

WOMEN AND SCIENCE: Review of the situation in Estonia

A. Background

Estonia is situated on the Baltic Sea with a population of 1.46 million, and a land area of 45 215 km². Estonia borders on Latvia, Russia, Finland and Sweden. Estonia's economic reforms can be characterised by its radical introduction of an open market-oriented economy.

The management of basic science and university research is the responsibility of the Ministry of Education, with the management of innovation being conducted by the Ministry of Economic Affairs.

In the field of research and development, the main advisory body to the government is the Estonian Research and Development Council. The Estonian Academy of Sciences, as a non-governmental body, is a unifying organisation on scientific competence. The Estonian Science Foundation, Innovation Foundation and Science Competence Council are involved in the financing of RTD.

The major objectives of Estonia's RTD policy are to:

- improve the quality of teaching and research
- develop a national innovation system, and an information and knowledge-based society
- increase co-operation between the R&D sector and private enterprise, and to promote technology-based small and medium-sized enterprises
- orient RTD more towards the RTD priorities of the European Union, and to participate actively in European research and development co-operation

Among Estonia's strong areas of scientific competence are: molecular biology and genetics; information technology; materials sciences and industrial technologies; laser optics and technologies; environmental sciences; marine sciences (focused on the Baltic Sea), humanities.

Estonia is a full participant in the EU *5th Framework Programme*.

RTD infrastructure: The vast majority of RTD is performed in universities and state research institutes. University research is concentrated mainly at the University of Tartu, Tallinn Technical University and the Estonian Agricultural University. In 1996-1998, the former research institutes of the Estonian Academy of Sciences were integrated with universities. In 1996, Centres for Strategic Competence were established at the University of Tartu and Tallinn Technical University in the fields of biotechnology, information technology, materials science and environmental technology. The major state research institutions are: Estonian Biocentre, Institute of Chemical Physics and Biophysics, Tartu Observatory, Estonian Institute of Cardiology, Estonian Marine Institute, Institute of Estonian Language.

Complete information on Estonian research institutes and universities is available on the Internet: <http://www.femirc.ee/English/teadusinfo.html.en>

B. Statistics

a) problems in statistics

- Estonia regained its independence in 1992. Since then, the Statistical Office has been working on upgrading statistics collection and analysis according to Eurostat requirements. Consequently, statistics from the early 1990s are often incomplete, particularly regarding research.
- the reorganisation of research since 1996 (from Academy of Science based institutes back into the universities) has made statistical comparison difficult
- 1998 was the first year that R&D statistics were collected from the private sector.
- the role of the private sector in research is increasing, but is still modest due to the fact that the private sector is so new (since 1992)
- R&D statistics is available from the following sources: Statistical Office, Ministry of Education and the Estonian Science Fund (regarding grants).
- the low numbers involved (due to Estonia's small population of 1.4 million) make it difficult to undertake meaningful analysis.
- One of the proposals to address the restricted availability of relevant statistics is the preparation and analysis of a questionnaire for women in research (cf. Finnish questionnaire and report), which could be done as a research project co-ordinated by, for example, Tallinn Technical University. There has also been discussion regarding extending this proposal into a Baltic project, with participation by Estonia, Latvia and Lithuania.

b) baseline statistics

Sources:

Statistical Office of Estonia, Ministry of Education and Estonian Science Fund

1. Higher education enrolment (by gender and scientific discipline), 1996-1999

1996/97 - enrolment

	Total	M	F	%F
Diploma Courses	7 772			
Engineering	604	544	60	9,4%
Natural Science	107	63	44	41,1%
Mathematics & Comp Sc	-	-	-	
Medicine & Public Health	464	22	442	95,3%
Bachelor Courses	18 770			
Engineering	4 226	3395	831	19,7%
Natural Science	560	330	230	41,1%
Mathematics & Comp Sc	361	217	144	39,9%
Medicine & Public Health	955	263	692	72,5%
Master Courses	2 803			
Engineering	373	321	52	13,9%
Mathematics & Comp Sc	58	22	36	62,1%
Medicine & Public Health	425	103	322	75,8%
Natural Science	218	125	93	42,7%
Doctor Courses	727			
Engineering	70	57	13	18,6%
Mathematics & Comp Sc	23	11	12	52,2%
Medicine & Public Health	252	75	177	70,0%
Natural Science	184	122	62	33,7%

1998/99 - enrolment

	Total	M	F	%F
Diploma Courses	14 997			
Engineering	979	856	232	12,6%
Mathematics & Comp Sc	126	87	39	31,0%
Medical Sc & Public Hlth	1 210	60	1150	95,0%
Natural Sciences	187	86	101	54,0%
Bachelor Courses	21 731			
Engineering	4 589	3509	1080	23,5%
Mathematics & Comp Sc	671	445	226	33,7%
Medical Science & Public	965	270	695	70,0%
Natural Sciences	714	384	330	46,2%
Master Courses	2 822			
Engineering	317	257	60	18,8%
Mathematics & Comp Sc	80	40	40	50,0%
Medicine & Public Health	208	42	166	79,8%
Natural Sciences	204	99	105	51,5%
Doctor Courses	1 071			
Engineering	110	84	26	23,6%
Mathematics & Comp Sc	43	21	22	51,2%
Medicine & Public Health	403	282	121	30,0%
Natural Sciences	208	130	78	37,5%

2. Higher education graduation (by gender and scientific discipline), 1992-1999

1992/93 – graduation

	Total	M	F	%F
Diploma Courses	116	20	96	82,8%
Engineering				
Mathematics & Comp Sc				
Medicine & Public Health				
Natural Sciences				
Bachelor Courses	3 982	1 976	2 006	50,4%
Engineering	880	784	96	10,9%
Mathematics & Comp Sc	66	25	41	62,1%
Medicine & Public Health	231	64	167	72,3%
Natural Sciences	108	62	46	42,6%
Master Courses	104	49	55	52,9%
Engineering	6	6	-	-
Mathematics & Comp Sc	7	3	4	57,1%
Medicine & Public Health	1	-	1	100,0%
Natural Sciences	14	11	3	21,4%
Doctor Courses	1	1	-	-
Engineering				
Mathematics & Comp Sc				
Medicine & Public Health				
Natural Sciences	1	1	-	-
Total	4 203	2 046	2157	51,3%

1993/94 - graduation

	Total	M	F	%F
Diploma Courses	310	32	278	89,7%
Engineering				
Mathematics & Comp Sc				
Medicine & Public Health				
Natural Sciences				
Bachelor Courses	2 772	1 235	1 537	55,4%
Engineering	576	475	101	17,5%
Mathematics & Comp Sc	33	11	22	66,7%
Medicine & Public Health	284	79	205	72,2%
Natural Sciences	92	43	49	53,3%
Master Courses	163	88	75	46,0%
Engineering	10	8	2	20,0%
Mathematics & Comp Sc	15	10	5	33,3%
Medicine & Public Health	6	1	5	83,3%
Natural Sciences				
Doctor Courses	9	7	2	22,2%
Engineering	1	1	-	-
Mathematics & Comp Sc	-	-	-	-
Medicine & Public Health	1	1	-	-
Natural Sciences	4	4	-	-
Total	3 254	1 362	1 892	58,1%

1994/95 - graduation

	Total	M	F	%F
Diploma Courses	455	87	368	80,9%
Engineering	14	14	-	
Mathematics & Comp Sc				
Medicine & Public Health	17	-	17	100,0%
Natural Sciences				
Bachelor Courses	2 546	1 062	1484	58,3%
Engineering	367	312	55	15,0%
Mathematics & Comp Sc	64	27	37	57,8%
Medicine & Public Health	234	69	165	70,5%
Natural Sciences				
Master Courses	325	123	202	62,2%
Engineering	17	15	2	11,8%
Mathematics & Comp Sc	15	10	5	33,3%
Medicine & Public Health	165	40	125	75,8%
Natural Sciences	41	29	12	29,3%
Doctor Courses	29	14	15	51,7%
Engineering	3	2	1	33,3%
Mathematics & Comp Sc				
Medical Sciences	16	5	11	68,8%
Natural Sciences				
Total	3 355	1 286	2 069	61,7%

1995/96 - graduation

	Total	M	F	%F
Diploma Courses	752	305	447	59,4%
Engineering	61	61	-	
Mathematics & Comp Sc	-	-	-	
Medicine & Public Health	14	-	14	100,0%
Natural Sciences	23	15	8	34,8%
Bachelor Courses	2 101	815	1 286	61,2%
Engineering	228	191	37	16,2%
Mathematics & Comp Sc	54	25	29	53,7%
Medicine & Public Health	195	47	148	75,9%
Natural Sciences	97	57	40	41,2%
Master Courses	410	154	256	62,4%
Engineering	14	8	6	42,9%
Mathematics & Comp Sc	10	2	8	80,0%
Medicine & Public Health	172	43	129	75,0%
Natural Sciences	48	29	19	39,6%
Doctor Courses	38	27	11	28,9%
Engineering	6	6	-	
Mathematics & Comp Sc	-	-	-	
Medicine & Public Health	15	5	10	66,7%
Natural Sciences	6	6	-	
Total	3 301	1 301	2 000	60,6%

1996/97 - graduation

	Total	M	F	%F
Diploma Courses	1 061	414	647	61,0%
Engineering	32	32	-	-
Mathematics & Comp Sc				
Medicine & Public Health	12	-	12	100,0%
Natural Sciences	22	14	8	36,4%
Bachelor Courses	2 094	814	1280	61,1%
Engineering	275	223	52	18,9%
Mathematics & Comp Sc	35	14	21	60,0%
Medicine & Public Health	187	40	147	78,6%
Natural Sciences	68	35	33	48,5%
Master Courses	618	236	382	61,8%
Engineering	22	21	1	4,5%
Mathematics & Comp Sc	11	6	5	45,5%
Medicine & Public Health	337	97	240	71,2%
Natural Sciences	60	29	31	51,7%
Doctor Courses	48	26	22	45,8%
Engineering	1	1	-	
Mathematics & Comp Sc	-			
Medicine & Public Health	29	14	15	51,7%
Natural Sciences	8	6	2	25,0%
Total	3 821	1 490	2 331	61,0%

1997/98 - graduation

	Total	M	F	%F
Diploma Courses	1 066	459	607	56,9%
Engineering	58	58	-	-
Mathematics & Comp Sc	-	-	-	-
Medicine & Public Health	13	-	13	100,0%
Natural Sciences	25	16	9	35,0%
Bachelor Courses	2 281	927	1 354	59,4%
Engineering	342	278	64	18,7%
Mathematics & Comp Sc	36	18	18	50,0%
Medicine & Public Health	170	42	128	75,3%
Natural Sciences	69	33	36	52,2%
Master Courses	586	225	361	61,6%
Engineering	44	36	8	18,2%
Mathematics & Comp Sc	14	10	4	28,6%
Medicine & Public Health	204	39	165	80,9%
Natural Sciences	62	39	23	37,7%
Doctor Courses	106	39	67	63,2%
Engineering	4	4	-	-
Mathematics & Comp Sc	-	-	-	-
Medicine & Public Health	73	17	56	76,7%
Natural Sciences	17	11	6	35,3%
Total	4 039	1 650	2 389	59,1%

1998/99 - graduation

	Total	M	F	%F
Diploma Courses	1 586	641	945	59,6%
Engineering	82	82	-	
Mathematics & Comp Sc	-	-	-	-
Medicine & Public Health	17	4	13	76,5%
Natural Sciences	24	11	13	54,2%
Bachelor Courses	2 639	1 075	1 564	59,3%
Engineering	403	324	79	19,6%
Mathematics & Comp Sc	56	25	31	55,4%
Medicine & Public Health	110	24	86	78,2%
Natural Sciences	67	32	35	52,2%
Master Courses	672	273	399	59,4%
Engineering	63	47	16	25,4%
Mathematics & Comp Sc	14	7	7	50,0%
Medicine & Public Health	164	39	25	76,2%
Natural Sciences	39	20	19	48,7%
Doctor Courses	135	66	69	51,1%
Engineering	9	7	2	22,2%
Mathematics & Comp Sc	6	4	2	33,3%
Medicine & Public Health	78	26	52	6,7%
Natural Sciences	24	20	4	16,7%
Total	5 032	2 055	2 977	59,2%

3. Female research staff in universities and research centres by level, 1998

	Total	Female	% Female
Full Professor			
<i>Professor</i>	447	71	15,9%
Associate Professor			
<i>Dotsent</i>	863	274	31,7%
Assistant Professor			
<i>Lektor</i>	813	441	54,2%
Assistant Teacher			
<i>Vanemõpetaja</i>	243	158	65,0%
Teacher			
<i>Õpetaja</i>	374	270	72,2%
Assistant			
<i>Assistent</i>	354	217	61,3%
Associate researcher			
<i>Vanemteadur</i>	232	76	32,8%
Assistant researcher			
<i>Teadur</i>	342	149	43,6%
Other (Incl. Extraordinary Prof.)			
<i>Erakorraline professor</i>	143	78	54,5%
Total	3811	1734	45,5%

4. Public research fund applicants and beneficiaries, by grant type and gender, 1993-2000

1993 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences			84	8 (9,5%)
Chemistry & Molecular Biology			47	6 (12,8%)
Biology & Geography			80	18 (22,5%)
Engineering			74	7 (9,5%)
Medical Sciences			68	27 (39,7%)
Agriculture			38	3 (7,9%)
Social Science			40	12 (30%)
Humanities			45	18 (40%)
All Projects			476	99 (20,1%)

1994 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	115	11 (9,6%)	99	9 (9,1%)
Chemistry & Molecular Biology	73	12 (16,4%)	60	9 (15,0%)
Biology & Geography	215	52 (24,2%)	139	35 (25,2%)
Engineering	183	17 (9,3%)	108	12 (11,1%)
Medical Sciences	174	68 (39,1%)	107	40 (37,4%)
Agriculture	123	24 (19,5%)	78	12 (15,4%)
Social Science	140	42 (30,0%)	77	19 (24,7%)
Humanities	120	52 (43,3%)	99	44 (44,4%)
All Projects	1 143	278 (24,3%)	767	180 (23,5%)

1995 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	123	10 (8,1%)	104	10 (9,6%)
Chemistry & Molecular Biology	92	17 (18,5%)	77	15 (19,5%)
Biology & Geography	223	56 (25,1%)	112	28 (25,0%)
Engineering	167	15 (9,0%)	122	15 (12,3 %)
Medical Sciences	181	83 (45,9%)	148	65 (43,9%)
Agriculture	141	30 (21,3%)	105	21 (20,0%)
Social Science	143	43 (30,1%)	102	33 (32,4%)
Humanities	141	60 (42,6%)	116	50 (43,1%)
All Projects	1 211	314 (25,9%)	886	237 (26,8%)

1996 - public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	128	14 (10,9%)	109	10 (9,2%)
Chemistry & Molecular Biology	97	19 (19,6%)	66	13 (19,7%)
Biology & Geography	165	35 (21,2%)	102	20 (19,6%)
Engineering	174	15 (8,6%)	131	11 (8,4%)
Medical Sciences	204	88 (43,1%)	138	54 (39,1%)
Agriculture	122	29 (23,8%)	90	20 (22,2%)
Social Science	136	42 (30,9%)	95	30 (31,6%)
Humanities	159	69 (43,4%)	117	49 (41,9%)
All Projects	1 185	311 (26,2%)	848	207 (24,4%)

1997 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	127	20 (15,8%)	114	15 (13,2%)
Chemistry & Molecular Biology	84	16 (19,0%)	74	14 (18,9%)
Biology & Geography	130	30 (23,1%)	96	22 (22,9%)
Engineering	162	18 (11,1%)	136	15 (11,0%)
Medical Sciences	177	68 (38,4%)	132	49 (37,1%)
Agriculture	106	26 (24,5%)	81	21 (25,9%)
Social Science	135	51 (37,8%)	97	33 (34,0%)
Humanities	174	78 (44,8%)	137	63 (46,0%)
All Projects	1 095	307 (28,0%)	867	232 (26,8%)

1998 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	122	16 (13,1%)	101	16 (15,8%)
Chemistry & Molecular Biology	88	15 (17,0%)	75	14 (18,7%)
Biology & Geography	135	32 (23,7%)	96	24 (25,0%)
Engineering	157	20 (12,7%)	143	18 (12,6%)
Medical Sciences	157	59 (37,6%)	120	41 (34,2%)
Agriculture	101	29 (28,7%)	82	24 (29,3%)
Social Science	131	53 (40,5%)	103	42 (40,8%)
Humanities	141	57 (40,4%)	121	49 (40,5%)
All Projects	1 032	281 (27,2%)	841	228 (27,1%)

1999 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	110	15 (13,6%)	97	11 (11,3%)
Chemistry & Molecular Biology	86	15 (17,4%)	80	14 (17,5%)
Biology & Geography	120	28 (23,3%)	95	22 (23,2%)
Engineering	159	27 (17,0%)	145	22 (15,2%)
Medical Sciences	140	53 (37,9%)	112	40 (35,7%)
Agriculture	90	27 (30,0%)	81	24 (29,6%)
Social Science	138	54 (39,1%)	109	44 (40,4%)
Humanities	148	55 (37,2%)	127	46 (36,2%)
All Projects	991	274 (27,7%)	846	223 (26,4%)

2000 – public research grants

	Total No. of Applicants	Applications by Women (%)	Number of Approved Grants	Grant Recipients Women (%)
Natural Sciences	104	15 (14,4%)	92	13 (14,1%)
Chemistry & Molecular Biology	86	15 (17,4%)	70	12 (17,1%)
Biology & Geography	105	26 (24,8%)	79	17 (21,5%)
Engineering	166	24 (14,5%)	129	20 (15,5%)
Medical Sciences	143	57 (39,9%)	101	41 (40,6%)
Agriculture	99	28 (28,3%)	82	23 (28,0%)
Social Science	139	60 (43,2%)	99	38 (38,4%)
Humanities	140	49 (35,0%)	111	38 (34,2%)
All Projects	982	274 (27,9%)	763	202 (26,5%)

5. Representation of women on boards on public research bodies and Academy of Sciences, 2000

	Estonian Academy of Sciences	Estonia Science Fund Council
Total Members	60	14
No. Female	1	4
% Female	1,7%	28,6%

6. Research and development financing by source of funds (incl. private sector), 1998

Source of Funds	Intramural R & D (%)	Extramural R & D (%)
Government Funds	7	2
Enterprises' Funds	84	68
Higher education sector's funds	3	-
Foreign funds	6	30
Total	100	100

C. In conclusion

As examples of the participation of women, academic staff statistics show that 15% of full professors are women, whereas 28% of senior lecturers are women. Looking at Estonia's major university, the University of Tartu, we can see that in the natural sciences and technical faculties, one-third of the researchers are women, whereas in social sciences, it is almost 50%. In medicine and humanities, the proportion of women researchers is greater: 55%. The University of Tartu has a female pro-rector (development activities), and the Academy of Sciences has a woman (astrophysicist) as Vice-President. Although more women than men graduate from higher education (60% female), fewer women than men go into research.

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