



NORWEGIAN MINISTRY
OF EDUCATION AND RESEARCH

Summary in English: Report no. 30 to the Storting (2008-2009)

Climate for Research





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The Norwegian Government will continue to increase the research budgets in the years to come but research policy will shift focus from research spending to research quality and results. A one-sided debate on funding is restricting for Norwegian research. There is a need for clearly defined policy goals within prioritised areas.

Future Goals

The Government therefore proposes that Norwegian research policy should be directed towards nine goals, five strategic and four overarching goals. The Government's goal is that Norwegian research policy will contribute to:

- meeting global challenges, with a particular emphasis on the environment, climate change, oceans, food safety and energy research
- better health, levelling social differences in health, and developing high quality health services
- addressing social challenges and provide research based practise in the relevant professions
- knowledge based industry in all

regions

- industry oriented research within the areas food, marine, maritime, tourism, energy, environment, biotechnology, ICT, and new materials/nanotechnology
- high quality research
- a well functioning research system
- increased internationalisation of research
- efficient use of research funding and results.

These goals are for a large part based on the priorities that were set down in the last White Paper on research Report no. 20 (2004-2005) *Commitment to Research*. However, these new goals imply a new direction in our research policy by placing a stronger emphasis on the challenges faced by the public sector and on global perspectives in our research. The annual research budgets should be oriented to support the nine policy goals and ensure that there is a concordance between the goals, the proposed measures and the actual distribution of funding in the annual budgets.

Systems for result-based funding have already been implemented for universities, university colleges, institutes and the four regional health authorities. With reference to the nine policy goals, a systematic approach based on indicators, evaluations and other types of assessments of Norwegian research will be introduced. The Government will appoint a panel of experts who will contribute to this work.



The Government's long term ambition is that total R&D expenditure will constitute 3 per cent of GDP. Government budget appropriations for R&D should increase to 1 per cent of GDP.

In order to give a more complete picture of public spending on research the Government will also include the revenue losses incurred by the tax-relief scheme Skattefunn.

Under this Government research spending has had an average annual real growth of close to five per cent, compared to four per cent under the previous Government. This is the highest growth rate since the early 1990's. The Government will continue to increase research funding in the years to come. This growth will contribute to realise the nine strategic goals for Norwegian research. It will also stimulate research spending in industry.

Important signals and initiatives

Norway has a well developed research system and Norwegian research is making progress, both when it comes to quantity and quality. This White Paper does not signal any major changes to the system, but rather seeks to strengthen Norwegian research based on the existing system.

Meeting Global Challenges

Man-made climate change is one of our time's greatest global challenges. In accordance with the new white paper on climate policy, the Government aims to strengthen research on renewable energy and carbon capture and storage in the National Budget for 2010. The Government will continue its commitment to polar research, establish a centre for ice, climate and eco-systems (ICE) at the Norwegian Polar Institute and present a national action plan on climate research. Many of these

initiatives form part of the Government's Strategy for the High North.

The climate challenges must not overshadow other problems related to poverty and other environmental issues. The Government has over the last years almost quadrupled funding for development research through the Research Council of Norway and will continue to contribute to strengthening research capacity in developing countries, as outlined in the Government's White Paper, Report no. 13 (2008-2009) Climate, Conflict and Capital. Biological diversity, environmental toxins and food safety are also central areas where research can contribute to viable solutions both nationally and internationally.

Better Health and Health Services

Since 2003, medical and health research has been the fastest growing area in Norwegian research. The Government will continue to give priority to this area. It will among other things, be important to identify how research can contribute to the expected new health reform, a coordination reform, for the public health service.

In the years to come the Government wants to give priority to research that can help level social differences related to health

Addressing Social Challenges and Provide Research Based Practise in Relevant Professions

The government wants to stimulate research on welfare issues that cut across sectors and disciplines. Education research occupies an important part of this because education, also, is a crucial social leveller. A central role of the welfare system and the public sector is to ensure research based professional practice and a research based policy development. This entails the development of successful learning arenas for researchers and service providers and that service providers develop stronger ties with the research community. The Government has already strengthened research on the social services system, and will now establish new research

programmes on education, welfare, working life and migration.

Knowledge Based Industry in all Regions

Sustainable economic growth is the basis for our welfare and for our ability to meet global challenges. The Government wants research policy to contribute to knowledge based industry throughout the country. This policy is a continuation of the policy outlined in the Government's White Paper on innovation Report no. 7 (2008-2009) – An innovative and sustainable Norway. The Government wants to stimulate increased research activity in industry by taking forward existing initiatives such as Skattefunn, user-directed innovation programmes, and R&D-contracts. The new industrial doctorates scheme will be used to ensure the recruitment of researchers to Norwegian industry. In order to strengthen the long-term research effort in strategic areas the Government will, in consultation with the Research Council of Norway, consider a new announcement of funding for Centres for Research-based Innovation.

Industry Oriented Research in Strategic Areas

In addition to a general stimulation of research and innovation in Norwegian industry, the Government will continue to support industry relevant research in strategic areas. This includes five areas where Norway has developed specific competences or has other competitive advantages. These are: the marine sector, tourism, the maritime sector, energy and the environment. Furthermore, the priority of food, ICT, biotechnology and new materials/nanotechnology, as outlined in the last White paper on research, will be continued. The Research Council's large scale research programmes are an important instrument in many of these areas and will be continued. The already initiated escalation of research on renewable energy and carbon capture and storage plays an important role both in reducing future greenhouse gas emissions and in creating more environmentally friendly industries. In concordance with its White Paper on innovation the Government continues its work to increase funding of

environmental technology. As part of the Government's strategy for the High North there will also be an increased effort in the area of marine bioprospecting. International research cooperation should also be used to the advantage of Norwegian industry, and the Government will consider possible incentives to strengthen industry's participation in EU research.

A Well Functioning Research System

The Norwegian research system includes all institutions and industries conducting research. A well functioning research sector should ensure sufficient capacity, a balance between cooperation and competition and good systems for knowledge-sharing.

The Research Council of Norway is a central institution in Norwegian research and has a significant impact on its quality, profile and development. The Government will ensure that a new evaluation of the Research Council will be initiated. Such an evaluation can among other things consider the Research Council's role in the research system, especially considering that research institutions have become more autonomous.

The Government's goal is to contribute to regional growth potential and value creation in all regions and to strengthen both private and public R&D-activity. The main strategy is to maintain a good research infrastructure all over the country. The most important new instrument to encourage regional research activity is the regional research funds, which will be established by 2010.

The Government will encourage a structure with academically stronger environments and higher quality of the courses taught at the universities and university colleges. Initiatives resulting in concentrated academic activity and an efficient division of labour will be supported by economic incentives and other rewards.

The Government's strong commitment to researcher recruitment will over a 10-year period probably bring Norway up on the same level as the leading neighbouring countries when it comes to the number of

PhDs per million inhabitants. In order to be able to meet society's demand for researchers, as well as to encourage a more research-intensive industrial sector the Government will continue its efforts to increase the number of PhDs, with a special emphasis on mathematics, science and technology, in addition to medicine.

Sami research is also facing recruitment challenges. The Government will continue to strengthen Sami research and researcher recruitments and will create a panel that among other things will consider how to achieve this.

High Quality Research

The quality of Norwegian research has improved over the last years, when measured by the number of publications, citations and in international evaluations. The Government will continue to promote high quality in research. In order to achieve this it is necessary to ensure favourable conditions, including funding systems that promote quality and access to modern infrastructure and equipment.

The implementation of result based funding systems for the universities, university colleges, the institute sector and the four regional health authorities is in itself intended to promote quality. The funding system for universities and university colleges is being evaluated, and the Government will return with possible adjustments in the National Budget for 2010. The funding system for the research institutes will be evaluated after its initial three-year period. The Government will initiate an evaluation on how priorities, funding and management instruments on the national level take effect within the universities and university colleges. Pending the results of this analysis, the Government will return to the question concerning funding of basic research.

Until then the Government will strengthen basic research through existing instruments. The Research Council's scheme for funding researcher initiated projects will be prioritized. The Centres of Excellence Scheme will be continued. The Research

Council will examine extent and possible adjustments of this scheme, the goal being new announcements every five years.

The White Paper suggests a new system which clarifies responsibility and principles for investments in research infrastructure. The broad, international cooperation on equipment is continued, including the realization of the joint European ESFRI-projects. Norway has initiated two of the ESFRI-projects listed on the European roadmaps: a laboratory for carbon capture and storage and the construction of a common data and observation system on Svalbard. These proposals are in line with national research priorities. The Government will also continue a solid and long-term commitment to infrastructure by earmarking resources to research infrastructure investments.

Quality in research also requires gender equality. The Government will consider a special incentive scheme to increase the share of women within the fields of mathematics, natural sciences and technology and consider new qualifying pathways.

Increased Internationalisation of Research

The Government will strengthen the internationalization of Norwegian research. Participation in the EU's framework programme and the development of the European Research Area (ERA) is a main priority. National goals and strategies for Norwegian participation in European research cooperation will be developed, as well as incentives and instruments that promote increased participation and benefit.

The Government will further develop the bilateral research and technology cooperation with the big countries in North-America and Asia and strengthen the Nordic research cooperation. The follow up of bilateral research agreements must be strongly connected both to national research priorities and to Norway's participation in the European research cooperation. A main priority for Nordic research cooperation in the years to come is

the execution of a joint Nordic research programme on climate research and renewable energy.

Efficient Use of Research Funding and Results

The demand that research should serve to improve society continues to increase. There must be a satisfactory relation between the resources spent on research and the results produced. Research results should be made publicly available and the resources should be managed well and efficiently. An important measure is the establishment of the Norwegian Science Index (NVI), which is a national information system for Norwegian research.

The Government wants as much openness as possible concerning research results, within the limitations set by laws and regulations and in consideration of competitive advantage. A larger part of articles in scientific journals shall be published in ways that make them publicly available. The Government also wants to increase access to and sharing of publicly funded research data. The Government will create a panel that will propose operational principles for data access arrangements for research financed through the Research Council.

In order to facilitate an increased commercialisation of research results the government will outline a new programme as a follow-up of the existing Commercialisation of R&D-results programme (FORNY), which will end in 2010.

Norwegian Research- an overview

Total R&D-activity

In line with international developments Norwegian research activity has increased significantly. Since the mid 1980s the number of people involved in research and development has more than doubled, bringing the number up to nearly 60 000 today. Research expenditure has also increased significantly. Measured in fixed prices total research expenditure has been

nearly tripled since 1981. This is somewhat higher than the average growth in the OECD-area in the same period.

Since 2005 Norwegian research has had an annual real growth rate of approximately eight per cent. The industry, the research institutes and the universities and university colleges have experienced noticeable growth in the past years, although with variations among the different sectors.

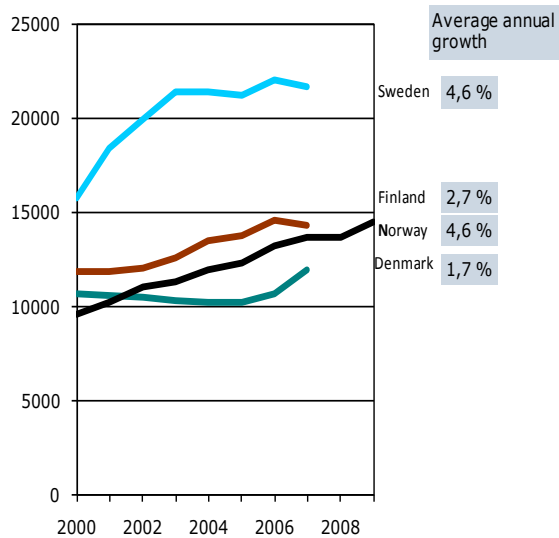
Public Spending

Total R&D-expenditure constituted 1.7 per cent of GDP in 2007. Public spending on research constituted 0.8 per cent, while 0.9 per cent was financed by industry, other sources and international sources. The relatively low level of R&D funded by industry can primarily be contributed to the fact that Norway has a more commodity based economy than many other countries in the OECD area and in the EU.

Compared to other countries Norway has a relatively high level of publicly funded R&D. In 2007, public spending constituted 44 per cent of total R&D spending, compared to an average of 23 per cent in the OECD area and 31 per cent in the EU. Only the U.S., Iceland and Austria among the OECD countries have a higher level of public R&D spending when measured per capita.

For a long time Norway has experienced a steady and solid growth in public R&D spending. Since 2000, and especially since 2005, research spending has shown a significant real growth. Under this Government, public research spending has had an average annual real growth of close to five per cent.

Government budget appropriation for R&D in Nordic countries 2000-2009. Fixed 2000 prices



Human Resources

Researcher recruitment has been a highly prioritized area in research policy. Data from 2007 show that Norway ranks sixth among the OECD countries when it comes to number of R&D personnel per 1000 employment.

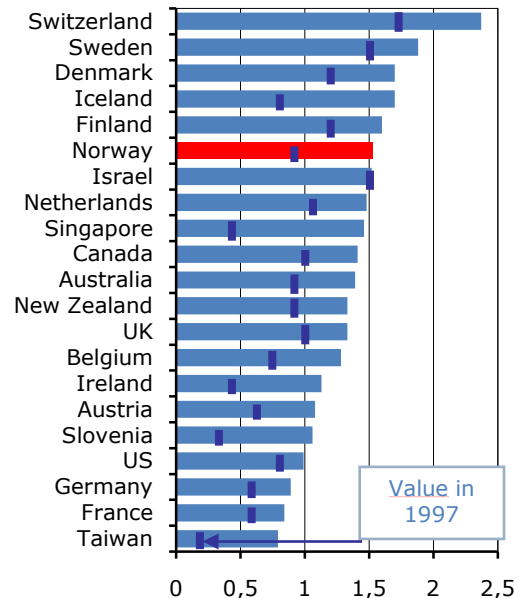
We are also approaching equal gender distribution among the Norwegian PhD-candidates. In 2008, 45 per cent of the PhD-candidates were women, and the gender distribution is relatively balanced within the social sciences, humanities, medicine and agriculture/veterinary sciences. Within mathematics/natural sciences and technology the number of female candidates is still low, with 37 and 21 per cent respectively.

Research results

The main impression of Norwegian research is that it is at a satisfactory level, and that the development is positive when it comes to scientific publications. If one considers the number publications per capita Norway ranks sixth in the world with 1.53 articles per 1000 inhabitants in 2007. Over the last years, Norway has been among the nations with the strongest growth in the number of

publications. While the OECD-countries, EU-countries and the Nordic countries have seen a decrease in their share of the global number of scientific publications, Norway's share has increased. Asian countries, especially China, are also showing an increase in the same period.

Scientific publications per thousand capita for the 20 leading countries in the world (1997 and 2007)



In addition, Norway has had a notable and long-lasting increase in the number of citations. Norway has moved from a position below the global average in the early 1980s to ninth place in the world and well above the global average in 2007. An interesting trend in the citations data is that Norwegian articles with international co-authorship are markedly more cited than articles with only Norwegian authors. This might suggest that international co-operation has contributed to increased citation of Norwegian research.

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