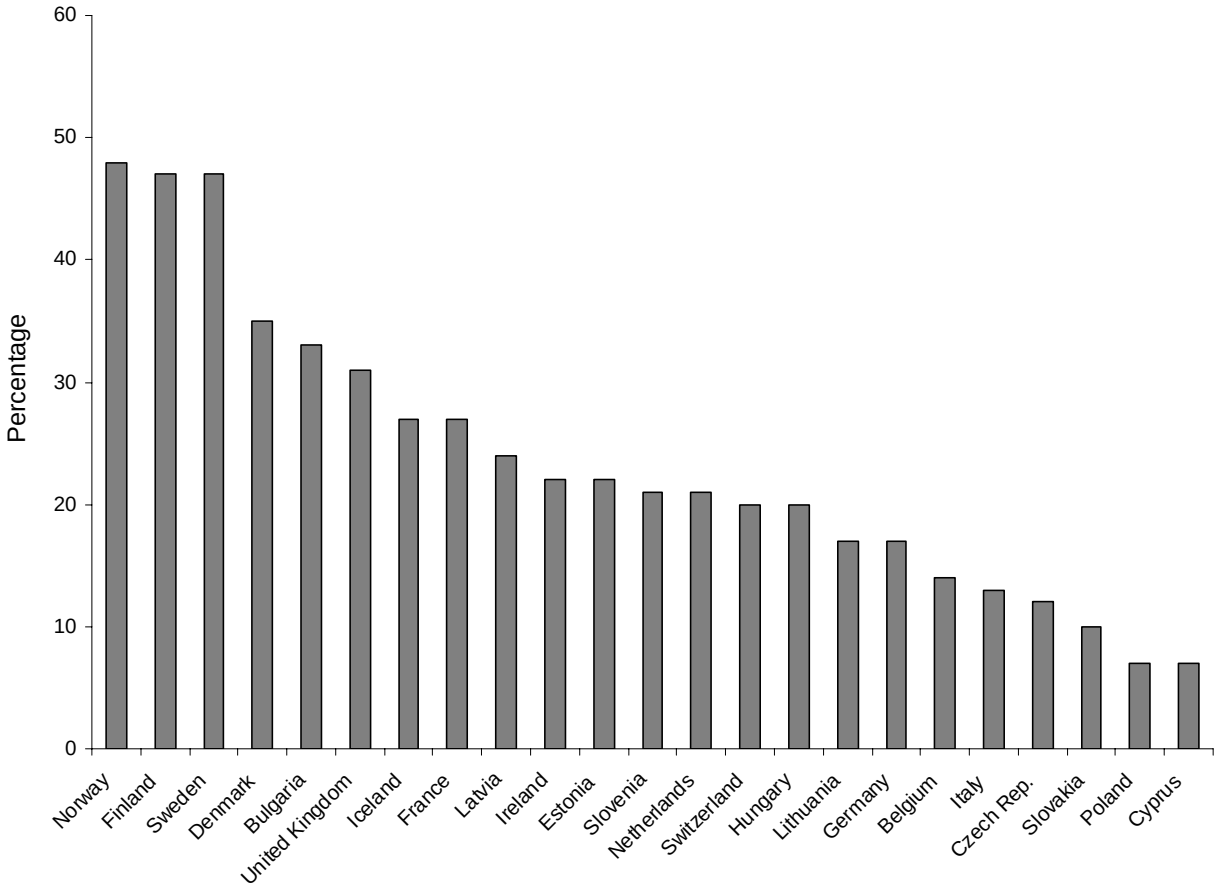
NAE Chapter 4 Figures

Figure 4.1 Proportion of women on scientific boards in EU countries in 2004[a)]. Source: adapted from: European Commission, 2006



[a)] Exceptions to the year of reference: FR, PL, SE: 2002; BG, IT, LV: 2003. Data for Belgium are for the French-speaking community only. To note: data collection differs in coverage and definitions between countries.

Figure 4.2 Public agricultural R&D spending trends (inflation-adjusted growth rates were calculated as weighted regional average, using the least-squares method described in World Bank, 2006). Source: Pardey et al., 2006.

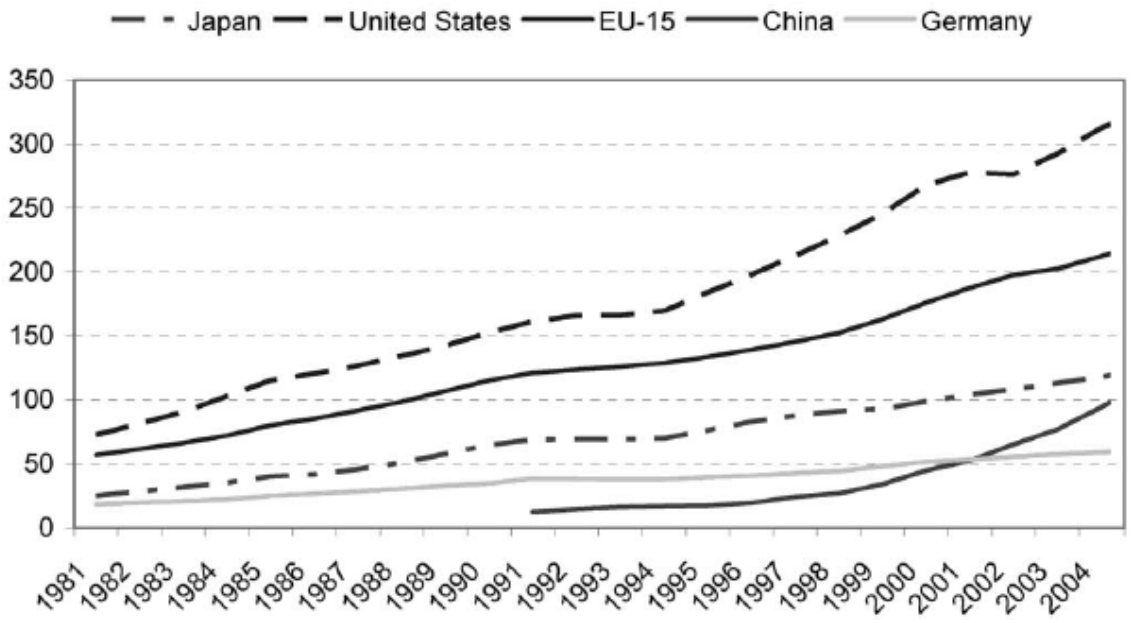


Figure 4.3 Gross domestic expenditure on R&D (billion current parity purchase price dollars). Source: OECD, 2006b

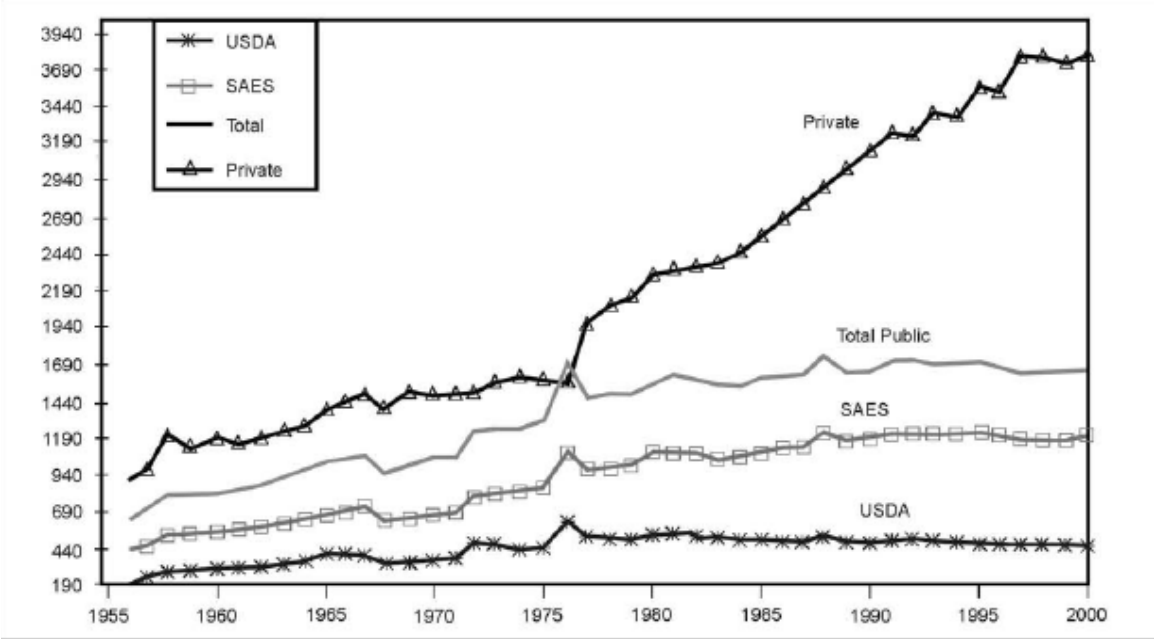
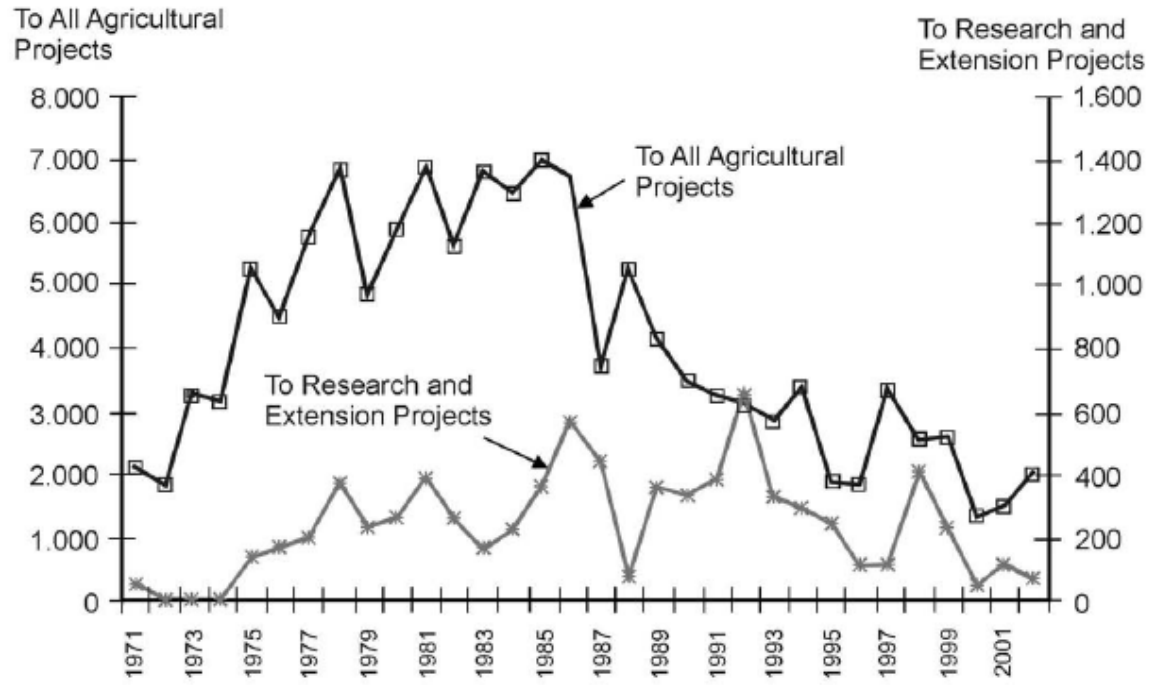


Figure 4.4 Funding for agricultural research in the US. Source: Huffman and Evenson, 2006.



*US (thousands of constant 1984 dollars; SAES=State Agricultural Experiment Stations)

Table 4.1 Percentage of female professors in university faculties (different ranks, all disciplines). Source: adapted from ETAN, 2000.

Country[a)]	Full Professor	Associate Professor	Assistant Professor	Year
Turkey	21.5	30.7	28.0	1996/7
Finland	18.4			1998
Portugal	17.0	36.0	44.0	1997
France	13.8	34.2		1997/8
USA	13.8	30.0	43.1	1998
Spain	13.2	34.9	30.9	1995/6
Canada	12.0			1998
Norway	11.7	27.7	37.6	1997
Sweden	11.0	22.0	45.0	1997/8
Italy	11.0	27.0	40.0	1997
Greece	9.5	20.3	30.6	1997/8
UK	8.5	18.4	33.3	1996/7
Iceland	8.0	22.0	45.0	1996
Israel	7.8	16.0	30.8	1996
Belgium (Fr.)	7.0	7.0	18.0	1997
Denmark	7.0	19.0	32.0	1997
Ireland	6.8	7.5	16.3	1997/8
Austria	6.0	7.0	12.0	1999
Germany	5.9	11.3	23.8	1998
Switzerland	5.7	19.2	25.6	1996
Belgium (Fl.)	5.1	10.0	13.1	1998
Netherlands	5.0	7.0	20.0	1998

a) Figures for Portugal include only academic staff performing R&D activities. The French-speaking and the Flemish-speaking parts of Belgium keep separate statistics.

Table 4.2 Types of participation in development. Source: Buhler et al., 2002.

Type of participation	Characteristic
1 Manipulative	A pretence (no real power). For example, the presence of 'people's' representatives on a board or committee, but who are outnumbered by external agents.
2 Passive	People told about a decision or what has already happened, with no ability to change it.
3 Consultative	People answer questions. The form of the questions and analysis of results is done by external agents.
4 Material incentive	People contribute resources (e.g. land. labour) in return for some incentive.
5 Functional	Participation seen by external agents as a means to achieve goals (e.g. reduced costs) usually after major decisions have already been made.
6 Interactive	People involved in analysis and development of action plans, for example. Participation is seen as a right and not just as a mechanical function.
7 Self-mobilization	People mobilize themselves and initiate actions without the involvement of any external agency, although the latter can help with an enabling framework.

Table 4.3 A comparison of agricultural higher education in the US and Russia. Source: Miller et al., 2000.

ISSUE	institution	RUSSIA
Curriculum	Determined by faculty at each institution	Approximately 75% set by federal governnment
Course content	Set by faculty at each institution	Centrally determined
Enrollment	Determined by market and campus	Quota determined centrally
Tuition	Set by individual campuses	Quota students free; above quota set by campus
Student/faculty ratio	Individual campus	System
Entrance requirements	Campus determined	Centrally determined
Greatest fiscal support	State governnment and tuition	Federal governnment
Links to research and extension	Inherent in land-grant system	No extension system and only weak links to research
Quality and applicability of education	Quality comparable, applied aspects greater	Quality comparable, lacking in application
Years of education	Comparable	Comparable
Senior project	Not required in most cases	Required

Table 4.4 Public and private agricultural R&D expenditure, circa 2000. Source: Pardey et al., 2006

	Expenditure (millions 2000 international dollars)			Share (%)		
	Public	Private	Total	Public	Private	Total
Developing Countries	93,7	6,3	13 688	12 819	869	100
Developed countries	44,8	55,2	22 767	10 191	12 577	100
Total	63,1	36,9	36 456	23 010	13 446	100

* Average annual growth rates calculated using the least-squares regression method, as described by World Bank, 2006. In 1981, private sector agricultural R&D spending was estimated to be $6,422 million, $9,930 million in 1991 and $12, 086 million in 2000 (2000 international dollars).

Box 4.1 Women in science in NAE. Source: ETAN, 2000

The presence of women in science has increased in NAE since the Second World War but they are still under-represented (ETAN, 2000). In the US women in academia began to make considerable progress in the 1970s through concerted protests, appropriate legislation and class action suits. Canada has also devoted considerable attention to the issue (ETAN, 2000). In Europe the issue of under-representation of women in science was taken up first in the Nordic countries in the early 1980s, particularly in Finland and Sweden (ETAN, 2000). More attention was paid to this issue at EU level in the late 1980s. For example, the European Parliament's *Resolution on Women and Research* from 1988 stated that "the under-representation of women in academic life is a highly topical problem and calls for practical incentives" and called on Member States to "promote positive measures to further the presence of women at the highest levels in universities and research institutes" (ETAN, 2000). However, although women now constitute about half the undergraduate population they still play a minor role in decision-making concerning scientific policies and priorities in many NAE countries (Table 2, Figure 2.) (ETAN, 2000). The proportion of women in senior scientific positions is small as there is a continuous drop in the numbers of women at each level of the academic ladder and many highly trained women are lost to science. In 2004, the proportions of female in the highest senior grade in some AKST-relevant fields of science in EU25 were 15% in agricultural sciences, 11% in natural sciences and 17% in social sciences (European Commission, 2006).

Working patterns of women vary between NAE countries. While career breaks and part-time working are common in some Northern European countries such as the UK and the Netherlands, in other parts of Europe, for example in Spain, France and Italy, women are much more likely to work full-time and throughout their adult lives. Systems of support and cultural expectations reflect and partly create these differences (ETAN, 2000) (See Table 4.1)

Box 4.2 An introduction to the evolution of the ecosystem approach.

The *ecosystem approach* is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems. Therefore, the ecosystem approach is a crucial step towards acknowledging, conserving and relying on the ecosystem functions and structure in the development of agri-food systems, compared to the earlier approach of *sustainable use*, which takes nature as a source of resources and sink of wastes for agriculture and calls for stewardship (Douglass, 1984). An even more narrow approach is that of *food sufficiency*, which lacks long-term perspective or consideration of environmental and social impacts of food production. The environmental, social and economic consequences of the latter approach, which has dominated the development of agri-food systems for the first decades after the WWII, are described in Chapter 3.

The ecosystem approach has its critics. Wood and Lenne (2005), for example, used the CBD as a framework to reject the three 'received wisdoms' in the agri-environmental policy over the past ten years: the ecosystem approach, the premise that agricultural expansion damages wild biodiversity and the premise that agricultural biodiversity ensures agricultural sustainability (c.f. MA, 2005). They proposed development of intensive agriculture to save off-farm biodiversity. Other recent contributors to this longstanding debate about intensive vs extensive agriculture include e.g. Green et al. (2005), Balmford et al.(2005) and Vandermeer and Perfecto (2005). One argument is that intensification (through increased yield per hectare), although causing declines of biodiversity on agricultural land, may help reduce the need for habitat reduction elsewhere (including natural pristine habitats). Pretty et al. (2006) suggest to exploit win-win situations that can be achieved in combining high productivity and ecosystem services. Another factor to be considers is that intensive agriculture often relied on inputs from beyond national borders (the so called "hidden hectares") to produce, e.g. feed (Deutsch, 2004; Johansson, 2005). Another view is that although the ecosystem approach may be appropriate in Europe, developing countries need the development of more intensive, highly productive agriculture, even if it has to rely on external inputs.

Box 4.3 An introduction to systems approaches

Beginning with Einstein's theory of relativity (1905), a more systemic approach has evolved within science (Jantsch, 1975; Ackoff, 1983), and been formulated into a general theory of systems, for example by Bertalanffy (1973). According to the systems view, useful information about a phenomenon is not obtained by studying its components in isolation, because their interrelations determine the function of both the part and the whole (Bunge, 1985). A system is seen always to be embedded in a larger system, thus implying the aspect of hierarchy, and the interrelations among system levels are important to consider. The soft systems approach (e.g., Checkland, 1981) further assumes that every system can be described in several ways depending on the underlying world-view. This shift from a hard systems methodology (an ontological systems orientation) to a soft systems methodology (an epistemological systems orientation) implies that not only is the phenomenon studied interpreted as a system but also the inquiry into it (Checkland, 1988; Bawden, 1991). This approach, participatory in its very nature (Laszlo and Laszlo, 1997), introduces the researcher as a responsible actor in the human activity system (also Alroe and Kristensen, 1998). Attempts to construct research methodologies especially for agriculture using hard or soft systems approach, were made starting with FSR in low-income countries and by Spedding (1979), Bawden et al. (1985), Odum (1983, 1988) and others. This approach is often seen as an articulation for a plea for holism in science. The danger of interpreting the systems approach as a need to focus solely at a certain, often relatively high, "the" system level, leading to "up-ward reductionism", has been pointed to by e.g. Bunge (1985)

Soft system research has been promoted for situations where there is uncertainty about what constitutes the problem and what represents an acceptable solution as they depend on the perspective of the individuals involved (Stephens and Hess, 1999). A key feature of the soft system approach is that it aims to avoid formulating problems from one perspective to the exclusion of others. Stephens and Hess (1999) suggested that "an idealised pathway may be to adopt soft systems approaches to problem identification, hard systems methods to researching acceptable and sustainable solutions, and then to develop bilateral projects … [to] facilitate the uptake of outputs" , although they were concerned that that the current short term funding situation does not allow the necessary time or the freedom of thought.

Box 4.4 The international ip architecture: Multilateral, regional and bilateral rules. Source: UNCTAD/ICTSD, 2001; CIPR, 2002.

The architecture of the global IPR regime has become increasingly complex, and includes a diversity of multilateral agreements, international organizations, regional conventions and bilateral arrangements.

Multilateral treaties
Most of these agreements are administered by WIPO, and are of three types:

i. Standard setting treaties, which define agreed basic standards of protection. These include the Paris Convention, the Berne Convention and the Rome Convention. Important non-WIPO treaties of this kind include the International Convention for the Protection of New Varieties of Plants (UPOV) and TRIPS.
ii. Global protection system treaties, which facilitate filing or registering of IPRs in more than one country. These include the Patent Cooperation Treaty (PCT), and the Madrid Agreement Concerning the International Registration of Marks.
iii. Classification treaties, which organize information concerning inventions, trademarks and industrial designs into indexed, manageable structures for ease of retrieval. One example is the Strasbourg Agreement Concerning International Patent Classification.

Other non-WIPO international agreements with an IPR content include the International Treaty on Plant Genetic Resources for Food and Agriculture and the Convention on Biological Diversity.

Regional treaties or instruments
Examples of these kinds of agreement include the European Patent Convention, the Harare Protocol on Patent and Industrial Designs within the Framework of ARIPO, and the Andean Community Common Regime on Industrial Property.

Regional trade agreements
Regional trade agreements normally have subchapters governing IP standards. For example, the North American Free Trade Association, the proposed Free Trade Area of the Americas, the EU/ACP Cotonou Agreement.

Bilateral agreements
Specifically, these include those bilateral agreements that deal with IPRs as perhaps one of several issues covered. A recent example is the 2000 Free Trade Agreement between the US and Jordan, but there are many others.