. Other regions

The level of education for girls is improving and the literacy rate has increased in recent decades to a level of at least 75% in many countries in Latin America, the Caribbean, and South-east Asia. But a high illiteracy rate for women continues to prevail in most of Africa and South of Asia and when it is high it is always accompanied by significant differences in the relative rates for men and women.

Important changes have occurred on a demographic level; many more women spend long periods of their lives without a partner and this fact has important repercussions on their economic condition and that of any children they may have.

In the poorest countries many women work in agriculture or family firms in which their contribution and economic participation is not recorded at all. In some countries, for example, India, Bangladesh and Pakistan, surveys on female activity have been conducted which show that more than half of the women living in rural areas are engaged in activities which are tied to agriculture and child-rearing.

In recent decades, urbanisation and urban growth have increased significantly throughout the world. In 1970, 37% of the world’s population lived in cities whilst today the percentage has increased to 45% and it is projected that it will rise to 50% by the year 2005. Urban life, however complicated and unhealthy it may be, often provides opportunities for women to escape from oppressive lives which can still be seen in many rural areas. Also, women have greater access to education and paid work in extensive but degraded urban suburbs as compared to underdeveloped rural areas.

In rural areas, the role of women is that of a manual worker, but without the wages which men receive. Women lack training, social status, property rights etc. Rural women suffer from the changing environment more than men. Rural areas in poor countries are often subject to environmental degradation and women are often the first to suffer because it is they who carry out activities, such as drawing water and gathering wood, which are most influenced by environmental deterioration.


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