

# Speech Prof dr M.J. Kropff

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## Science for Impact; Impact for Science Academic values in use

### Introduction

The presentations by Professor van t Veer and Dr Henk Smid indicate how fascinating science can be, not in the least because the science they presented is embedded in a meaningful societal context. Wageningen University is a mission-driven and domain-oriented university which focuses on issues related to nutrition, food production, and the living environment. This domain is increasingly at the centre of public interest and debate.

Society develops quickly, and this rate of development is accelerating. Also science and especially technology develops at an increasing speed. This provides new insights into complex issues within our domain. It is this combination of scientific development and rapid societal change that forms the appealing challenge to our faculty, our staff and our students. Today, I would like to discuss some related aspects that require our attention at Wageningen University. First of all I will elaborate on what it means to work on science for impact, and the consequences this has for some of our academic values like accountability, reliability and independence. I will assert that science is a team effort which includes our students. In this presentation I will mainly focus on our University, as it is its dies today, but of course our colleagues from DLO and VHL have an essential role in the teams as well. Finally I will discuss some interesting developments with respect to our educational system. The ideas presented also result from discussions with faculty and students and are supported by my colleagues Aalt Dijkhuizen and Tijs Breukink. I hope that this will generate discussion in our university.

### Impact for Science

In earlier contributions I underlined the great appeal of the combination of scientific and societal challenges. I called it Science for Impact.

Society rightly asks for solutions for questions in the fields of healthy and safe food, animal welfare, and healthy lifestyles and livelihoods. Also, the issues of the Millennium Development Goals can not escape our attention. Nor may the complexity be ignored that comes with the need to protect biodiversity and our environment. Our Science has impact, because backgrounds and causes of these issues are being scientifically unravelled. This implies responsibility with respect to the way we approach our work and the way we present our insights and facts. Excellent scientific work must be the natural basis for all our activities, including education. Excellent science that is inspired by the societal context and driven by curiosity to have impact. That is what I mean with Impact for science.

An interesting example is the work of Prof. Hilhorst and colleagues who explored the motivation of staff of medicines sans frontiers (Artsen zonder grenzen) to leave the extreme situation because of too much impact. This gives academic insight and publications on humanitarian help and the culture of organisations in situations where they are needed the most.

### Academic Values

Academic values such as carefulness, responsibility, verifiability, independence, reliability – but also, accountability, transparency and objectivity – are essential for our role in society. A few years ago my colleague, Professor Paul van der Heijden, discussed public trust in science at the Dies Natalis of the University of Amsterdam. He made a plea for a common code of conduct for university scientists. In the meantime such a code has been developed by the Dutch association of universities, VSNU. Wageningen fully accepts and embraces this code. I would like to bring to mind that by the end of the 1990s, our alumni association KLV had already developed and proposed an ethical code of conduct for our alumni. Every PhD degree in Wageningen is awarded only after explicitly formulating this responsibility in the presence of the PhD candidate. It clearly shows that Wageningen students, scientists and alumni are aware of their position and of the importance of their work and that they have to maintain high standards and respect academic values. The close relationship between research and education within our university provides a unique opportunity to teach our students these values by showing them the example of our daily practice of ethical conduct. We must cherish this.

The first values I would like to address are

#### **Independence and Accountability.**

Given the potential societal impact of our work, we are open to assessments of our performance. Recently, the Ministry of Agriculture ordered a thorough assessment of academic values of the Wageningen UR organisation and its scientists. Special attention was paid to the degree of influence of the funding organisation or company. The committee in charge found no evidence or indications that externally funded projects led to improper pressure on our scientists.

Nevertheless, we as a board asked our Scientific Advisory Board to conduct a follow-up survey to ensure that academic values are being fully maintained within our organization. We have to constantly monitor the developments. I have stated that our staff and students who experience improper pressure in their work as independent scientists can count on my full support to overcome such problems. The recent foundation of a new ethical committee will prove to be helpful. We have to realize that ethical standards in a broad sense

must be part of our daily routine and that we have to ensure that it is also part of our educational efforts.

Independence and transparency are essential parts of our quality and of our credibility. Quality is our core value, and it has many dimensions. It must never be subjected to doubt, and we are always accountable for the way we work and the way we present our results.

The value **Responsibility** has many dimensions.

The classical and almost mythical distinction between curiosity-driven or pure science and applied science within a societal context is not really relevant. Because, and I quote the well known Dutch physicist Hendrik Casimir, "we just need good science. All good science is based on the persistent desire of scientists to understand observed phenomena in the real world."

In the old school of the Humboldt University, the aim of science was described as a search for truth, in contrast to the predecessors that were using science as a tool to disclose divine greatness. The role of science must be to describe, categorize, analyse and understand the underlying mechanisms of various phenomena. With this understanding comes the responsibility to use it in an ethically and socially accepted and economically sound fashion to resolve complex issues. The development of knowledge and the use of this knowledge are not two separate denominators. They are intertwined.

Scientists may be more strongly motivated to understand difficult phenomena if their work also contributes to resolving global issues such as sustainability or eradicating hunger. This was exactly the reason why I decided to come to Wageningen halfway through my biology Masters in Utrecht, where I came to work with C.T de Wit in Theoretical Production Ecology. Besides the relevance, the excellence of the science was highly stimulating. This research group developed eco-physiological systems models that explained the behaviour of agro-ecosystems. These systems are inherently simpler than more diversified natural ecosystems. Moreover, they were more intensively studied, because of their economic importance. Consequently these systems approaches not only led to better insight into the agro-ecosystem, but also into the generic processes of ecosystem behaviour. This was something that was considered too complex by ecologists. The work of our team enabled a major step forward towards the quantitative understanding of fundamental processes underlying plant-plant interactions. The models Wageningen and its international colleagues developed are now widely used for studying natural ecosystems.

#### **Reliability and objectivity**

In spite of the increased motivation when working on socially relevant issues, this must not lead to a loss of independence or critical attitude regarding the findings. My PhD thesis focused on eco-physiological modelling of the effects of air pollution on plants, a topical issue in the mid-1980s. At that time, I noticed that there was pressure on scientists to present the problems without clearly identifying the uncertainties. There were several reasons, one of them being the worry of scientists that the problem would not be taken seriously enough. One of my propositions at my defence here in this aula in 1989 was that scientists need to be very clear about the values and uncertainties of their findings and not overstate their conclusions. Therefore, scientists must present the facts while taking account of statistical and theoretical uncertainties. In that respect as well, scientists must act independently.

The political wish for more innovation should stimulate co-operation between science and industry – including SMEs. It must stimulate co-operation in pre-competitive research, as is the case with major initiatives such as the national top institutes Food and Nutrition, Water and Green Genetics, in which we have a leading role. At these top institutes, all scientific results are published and new, unexpected findings are generated, as in all fundamental scientific effort. The sense of urgency to play an innovative, globally leading role must never lead to political or other pressure on pre-defined outcomes – not to mention the fact that such results would be of no value whatsoever. In the scientific field that we discussed today this is very clear: incorrect health claims will, in the long run, have a damaging effect on science and industry.

#### **Serendipity**

That brings me to an important item in science that was discussed at length by our emeritus Professor van Breemen in his farewell address and again in a recent NRC newspaper article: serendipity. Serendipity is finding something that you were not looking for. Prof. Van Breemen stated that really new findings are often a spin-off of research on other topics. He concluded that truly innovative knowledge can only be tested with truly innovative hypotheses. And this implies serendipity. One of his examples was a joint study we conducted on rice methane production. It was exciting when we discussed the counter-intuitive results of their methane studies in rice and when interdisciplinary work helped us to understand these results. Our rice crop models were crucial in that.

I agree with his conclusion that leaders of scientific organizations must create an environment in which the art of science can flower by not being too specific on the expected outcome of the research program. However, his example also shows that interdisciplinarity and teamwork gives often unexpected options to move the scientific frontiers. Especially in the link between social and natural sciences gives great opportunities,

#### **Team effort**

Science is a team effort and a people business. Teams all over the world work together, publish their results, evaluate each other's work, scrutinize facts and hold fierce debates about conclusions, theories and implications. Scientists are curious people, and it is their curiosity that drives the science. 'We have all experienced the exciting discussions with international colleagues until late at night at meetings and conferences, still digging to find answers.

In order to let our university and our entire organization thrive, we need high quality faculty and staff. Wageningen Graduate Schools have helped to enhance the quality in the past decade. This has consequences for our recruitment policy. Recently we have been very successful in recruitment of our faculty and have again attracted some very talented professors who preferred a position in Wageningen

The team approach is one of our assets. Also the Wageningen Graduate Schools evaluated the performance of our externally funded chairs and the results indicate that also here high quality standards are maintained. Fortunately, the outside world is impressed by our university and our achievements, both in science and in society. However, we have to keep on working on the quality as that determines the future of our University.

In my view, it is not the funding that drives the direction and the outcome of science. It is the capacity, skills, know-how and scientific expertise of individual researchers and the content of scientific programmes that get decision makers excited to allocate research funds and to partly establish research agendas. The Executive Board realizes that basic funds from the university are always limited. According to a very recent report, we have the lowest overhead of all Dutch universities, but we will continue to reduce costs for housing and services, as we did during the past 2 years, when 10 million Euros were saved and became available for research and education. Due to a one-time savings in 2006, I am pleased to announce on behalf of the Board that we will have another one time 2 million Euros of funds available this year for equipment and for improving the quality of research and education and talent.

An issue that needs special attention is Scientific Impact on policy making. I previously stated that scientists have to present reliable facts, and then let society draw the conclusions. This is one side of the coin. Scientific results can be much better used in decision making for example in land use planning. The scientific process and the decision making process are not often linked.

Professor Johan Bouma et al recently reviewed a large number of international eco regional methodology programmes in which Wageningen strongly participated. He distinguished the phases of the policy cycle that apply at different scales: signalling, design, decision, implementation and evaluation. In these processes, joint learning programmes are needed in which all stakeholders participate. In that way technological solutions are based on clearly defined questions which may help the results to be useful in the societal context.

Of course scientists also need to participate when results are being implemented in policy making and in societal processes. The role of scientists is different at different stages. But at all stages, scientists must be very clear that joint conclusions should always have a reliable scientific basis. The process of using scientific achievements on several levels of decision-making recently became part of our new Strategic Plan, in which up-scaling and down-scaling in relation to governance is a focal point.

In relation to this I am very pleased that I can make an announcement on a new appointment. Together with Tilburg University we will appoint our former minister Cees Veerman as professor with special attention for sustainable rural development in a European perspective. He will strongly contribute to our educational programmes related to this field. I am very pleased that the Wageningen University Fund (WUF for insiders) took the initiative for this appointment.

At the end of my talk I would like to address our **Education plans for the future**

So far I have discussed our scientific approach.

But students also have a central position in our university, including Bachelors, Masters and PhD students. Since Von Humboldt established the principle of the research university in Berlin in 1809, it has been recognized that students need to participate in academic research as an essential part of their learning process.

This educational principle is strongly implemented in our university with problem-oriented courses and the participation of our Masters students in research projects for their thesis, preferably with all elements of a research project – from problem definition to conclusions. PhD students must demonstrate their capability to independently conduct high quality science. This requires a scientific research environment and lecturers and professors who are active scientists themselves. Academic competences are developed in the academic research environment.

Every year, Wageningen University attracts as many new Masters students as Bachelors students that continue their study. Moreover, Wageningen has a relatively high proportion of PhD students. With more than 200 PhD graduates per year we have mid-size program in the Netherlands. We thus have a relatively stronger focus on the research phase in education than most other Dutch universities. Nevertheless, the inflow of Bachelors students is essential, and we will continue to invest in our initial Bachelors degree programmes. And I am pleased that last year we had 10% more Dutch BSc students and the pre-subscriptions this year suggest an even much higher percentage. As an international university we are very pleased with initiatives such as the Erasmus mundus program of the Animal Genetics team of Prof. van Arendonk.

An additional main asset of Wageningen education is the fact that we have strong DLO-research institutes with both basic and applied research. This enhances our PhD and MSc programmes and it links the education with society. At the same time, Wageningen UR has a professional education programme at Van Hall Larenstein. That helps us to link academic and professional competencies. We are developing what we call our education house, with a backbone of 2 pathways: a professional and an academic educational pathway. Both pathways are complete educational programmes. In addition, the pathways can be linked, so that the professional and academic competences can be combined. Another interesting development is a general first-year programme that prepares students for six different Bachelors programmes. This first-year programme is meant for students who are not yet ready to make very specific decisions about their study when they graduate from high school but who know that they want to study life sciences.

One issue that requires attention is the fact that academic competencies are well developed at the university, but that many students who enter careers outside academia may require some additional professional competencies. Our Academic Master Cluster includes a basic professional element, but we

are exploring additional possibilities. One of the developments is to establish paths in our Master programmes with clearer professional profiles, such as research, business or public policy.

I would like to end by addressing our students. During the past 18 months the EB met with many of you on many different occasions. The EB is impressed by your dedication to study and learning by the way you handle the knowledge and skills our teachers provide you with and with all the activities you organize. You really make Wageningen a lively university city in all respects. You are – justly so – critical observers of the policy of the board and of the developments within our university. I like that. But you are also extremely proud of our organization and you make it work. I like that too. I was very impressed by the discussion we had on the scholarships Wageningen University provides (the so called FOS beurzen) in order to enable you to do your organizational work. It convinced the EB that the half million Euros for these scholarships is money well spent. And I am glad to be able to announce on behalf of the Executive Board that we will continue the budget for the coming year.

Distinguished colleagues, students, ladies and gentlemen,  
Hardly anyone realizes the fact that only 50 years ago, Europe still had a problem with food self sufficiency. Mansholt developed his innovation programme, which ended up being even too effective when we ran into a food surplus situation. And today we are facing new challenges within our domain some of them presented before and others such as defined in the Millenium Development Goals continue to be a challenge.

For 89 years, Wageningen has contributed to innovations and social improvements worldwide through research and the education of well qualified academic scholars who found their way in society. Science for impact by impact for science. I hope that we will be able to continue this role in an authoritative, academic, transparent and reliable way. In other words, academic values in use.

Thank you for your attention.

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