INTERNATIONAL HIGHER AGRICULTURAL EDUCATION

EXPERIENCES CONSTRAINTS PERSPECTIVES

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CONTENTS

PREFACE

On 15 September 1971 Professor J.M. Polak, my distant predecessor, opened the first Master of Science course at the then Agricultural College. In its first year the course Soil and Water attracted 23 students from different developing countries. Though somewhat belated, last month the 25th anniversary of international education at our university was celebrated by way of a symposium and, of course, a party for the - meanwhile considerably increased - population of foreign students.

In the study year 1996/97 the Agricultural University has offered 15 MSc-courses in which 205 students have enrolled, which is about 20 per cent of our total annual intake. So, clearly international education takes an ever prominent place, even more so when we also include PhD education.

Since 1987, more than 100 foreign students have obtained their doctor's degrees (PhD certificate) in Wageningen; 70 (of a total of 310 PhD students) of whom in the past two years.

The largest group (about 75 %) is still formed by students from developing countries in Africa, Asia and Central and South America, although interest from European countries (EU-countries as well as countries in Central and Eastern Europe) is increasing. From Europe also come the students who come to Wageningen for a short stay of a couple of months as part of the European exchange programmes ERASMUS and TEMPUS. All in all, in November 1996, there were 550 students from 85 countries studying at our university. This does not include the many hundreds of students at the IAC, who also contribute to the international image of Wageningen.

It stands to reason that such a large contingent of foreign students has its effects on university life. For instance, English has become more and more the official language in discussions of progress and lectures, which are attented by both Dutch and foreign students. But also the Wageningen University Journal has drawn the conclusion and has included an English page in its weekly issue for some time now. Last year the International Student Organization Wageningen (ISOW) set up its own "home away from home" at Duivendaal, which also comprises a room for prayer for muslim students. Moreover, for some time there has been the International Student Panel, which guards the interests of foreign students. I am frequently confronted by this Panel with regard to shortcomings in our international orientation like, for instance, the fact that the nameplates in the university buildings are in Dutch only.

Is international education the university's 'love-baby', as the Wageningen University Journal recently wrote? Is it a success story? In many aspects this is certainly true. On average, the quality of the students ranges from good to excellent. Some graduated MSc students have no problem to be accepted as a PhD student, not only by renowned foreign universities but also by our own professors. To obtain a degree at Wageningen is attractive and we will take care that the high quality is maintained. An international visitation commission judging Dutch international education last year expressed a very favourable opinion on the quality of our MSc courses.

Financing our international education programme, however, is still cause for concern. In contrast with special institutes for international education (IE-institutes), the Dutch Government does not financially support universities providing international education. Having said this, the Ministry of Agriculture, Nature Management and Fisheries, however, has generously contributed to the development of the programmes. But, when we offer the programmes in a cost-effective way they appear too expensive for students from developing countries. The lack of the necessary grants for these students is the main barrier to a larger inflow of foreign students.

In this respect I feel that the Dutch Government underestimates the importance of international higher education to the economic position of our country. A well-educated foreign alumnus is a potential goodwill ambassador for the Netherlands and can be of great importance to Dutch firms (industry) that want to establish abroad. Moreover, raising the academic level of faculties of universities in developing countries, together with other forms of cooperation, such as bringing in Dutch experts on the spot, is a very effective way to develop cooperation.

The Agricultural University will continue developing international education. It is our aim to at least double it in the next 10 years. It will become a vital part of 'Brainport Wageningen'.

Cees M. Karssen
Rector Magnificus

INTERNATIONAL HIGHER AGRICULTURAL EDUCATION AFTER 2000
Conditions and Issues

Wout van den Bor, Wim Heijman and Tini van Mensvoort[1]

INTRODUCTION

This year, Wageningen Agricultural University, the Netherlands celebrates the 25th anniversary of its International Postgraduate Programme. This programme encompasses 15 MSc-courses, enroling more than 200 international students. In addition, WAU also offers an extensive PhD-programme to international students. The international postgraduate programme of WAU is developing rapidly and dynamically, both in scope and in size. Although these developments are labelled positively, there is need for concern and reflection as well. This has to do with serious questions, such as: what are the claims of society, on a global scale, with regard to postgraduate teaching and learning? Should international higher agricultural education develop according to market demands or is there a need for autonomous, institutional policy development? Should international postgraduate education be promoted through local institution building or through international student mobility? Are universities in the North sufficiently equipped to cope with the growing demand for international postgraduate programmes? What are the ramifications of these questions and their answers for institutional policy?

These and many other questions were discussed during an International Symposium on International PostGraduate Education in Agriculture and the Environment, held in Wageningen on January 29, 1997. As most of the issues and problems apply to practically all international institutions for higher agricultural learning in the North and West, it seemed to be worthwhile to publish the Proceedings of this Symposium for a wider audience.
In what follows we elaborate on a few of the essential questions that beset international higher agricultural education. At the end of this position paper we briefly introduce the other contributions to these Proceedings.

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CONDITIONS AND CLAIMS

Global restructuring has undoubtedly created new conditions for agriculture and rural areas in the North and West. New demographies are emerging in rural areas and new land holding structures are created, whereby a diminishing number of farms produce the bulk of the value of farm products. A new land-use paradigm is emerging, questioning the production imperative in the light of surplus and environmental implications. Institutions are becoming 'flatter' and governance is decentralized; 'just in time' production has been stimulated and horizontal networking of third sector institutions at the local level is growing rapidly. Labour market conditions are changing; women are participating more strongly in a diversified and pluri-active type of rural activities. Agrarian disengagement is becoming a serious social and emotional problem. The role of the state is declining or changing; 'remote' governance and a 'hands-off' approach are being driven by ideological and financial constraints (Van den Bor, *et al*, 1995).

The South and East are equally strongly confronted with rural change and diversification. The World Bank recently admitted that its policy of structural adjustment, macro-economic and top-down restructuring in the developing world has not resulted in tangible solutions for their rural economies. The Bank as well as other international donors, national governments and NGOs seem to realize now that rural development is regional and culture specific. The enhancement of regional and local rural economies has to be based on a bottom-up and participative approach, building on local expertise and a transparent incentive pattern (see e.g. the PhD-studies of Mongbo, 1995; Mahir, 1996; Millar, 1996).

The problems connected with agriculture in the Eastern and Central European countries are gigantic. Adaptation to the requirements of a market economy is particularly difficult. Opening state borders a large influx of competitive products, a decrease in real wages and other incentives have caused a drastic reduction in domestic demand for agricultural products. The problem now is how to sell, not how to produce, as Wieczorek (1996) rightly states. The very poor and increasingly obsolete infrastructure and the lack of access to cheap credit makes it almost impossible for the agricultural sector to change the production from bulk-oriented to quality-oriented.

These structural problems cannot be solved by adaptive and appropriate higher agricultural education alone. But higher agricultural education can certainly contribute to bringing these problems closer to a solution. As we have seen, most problems mentioned originate from changing international conditions. This means that higher agricultural education should take these international conditions into account. The question is what kind of new professional expertise graduates of (international) higher agricultural education need, in broad terms and in addition to more conventional disciplinary knowledge, to comply with these rapidly changing demands of a restructured rural domain and the support systems which services it. In addition to the analyses of Teichler (1991) and Neave (1991), Van den Bor et al (1995) mention the following key areas of expertise: new information technologies, international orientation, social dynamics, basic knowledge of processes of globalization and rural restructuring, integration of technical subjects and liberal arts, a comparative outlook, an emphatic orientation on the ethical and moral

implications of technical agricultural knowledge, and a deeper insight into the mechanism of university outreach.

Do we not ask too much from international higher agricultural education? Can our agricultural universities and colleges meet all these demands in our rapidly changing international society? Finding answers to these questions requires careful scrutiny and re-thinking of the mission of our system of international higher agricultural education.

AIMS AND BALANCES

Processes of globalization and rural restructuring demand critical re-orientation of international higher agricultural education. This reflection pertains to such issues as changing target groups and contents, institutional management and professionalization.

The clientele of institutions for higher agricultural education is changing rapidly. Demand categories are no longer restricted to 'regular' students in the 16-25 age cohort. New categories of international students knock at the gates of Western and Northern universities, such as students from Central- and Eastern European countries but also elderly students who will ask for tailor-made courses. This diversification of demand is, at least partly, induced by the fact that the content of education and training becomes obsolete with an ever-increasing speed. Hence, life-long and continuing learning is unavoidable. If diversification of target groups is the aim of international higher agricultural education, the balance will be dictated by financial and administrative possibilities. International education is costly and demands creativity in the yearly planning cycle. If institutions in the North and West want to diversify in this respect, and we think they should, it is of utmost importance to find financial sponsors and to promote efficiency and flexibility in the deployment of staff.

Changing social and manpower demand requires a drastic restructuring of traditional curricular content. Universities and colleges in the North and West will have to change from the traditional 'tropical' courses and programmes stemming from long past colonial times. Instead, new curricula must be designed together with international target groups. These curricula must offer ample opportunity for external input, in terms of both subject matter and staff. Reciprocity is the important word in this respect. Institutions in the North and West together with those in the South and East will have to establish mutual strategic alliances, providing opportunity for staff exchange and jointly produced curricula. Increasingly, the newest information and communication technology will play a vital role in this respect. Electronically produced 'textbooks' and databases will prove to be more economically viable than the production of conventional printed textbooks. Jointly organized international postgraduate programmes consisting of separate modules are developed already but need more support from institutional managers.

Revitalizing and restructuring international higher agricultural education presupposes focused management. International education demands specific management from Northern and Western institutions. Study programmes for international students and so-called 'regular' programmes for local students cannot be integrated as if there were no differences in student characteristics, didactic demands or other professional staff requirements. But if financial limitations dictate further integration of international programmes into 'regular' ones, it will not suffice to 'streamline' the international programmes. So-called regular programmes will have to be critically reviewed and adapted as well, if only because mixed student groups will put different demands on staff. Western and Northern institutions that deliberately aim to offer international programmes should strike a balance between their financial possibilities and managerial expertise and the very specific demands of international target groups. If they are not willing or able to adapt institutional policy to these specific demands, they will lose their international reputation and image.

Another issue which deserves special attention is the commoditization and commercialization of international higher agricultural education. Increasingly, the future of higher (agricultural) education is defined in market terms. We should find a 'market' for the 'products' of higher education. Our 'customers' should be approached by means of an appropriate 'acquisition strategy' and teachers and lecturers will be called 'account managers' before long. Wageningen Agricultural University generates 40% of its yearly budget by carrying out commercial research and teaching activities. These developments have potential positive and negative impacts. As soon as academic life becomes involved in commercial entrepreneurial activities, questions can be asked about the balance between the original idea of the "Bildungsuniversität" with its ideological undertones and the modern 'knowledge factory' that has to tune its aims and objectives to the wishes (and whims) of external sponsors (Barnett, 1990). Again, choices have to be made as to the most desirable future strategy.

ISSUES OF (RE-)LOCATION

Too long it has been taken for granted that Western and Northern universities and colleges were the best loci for international higher agricultural education. This was legitimized by the sophistication of the systems of higher education in the North and West but also, though candidly, by the specific institutional interests of these institutions. Knowledge is increasingly considered to be an economic asset which has to be marketed worldwide. This, however, is the language of economists. Advocates of these policies are not concerned primarily with the question: should possibilities for higher agricultural learning in the South and East be enforced through ongoing one-way student mobility to the North or West or through institutional strengthening in the South and East? Or, we would like to add, through a combination of the two options?

This discussion is almost as old as the system of international education itself. The present Minister for Development Cooperation of the Netherlands, Jan Pronk, has been one of the strongest advocates of building up strong systems of (higher) education in the South. However,

the Dutch system of international education has not disappeared. On the contrary, more and more international students find their way to Dutch universities and colleges (Van den Bor, 1997). Van der Wende (1996) recently analyzed the developments and trends in the provision of international curricula. She found that in all the OECD countries examined (Australia, Denmark, France, Germany, Japan and the Netherlands) there has been a large increase in the provision of international curricula over the past ten years. The motives behind this process of curricular internationalization were, generally speaking, commercial. The question remains to be answered whether this is the most efficient and cost-effective way to promote access and equity for students from the South and East.

PROFESSIONALIZATION OF STAFF

Building an 'international or intercultural classroom' has become a hot issue in discussions on the internationalization of higher agricultural education. There is growing concern about the need to culturally sensitize academic staff. But if one looks very carefully at what really happens in lecture rooms, however, one becomes easily disappointed. In a recent publication, Van den Bor (1997) questions whether the majority of teaching staff in the North and West is convinced of the necessity to receive additional intercultural training. And if staff is convinced, their working conditions are often so restricted that this type of professionalization does not feature prominently on their list of priorities.

Further it has to be realized that providing intercultural training to teaching staff who have never received basic didactic training does not make them good teachers in the intercultural classroom. Intercultural training should be based on and integrated into basic didactic skills.

Professionalization of staff for international higher agricultural education requires a broader array of competencies, however. Farkas-Teekens and Van der Wende (1995, Zie paragraaf 6.5) developed an inventory of specific lecturing skills for those active in intercultural teaching. This inventory is based on several clusters of demands, notably:

- general aspects of the lecture profile;
- aspects related to teaching in English;
- aspects related to dealing with cultural differences;
- demands related to didactics and educational innovation;
- specific demands related to subject matter mastery;
- knowledge of the international labour market;
- knowledge about characteristics of the educational system of the countries of origin of foreign students;
- use of media and new educational technologies; and
- additional optional demands.

Within each cluster of demands they differentiate between knowledge, skills and attitudes.

Professionalization of staff is the responsibility of institutional management. This brings us to a brief discussion of issues related to management and strategy.

INSTITUTIONAL MANAGEMENT AND STRATEGY

If Western and Northern institutions for higher agricultural education want to continue or even enforce their international activities after 2000, they will have to look critically at their specific institutional weaknesses. Most of these constraints can be traced back to poor strategic planning. The consequences of inadequate strategic planning may be rather serious. Van den Bor (1997) in his previously mentioned publication explored a number of these consequences, as follows.

First, a lack of integrative strategic policy-making will sooner or later result in overlooking important possibilities for international interinstitutional scientific cooperation or for commercially attractive activities. So far, many universities in the North and West have held the opinion that international contacts will automatically emerge and be maintained by individual staff members and/or departments. 'Bottom-up' internationalization is regarded as the most appropriate way for tangible international projects. Not seldom, this view leads to a *laissez-faire* policy. Far worse is that no or insufficient arrangements are made to create a much needed institutional infra-structure for internationalization, such as provisions for intercultural training, strategies to access donor-money, seed-money for project tendering, funding for mobility, provisions for technology input and a hospitable and professional climate for foreign guests and students. Possibilities for international scientific cooperation and commercial activities are presently both very expensive and sometimes highly inaccessible. It has become extremely difficult for individual staff members or departments to make proper choices, to find the way in donor land and to prioritize.

Second, lack of a central and common internationalization policy may result in a weak organization, in doing double work, in isolated activities, in short in special small kingdoms within the institution. Lack of central guidance and provision of conditions for intra-institutional cooperation and pooling of forces is absolutely necessary to face the rapidly growing international competition in academia.

Third, weak central planning has serious ramifications for professionalization of staff and management. Programmes for staff development in the areas of language proficiency, intercultural training and internationalization of curricula need central attention, support and planning. The development of professionalism in cutting edge areas, such as virtual mobility, interactive video lecturing, electronic textbook production and distance education will never be successful if not supported and conditioned at the central level.

Last, the ultimate consequences for the image and reputation of the institution (and its staff) should be envisaged. Lack of central planning will in the end affect quality of teaching, supervision of students and of curriculum development. International evaluation and comparison of quality

will become more serious and stringent now that international clientele and partners have become emancipated and rightfully demand quality. Our world changes into a global village. Northern and Western partners who fail to build up and carefully watch over their goodwill and reputation will lose a once solid image, globally!

These and other issues and conditions set the stage for our discussions on the future of international higher agricultural education. In the next and last section of this introductory chapter we will briefly introduce the plenary presentations of our distinguished speakers.

BRIEF INTRODUCTION OF PRESENTATIONS

As we have indicated above, international higher agricultural education is mortgaged with several problems at the policy level, the institutional level and at the level of actor- and target groups. Fortunately, international higher agricultural education can also take a pride in some successes and in the creation and evolution of international academic cooperation.

Frank Muchena from ETC East Africa Consultants in Nairobi, Kenya analyses the impact of the Wageningen MSc-programme on agricultural research, university training and the management of production systems in Kenya. He stresses the need for Wageningen Agricultural University to continue playing its role in the development and dissemination of knowledge, especially with a view to the selection of priority areas in agricultural research and to the 'feeding' of policy debates in the agricultural sector in the South. Re-training and follow-up of alumni is a *conditio sine qua non* in this respect, however.

Larry Zuidema from ISNAR and, formerly, from Cornell University, USA presents a very useful and detailed overview of the historical experiences in international agricultural education at Cornell. He stresses the need to constantly respond to changes taking place in the North and the South. He feels that we need to move away from programmes that singularly focus on traditional disciplines. His message is that we need to assist international students to learn how to apply knowledge in their own environments. New modes of teaching and research need to be explored through joint South-North activities. The ultimate goal should be that countries in the South and East are able to provide adequate postgraduate training for their own students.

Wout van den Bor and Frank de Jong from the Department of Agricultural Education of Wageningen Agricultural University develop a set of perspectives on international higher agricultural education for the next century. They juxtapose two completely contradictory ideal types: the knowledge multinational and the free global universitas. Future international agricultural consortia, such as taking shape now in Wageningen, will have to strike a balance between these two options. This generates important questions: what is the best balance? What are criteria for making choices? Who makes the choices and, especially, what is an appropriate strategy at the institutional

level. The authors develop concrete ideas for shaping such a strategy by developing a framework for strategic discussion and long-term development.

Niels Röling from the Department of Communication and Innovation Studies of Wageningen Agricultural University explores the present and future challenges to agricultural professionals. Starting with the Copernican Revolution he develops the notion of a highly useful and necessary academic relativism. He states that we are in the midst of discovering that our efforts to master and control our environment are turning against us. This sheds new light on what it means to be an agricultural professional in the future. The key to such professionalism is continuous learning. He ends his contribution by giving an illustrative example from the domain of soil fertility management.

The editors of these Proceedings sincerely hope that the plenary symposium discussions and presentations have contributed to the enhancement of more effective systems of truly reciprocal, long-term and participative international university cooperation in the realm of agriculture and rural development in its widest sense.

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IMPACT OF THE WAGENINGEN TRAINING; EDUCATIONAL DEMANDS IN THE KENYAN SITUATION: WHAT SHOULD WAGENINGEN OFFER?

F.N. Muchena[2]

INTRODUCTION

Since the start of the international education activities of Wageningen Agricultural University Kenyans have been trained there. Wageningen suited the Kenyan needs and has contributed substantially to agricultural research, university training, and management of production systems. In the near future, Kenya is expected to shift from a predominantly agricultural economy to an industrial economy with a large proportion of agro-industries. Accordingly, education needs will need to be refocused. General awareness of the need for sustainable production and proper natural resources management prompt a need for well-trained personnel with both a broad education and in-depth knowledge. People who can provide intellectual and management leadership are also needed. Wageningen must continue to play its leading role in development and dissemination of knowledge with a realization of the need for a multidisciplinary and interdisciplinary approach to development. Wageningen can play a role in influencing the selection of priority areas in research through participation in policy debates. A follow-up of Wageningen alumni to determine performance, retraining needs and facilitation needs is a desirable activity.

BACKGROUND

The Wageningen Agricultural University opened its doors to international students during the first Msc course in soil science and water management in 1971. This course had two Kenyan participants, one specializing in soil survey and land evaluation, the other in water management. The second training (1973) was attended by the author of this paper who specialized in soil survey and land evaluation with a minor in soil fertility and plant nutrition.

Over the years, partly stimulated by alumni of the Wageningen MSc courses, the relevance and demand of training in Wageningen grew and so did the number of participants from Kenya. The major fields of participation widened: soil science, water management, crop science, animal science, forestry, geographic information systems and technology transfer. There has always been Kenyan presence in the Wageningen Programmes since 1971, and 42 Kenyans graduated.

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One may ask the question why the Wageningen training has continued to generate interest? This can be attributed to the following:

- relevance and the quality of the training programme;
- academic content of the programme;
- relevance of the knowledge learned in the context of what the alumni are doing as perceived by employers;
- perception of the training by students; and
- intellectual setting and environment.

The concept of the training particularly as it relates to "export of knowledge", is a peculiar one and not many institutions tend to think about it especially with respect to the developing countries. At this juncture it may be relevant to refer to a common adage which states that "Give a man/woman a fish and he/she will be back to you tomorrow. However, if you teach him/her how to fish, he/she will be independent". In this context the third world experience is that there are too many people giving us the fish, which in some cases may be of questionable quality, rejected or not good enough. Emphasis on education should be geared towards creation of some degree of independence. It should focus on building and moulding people who can stand on their own feet. It should also build people with broad base education and thorough in-depth knowledge and understanding of their area of specialization. Wageningen has responded to this positively through its alumni, the majority of whom have performed above average after returning to their countries.

IMPACT OF WAGENINGEN TRAINING IN KENYA

The impact of Wageningen training in Kenya can only be judged against the education policies of the government, its aspirations and expectations including those of the employers of the Wageningen alumni.

For more than thirty years the Government of Kenya (GoK) has made efforts at providing quality education and training opportunities to all Kenyans. Its agenda for the development of the education and training system has been and will continue to be guided by its main long-standing concerns as part of its national development philosophy of combating ignorance, diseases and poverty. One of the central goals of GoK is to ensure that education and training will contribute substantial improvement in the productivity of investment through:

- ensuring acceptable standards of training;
- ensuring linking of education and training with national development;
- reducing imbalances in training programmes to meet identified needs; and
- provision of opportunities to Kenyans to go for training outside the country to gain new experiences and expertise not available in the country.

Considering the policy aspects above it can be stated that Wageningen training has contributed significantly in the following areas:

- Agriculture, particularly in agricultural research. A number of Wageningen alumni have played key role in conduct and leadership of research in the fields of soil survey and land evaluation, soil fertility and plant nutrition, soil and water management (including irrigation and drainage), plant breeding, and crop production. Some have contributed to directing research and setting priorities for research. Results of agricultural research have contributed significantly to increased agricultural productivity, for example, through improved fertilizer use, improved crop varieties etc. Wageningen alumni have been instrumental in building up and institutionalization of one of the leading soil survey organizations in Africa. I am proud of having been associated with this institution - the Kenya Soil Survey (KSS). The products of KSS (soil maps, agro-climatic maps and reports) have contributed to agricultural development, land use planning and priority setting for agricultural research.
- University education: Wageningen alumni are involved in training at our local universities. Two alumni are at Egerton University, Department of Crop Science, two are at the University of Nairobi, one in the Department of Soil Science and another in the Geography Department.
- Management of agricultural production systems. Two alumni have been and are still involved in management of sugar cane production in two of the main sugar producing organizations in Kenya, that is Mumias Sugar Company and the South Nyanza Sugar Company.
- Fertilizer industry. One alumnus is working with a company involved in compounding and sale of fertilizers as well as conducting trials to demonstrate appropriate fertilizer usage and application.

EDUCATION NEEDS IN KENYA

In the past two years there has been special attention to education particularly with regard to access, equity, quality, and relevance. This becomes more important considering the socio-economic conditions in the country. As we approach the next millennium the country has great concern for rapid development particularly in the direction of industrialization. This implies that the emphasis will shift from a predominantly agricultural economy to an industrial economy in which a large proportion will be agro-based industries alongside other industry development. The implications of this in education terms are:

- Primary education should be made universally available.
- Increased numbers of primary school leavers must go to high school.
- Need for refocussing on education and training at tertiary level.
- Need for institutions that will focus on producing technologists/technicians who can participate in the development of an industrial society.

What are the challenges of making the above happen? There is a need to improve agricultural production, management of resources and dissemination of agricultural knowledge. Therefore, training in disciplines such as crop science, plant breeding, soil fertility and plant nutrition, soil and water management, agricultural extension and sustainable agriculture will continue to be important. Considering the cyclic rainfall failures there is a need for appropriate technologies in

water management, water harvesting and efficient water use. Post-harvest crop storage, processing, and packaging for both local and international markets is also an area requiring attention. There is also a need for technologists who can design and develop agricultural machinery appropriate to the prevailing conditions in the country-both biophysically and socio-economically.

There is a need to train people at higher levels (technologists, undergraduates and graduates) in order to provide intellectual and management leadership in the development process towards achievement of national goals. Current training programmes do not have this intellectual leadership as their goal, but focus mainly on technical know-how. Hence, there is a need for rethinking and transformation of education programmes.

In the light of the above mentioned Wageningen must continue to play its leading role as a first class institution to develop and disseminate knowledge through solid scientific training programmes which focus on areas of interest to both developed and developing countries. In this way everybody benefits. This should deliberately be engineered in the process: agricultural production-harvesting-storage-processing-logistics. Another emerging area of interest of training at graduate and post-graduate levels is in the field of natural resources management. Training in this direction requires emphasis on a multifaceted and interdisciplinary approach. Students should be equipped with tools and techniques of community mobilization and collection and analysis of data on natural resources, socio-economic and cultural aspects.

ROLE OF WAGENINGEN IN INFLUENCING FINANCING INSTITUTIONS

Wageningen University can play a major role in influencing institutions such as the World Bank, European Union and Regional Development Banks towards flexibility in selection of focus in studies. Over the past ten years one has seen pressure being brought to the developing countries to re-emphasize provision of basic/primary education. If this is taken to its extreme, it is a dangerous trend because it will curtail the development of higher level education, which is essential to the development of all sectors of the economy. As pointed out earlier a well-developed human capital, especially in terms of technical and managerial skills, is one of the most critical factors for industrial development and competitiveness. Promotion of industrialization and technology is critical to wealth and employment creation. In view of this there is a need to maintain a balance in education policy.

Institutions like Wageningen can play an important role in getting institutions such as the World Bank, EU and other donors, change their outlook from emphasizing primary/basic education as opposed to tertiary education. It is this level that provides well-trained managers, skilled technicians, inventors, innovators, researchers, doctors, engineers etc. Everybody knows that these are desired specialists. Hence, the direction which education policy takes, particularly in the developing countries, is crucial. There is, therefore, a need to focus training and manpower

development policies towards specializations that are relevant to the prevailing socio-economic conditions of both the developed and developing countries.

FUTURE PERSPECTIVES

Considering the training and manpower development needs of Kenya and other developing countries in the region the following suggestions on what Wageningen training could consider in the future are given:

- In-country short term training particularly in aspects related to development studies.
- Postdoctoral courses especially in research management. These could be in the form of in-country courses.
- Short updating training courses for past graduates from Wageningen.
- Linkages with foundations to support Wageningen graduates, particularly those from developing countries, to do research after completion of their studies.
- Promote research linkages with National Agricultural Research Systems and International Agricultural Research Centres to facilitate conducting of research in developing countries. Through this, export of knowledge and sharing of experience will be enhanced.

It has been noted that over the years the duration of the MSc training has decreased from two years at the initial years of the training to seventeen months at present. Notwithstanding the thinking behind this, careful considerations should be made to ensure that there is no compromise to the standard of education and quality of graduates from Wageningen. A training period of two years is preferred for Msc training with a thesis.

Finally, I would like to thank the Organizing Committee and the entire management of the Wageningen Agricultural University for inviting me and bestowing me with the honour of addressing this distinguished audience.

Perspectives on International Development Education
The Cornell Experience

L. Zuiderna[3]

INTRODUCTION

The demand for international development-oriented education in agricultural fields of study at postgraduate level comes from both the North and the South. The nature of the demand for this type of education is changing along with political and economic changes and the rapid improvements in communications. What we offer and how we organize dealing with knowledge transfer will determine the future viability of our programmes.
Wageningen Agricultural University and Cornell University have long histories in international development-oriented education and are valued highly for focusing on training and support of professionals from and for the South. It is apparent, however, that we constantly need to respond to changes taking place in both the North and the South. We need to move away from programs that singularly focus on traditional disciplines towards programmes that also assist students to learn how to apply knowledge in their own environments. New modes of teaching and research need to be explored and incorporated into the design of our educational programmes. More joint activities with educational institutions in the South will enable us to focus our efforts on institutional strengthening. Only when countries are able to provide adequate education at the postgraduate level for their own students can we declare our programmes to be fully successful.

It is a pleasure to join the celebration of the 25th Anniversary of the International Postgraduate Program in Agriculture and the Environment at Wageningen Agricultural University. I know of no other university in the world which has made such an investment in international development education in agriculture. You are to be commended not only for sustaining this important program over the past 25 years, but also for your constant efforts to develop and improve programmes that respond to the needs of the South. This paper discusses the changes taking place in the world which will continue to influence our programmes. Most of the points raised come from my experience in the US and particularly at Cornell University where I was associated with the International Agriculture Program for the past 30 years.

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WHAT IS INTERNATIONAL DEVELOPMENT-ORIENTED EDUCATION?

The focus of this presentation is on international development-oriented education at the post-graduate level. International development education is often viewed as programmes for foreign students. But this needs to be defined more precisely. For this presentation, *international development-oriented education is defined as advanced programmes which address the unique needs of persons who are or expect to be involved in development activities in the South including technical services, extension, research, education, and institutional development.* These programmes can be based in any discipline (technical, social, economic or management) or they can be multi-disciplinary in nature. While some information on the training of foreign students is presented, the focus is on development-oriented educational programmes designed in the North that are offered to students from both the North and the South.

A distinction is made between universal education and international education. Much of the discipline-based curricula is focused on universal and basic knowledge that can be applied anywhere. While this is an essential component of postgraduate degree programmes, the focus here is on the range of learning opportunities designed to meet the unique needs of those working in the South. This includes tropical agriculture, development economics, small-scale mechanization and other targeted programmes such as those offered in the International Postgraduate Program at Wageningen Agricultural University.

It is recognized that there is a tension between in-depth discipline-focused educational programmes and those which provide breadth in relation to a particular application of discipline or are interdisciplinary in nature. The argument for strong discipline-based education is that we need to educate students for the changing needs of the future. However, those of us involved in international development-oriented education recognize that the context for applying knowledge is also an important dimension of our educational programmes.

WHY ARE WE INVOLVED?

There are really two sides to the question of why we are involved in international development education. First, what educational programmes are in demand and, second, what we are able and willing to supply.

There are two aspects of demand in relation to students from the South. First, there is intrinsic demand for educational programmes in the North that cannot be adequately provided by educational institutions in the South. Usually, this is transformed into effective demand only when there is external support since the cost of education in the North is over 10 times more expensive than in most countries in the South. So, external funds are necessary for most scholars. Second, the funding of most scholarships is based on external perceptions of what is needed to develop the agricultural and rural sectors in the South. Bilateral and international development agencies and

donors, therefore, create a demand through external pressure for international education since they recommend it and pay the cost. In short, demand for our programmes is based on the perceptions of many individuals and entities: students, country leaders, development agencies and donors.
What makes university development-oriented educational programmes attractive to students from both the North and the South? First, the programmes usually have excellent academic standing based on professors of high reputation who have a good publication record. Second, they are targeted and focused on the issues of the South (e.g. tropical soils). Third, they are flexible enough to meet the specific needs of each student. There is a fourth and less comfortable attraction. Some students seek programmes which have a reputation for making it relatively easy for them to achieve a postgraduate degree. Unfortunately, many of these educational programmes recruit international students merely to maintain student enrolment levels. Wageningen and Cornell are not among these institutions.

On the supply side, many international development education opportunities are created by the North for various national purposes. First, to expand a country's impact by utilizing its educational capacity in new markets. Second, to have educational programmes which contribute to the overall objectives of a country's foreign policy. An example of this is university participation in government-funded international development projects that have capacity building and/or institutional strengthening dimensions. Here educational programmes, qualification levels and even student research activities are pre-defined and monitored to fit the overall scheme of a project. Third, to serve national economic goals. For example, some countries develop educational programmes to give international participants an appreciation for the equipment, supplies and services that they want to export. In some cases (not here in the Netherlands), funding from governments for international education programmes is based on these conditions.

At the university level, we are involved in international development-oriented education for the following reasons. First, we recognize that a multi-national mix of students enriches the learning environment. To do this, we have made efforts to make our programmes attractive to international students. We believe that the transfer of information and ideas among students and with professors has high potential for increasing the value of our programmes to all who participate. Second, we recognize the importance of North to South transfer of resources and that the sharing of ideas and knowledge is one effective way to accomplish this. Third, when we become involved in development activities abroad, we see human resource development as a key component in the building of viable institutions in the South to serve their agriculture and rural sectors. In short, we have a vision of a better world and are trying to make a difference.

To summarize, we are involved in international development education for a variety of reasons and both the effective demand and the quality of the educational programmes that we supply effect the extent of our involvement as educational institutions. When we know our market well, we will have the opportunity to educate development-oriented students. When we do our job well, we will be building the capacity for future education in the South. Then we can look forward to the day when exchanges of professionals and ideas will be on a more mutually beneficial basis.

WHAT IS THE EXPERIENCE OF CORNELL UNIVERSITY?

Most of my experience with international education was with Cornell University where I participated in the development and management of the International Agricultural Program of the College of Agriculture and Life Sciences. Here I will refer to the particular experience of Cornell University and allow you to compare this with your own experience at Wageningen Agricultural University.

Before discussing Cornell University, let us look at the broader US context for international education. First, there are currently over 450,000 foreign students in the US (up from 82,000 in 1965, 155,000 in 1975 and 342,000 in 1985). Of this population, only 2% are currently enroled in agriculture education programmes (down from 4% in 1965). The major growth areas have been in Business Management (now 20%) and Mathematics and Computer Sciences (now 8%) and Engineering remains high (now 16%). Second, of the nearly 42,000 PhD-degree recipients (US and foreign) from US universities in 1995, 21.2% were foreign students on temporary visas (another 10% were on permanent visas). The highest proportions of foreign students were in the fields of engineering (42%), physical sciences (27%) and business and management (26%). These facts show that the US is playing a major role in international education, but that interest in agriculture education is small and declining.

The US "land-grant" universities (about 70 with Colleges/Faculties of Agriculture) have had large numbers of international students for many years. They also were involved in many USAID-funded development assistance activities in the South including over 60 agricultural university institutional development projects, which involved 35 of these universities. A 1988 study of 58 US universities involved in all types of international development assistance projects points out that university "participation in (these) development assistance activities had played an important role in the internationalization of some college (educational) programmes and activities." Also, these activities have broadened faculty experiences and perceptions which they then incorporated into on-campus educational programmes. It is interesting to note, however, that very few US universities developed international agriculture education programmes on their campuses before the late 1980s.

Cornell University was one of the early leaders in international development education in the US. At Cornell University today, the area of international development studies involves about 200 professors, a multiplicity of programme units (College/Faculty based, Department based, problem focused, and area studies focused), and over 250 specific courses that are internationally oriented. One of the largest of the Cornell programmes is the International Agriculture Programme (IAP) of the College of Agriculture and Life Sciences. Another international programme relevant to our discussion is the more recently developed university-wide Cornell International Institute for Food, Agriculture and Development (CIIFAD), which is closely affiliated with IAP.

Cornell University launched a programme in International Agricultural Development in 1963 (later the name was changed to International Agriculture Programme) as the fourth dimension of the

College along with teaching, research and extension). From the very beginning, IAP had strong support from professors, Department Chairs, the College Dean, the University President, the State of New York and the Ford Foundation. The international experience and interest of professors was high, since many had been involved in international development assistance activities, including over 60 who had participated as long- and short-term staff of an institutional development project at the University of the Philippines College of Agriculture.

The Ford Foundation was heavily involved in agricultural development activities at the time and funded the development of an internationally-oriented social science programme in the College of Agriculture and Life Sciences at Cornell (later this support was extended to the agricultural sciences). They assisted in the creation of 10 international professorships in the College by supporting them for 5 or more years under the condition that Cornell arrange for the State of New York to continue their support on State funds. Thanks to an internationally-oriented Governor (Nelson Rockefeller) and an enlightened Dean (who suggested that Cornell should view world agriculture as its challenge), these 10 international positions were established. So, one foundation block of the new International Agricultural Programme at Cornell was the establishment of 10 international agriculture professorial positions in 8 disciplines.

In the early years, IAP had responsibility for several international development activities abroad, including a large Ford Foundation sponsored project at the University of the Philippines College of Agriculture, which focused on developing the capacity of that institution to offer and award postgraduate degrees. Despite this, IAP immediately began to develop a comprehensive international educational programme on the Cornell campus to address the needs of the South. One of the first steps was the creation in 1964 of a new Graduate Field of Study in International Agriculture and Rural Development (IARD). This field of study now consists of 58 professors in several disciplines. It offers a secondary degree programme (minor) for those studying for MSc and PhD-degrees, since we believe that most students at the postgraduate level should be well founded in a discipline and treat the study of development as complementary to their major field of study. It also offers a Masters of Professional Studies degree which is discussed below.

One of the most important elements of the graduate Field of IARD is its curriculum of courses. For the past 20 years, about 60 individual courses that relate directly to international agricultural development (35 others indirectly) have been offered. Among them are twelve interdisciplinary International Agriculture courses, which are offered as a core programme to our students and others who may be interested. Two are worthy of note. The first is IA 602 which involves a three-week field trip to a country in Central America for 30 postgraduate and advanced undergraduate students (foreign and US) and 6 professors. Offered for the past 30 years, this course has been valued highly by all students for its ability to bring them into direct contact with both development institutions and targeted beneficiaries to discuss problems and alternative ways of dealing with development. The second is IA 603 on the Administration of Agricultural and Rural Development, which helps students learn how to formulate viable development projects and develop the skills to implement them as projects or programmes.

A second important element of the graduate Field of IARD is the Masters of Professional Studies (MPS) degree programme. Launched in 1973, this programme was developed to improve the understandings of development professionals about the processes of development while allowing them to up-date themselves in technical areas. It is designed to prepare existing professionals to assume leadership positions in development projects, government and non-government organizations, and international development agencies. A total of 15 students (5 from the US) are currently enroled in the 18-24 month programme. A little over half of the 200 students who matriculated in the first 20 years were from the US (several as former Peace Corps volunteers) and the remainder from 37 different countries. The minimum professional experience required for entry is two years and about half of the students had over 5 years experience prior to enrolment. While the minimum education for entry to the MPS-IARD programme is a bachelor's degree, 17% already had a Masters degree and two persons had a PhD. The majority of the students focus on the social sciences (agricultural economics, rural sociology and education); but, in recent years, interest in environmental issues has increased substantially.

One of the strategic components of the MPS programme is the development of a project paper (not a research thesis). The project paper is designed to help participants blend their past experiences with a mix of current educational activities to develop a product that they and others can use in the future. Accordingly, several field manuals and educational materials have been produced for use by NGOs, development organizations and government agencies.

In 1990, Cornell University was the recipient of a large anonymous gift for the establishment of a new institute called CIIFAD. This Institute works with groups composed of professors and students to define and execute thematic programmes (country based and universal). These programmes involve cooperative research, training and policy-oriented activities. They are designed to increase the opportunity for Cornell students (US and foreign) to conduct research abroad. Students supported by CIIFAD are among the 100 or more (10%) postgraduate students in the College of Agriculture and Life Sciences that go abroad each year to conduct research, usually in cooperation with local institutions in the South.

What are some of the lessons of the Cornell experience? First, our international programme depends on a dedicated and interested faculty with considerable international experience. Second, international development education programmes, which are usually interdisciplinary in nature, must be carefully managed to be sustainable in a discipline-oriented environment of a university. Third, international programmes must be flexible to meet the individual needs of our diverse population of students. Fourth, courses that help students make the transition from the academic to the "real" world are valued highly by our graduates.

HOW DO WE COPE WITH CHANGE?

We are living in an era of rapid change and our educational institutions are not exempt. This section looks at the changes taking place in both the North and the South that effect international development education. An attempt is made to indicate some appropriate actions that respond to these changes.

Relationships between countries in the North with those of the South are changing economically, politically and structurally. In the past, colonial interests and the cold war stimulated much of the funding that went into international development education in the North. These factors also motivated the funding of language and area studies programmes for students from the North. The new motivation for international studies for our students is called international competitiveness. Now there are less bilateral and international foreign student scholarships. Consequently, an increasing number of students or their countries must pay directly for education in the North. This means that the demand for education in our universities is now more influenced by job and business opportunities and less by development projects with human resource capacity building objectives. ACTION - These changes reinforce the need for us to focus on institution building in agriculture to enable the South to meet its own needs for postgraduate training in agriculture. This has implications for the recruitment and selection of students, for how we train them and for how we design our programmes.

Changes taking place in educational institutions in the South are influencing our educational programmes in the following ways.

First, more of the developing world countries are awarding postgraduate degrees than ever before, particularly in Asia. This is positive and we can be proud of what contributions we have made to this. Cornell was part of an effort to strengthen agriculture institutions in the South in the 1950s and 1960s and today the Philippines provides most of the human resources it needs in agriculture at the postgraduate level. ACTION - We need to develop partnerships with these postgraduate institutions in the South for joint activities including short courses and workshops to help in the development of new programmes and to strengthen others.

Second, there is diminished reliance on agriculture in the economies of many countries in the South. What has not changed, however, are the levels of rural and urban poverty. While much of this poverty is related to changes taking place in the agricultural sector, not all is ameliorated by agricultural programmes and projects. Dealing with those left at the margins of the economy is still an issue and an important focus of some of our programmes. ACTION - We need to train more persons from and for NGO organizations and empowered community organizations which are best able to deal with poverty alleviation.

Third, the pressures on the environment are increasing and competition for the use of natural resources is causing tensions and raising concerns about their availability for future generations. Agriculture can be both the problem and the solution and many countries are focusing on these

policy issues at this time. ACTION - We need to create more multi-disciplinary, postgraduate education programmes which focus on the nexus of agriculture and the environment.

There are changes in the national and discipline mix of students in postgraduate programmes at our universities. In looking at the statistics for foreign students in the US, there appears to be a high correlation between country representation and the ability to pay economically or through development assistance. Many countries that now have the ability to pay also have educational institutions at the postgraduate level, but they value our education in certain fields of study where they remain weak, for example, engineering for Koreans and business management for Japanese and Taiwanese students. Asians lead the list with almost 60% of the 450,000 plus foreign students in the US and 51 % of the 2,600 plus foreign students at Cornell University. The top 4 countries represented are all tigers of Asia, while only 4% are from African countries (both in the US and at Cornell). It is interesting to note that there are fewer Africans studying in the US today than there were Nigerians enroled in US degree programmes 12 years ago. Sadly, the need for trained manpower in Africa is even greater today than in the past. ACTION - The North must continue to provide scholarships for students from Africa and other countries where postgraduate education opportunities and ability to pay are limited.

The development interests of students from the North is also changing. The demand for development-oriented education in agriculture on the part of students from the North is currently flat in the US. At Cornell, the numbers of students in the MPS IARD programme increased to the mid-80s and levelled off at that point. The number of students producing development-oriented theses and dissertations also peaked in the mid-80s, declined in the late 80s and moved up slightly thereafter. Furthermore, there has been a move away from support by development agencies of long-term staff from the North to go to the South with the exception of staffing for PVO type activities. ACTION - We need to train more persons from the North who have a broad knowledge about development approaches to go along with technical skills so they can work effectively in small PVO and NGO projects. Others who need our educational programmes are the staff of international and bilateral development and donor agencies.

Finally, *the communications and information revolution will force changes in our educational programmes.* Two aspects are worthy of our review.

First, access to information is increasing rapidly worldwide. While many now have more information at their disposal, their ability to apply it in development settings may still be limited. One reason is that the institutional framework of the country may not be well developed or strong enough to convert this information into knowledge that can be applied effectively. ACTION - Our educational programmes must help bridge the gap between information and knowledge and the processes necessary to utilize both effectively.

Second, we now have opportunities to package educational programmes for different delivery modes. Our ability to communicate by e-mail now, and in real-time conferencing in the future, will enable us to increase the numbers of students we train at lower cost to them. ACTION - We

need to introduce more flexibility into our programmes to utilize a mix of modes. We can do this with individual students or in cooperation with educational institutions in the South through short courses, complementary programmes, joint degrees, etc. We must not lose, however, one critical dimension of our development-education programmes - lateral learning. The opportunity that our students have to share their considerable experiences and ideas with each other and with our professors is one of the real and often underestimated values of our international development-education programmes.

CONCLUDING REMARKS

The demand for international development-oriented educational programmes in agriculture and the environment will continue for some years to come, but the national mix of students and their educational needs will continue to change in relation to progress being made in institutional development in their countries. Quality educational programmes that are flexible enough to meet the variable needs of development-oriented students will survive. While the same educational standards must be maintained for all our students, we need to recognize that each person starts at a different point and has different needs. The relevance of our programmes can be improved in several ways. First, helping students develop the capacity to analyze and design programmes and activities that can make a difference should be a distinguishing hallmark of our development-oriented programmes. This means that we need to structure programs to help students deal with the processes of applying their knowledge. Second, we need to increase the opportunities for our students to become more engaged in their specific problems, while enroled in our programs. One way this can be done is by encouraging students to do their research on problems in or related to their countries.

Maintaining lateral learning opportunities to let students share the richness of their experiences with their peers from other countries will increase the value of our programmes. This is something that is sacrificed by traditional remote learning programmes, but may be possible with new forms of communications in the future.

Finally, the more our international education programmes can focus on the strengthening of local institutions, including educational institutions, the more valuable they will be for sustainable development in the South. Only when these countries are able to provide adequate education at the postgraduate level for their students can we declare our programmes to be fully successful.

I wish WAU every success in its next 25 years of development-oriented education.

BETWEEN KNOWLEDGE MULTINATIONAL AND FREE GLOBAL UNIVERSITAS
International higher agricultural education towards 2010

Wout van den Bor
and
Frank de Jong[4]

INTRODUCTION

Reform debates on content and structure of higher education are as old as the idea of the university itself. After World War II higher education in Western Europe has changed considerably. These changes relate to the role of research and scholarship, the disciplinary and professional thrusts, the ways of teaching and learning and the relationship between academia, university administration, government and society (Teichler, 1996: 90).

These general shifts are reflected, at least partly, in the development of higher agricultural education. In addition, structure and content of higher agricultural education is strongly influenced by processes of globalization, changes in the agricultural production system and concurrent ruralization (see Van den Bor et al, 1995). Global developments and the subsequent processes of rural restructuring are no longer gradual but represent a 'quantum leap' (Fuller and Van den Bor, 1995).

Over the past few years serious discussions have been initiated on the implications of globalization and rural restructuring for higher agricultural education (Van Haarlem and Colpaert, 1993). These discussions focus inter alia on targets and contents, institutional management, issues of professionalization and strategy (Van den Bor, 1993). They are both relevant and speculative. Relevant because extremely rapid societal and sectoral developments are taking place right before our eyes. Speculative because professing what higher agricultural education will look like in 2010 is as difficult as predicting who will be the next Pope. Yet, we will have to do something very soon to prevent our higher agricultural education system becoming obsolete through its own lack of innovativeness or being made obsolete by multinational media giants who see a market for virtual higher education of the worst kind. Thus, the question is: how can we structure our discussion on higher agricultural education in such a way that policymakers, university leadership, faculty and students can do something now to initiate educational improvement? We feel that a productive way of looking at higher agricultural education towards 2010 is to try and free ourselves as much as possible from dusty paradigms, conditional straitjackets and blurred tunnel visions. Instead we propose to step into a time-machine and travel to 2010. What will we find

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when we look for an institution for higher (agricultural) education in the United States of Europe? Let us assume, just for the sake of discussion and argument that our agricultural university will have developed into either a *knowledge multinational (KMN)* or a *free global universitas (FGU)*.

In what follows we develop these two polar notions by looking at the following key issues: mission, target groups, societal role, internal task differentiation, international task differentiation, disciplinary development, role of information and communication technology (ICT) and internal human resource development. We do realize that our experiment will result in two somewhat caricatural ideal types. We hope, however, that it will stimulate our discussions about the most desirable course of higher agricultural education. Lastly, we will discuss the possible ramifications for institutions for higher agricultural learning such as Wageningen Agricultural University.

PROFILE OF EXTREMES

Mission: marketeer or moderator?

The *KMN* is strongly market-oriented. Courses, modules, teaching materials and other services in the educational sphere will be geared to market demand. Logically, these products will be made in the first place for those who can afford them: industry, government, the rich in the society. Product differentiation will be based on market surveying. The KMN will try to influence consumer behaviour through the media. Presentation of products will be very important; sometimes the packing is of more importance than the quality of the product. Quality control will be strongly influenced by the market but not in the first place by individual consumers. Quality indicators will not be based primarily on scientific considerations but, for example, on the manipulative power or commercial value of the academic produce. Fundamental or small-discipline research will only be carried out on the basis of rather lengthy and cost-effective contracts with government institutions or big multinationals. The latter clients determine the research questions, however, as well as the dissemination of research results. Commercial expertise plays an important role in staff recruitment. The *FGU* is also oriented to a market. Its market orientation is not characterized by commercial considerations, however, but by the wish to moderate between people and institutions. Curricula, research programmes and outreach strategies are based on participative and societal needs assessment, scientific curiosity and the 'Bildungs' idea (Barnett, 1990: 43). Social demand plays an important role in curricular innovation. Quality control is based on academic peer review and societal recognition. Quality indicators are derived from a combination of scientific standards, societal values and ethical considerations. There will be ample opportunity for the development of original, creative research, also in so-called small disciplines. Research, teaching and outreach are equally important and researchers, educators and outreach staff are equally rewarded. Contract activities will be subject to strict rules and regulations to avoid commercial dominance. The mission of the FGU is adapted to international regulations regarding human rights, environmental care and responsible natural resource

management. The FGU is primarily financed by governments, the EU and international agencies. Scientific background, didactic and communicative skills, international orientation and ethical responsibility are important indicators in staff recruitment.

Target groups: customers or partners?

The *KMN* has customers, individual and corporate. The customer is always right or will be given that feeling. Public relations, price and market policies of the KMN are directed towards customers who can afford the knowledge and information products or who can be assisted to get access to financial means to buy these products. The total clientele of the KMN is flexible and differentiated. The choice of clientele can depend on the entrepreneurial mission of the KMN. Sometimes the production of knowledge is directed towards specialization to serve well-selected but highly affluent customer groups (e.g.the military). On other occasions the KMN is active on the 'bulk' market (e.g. food industry). The choice of target groups is always directed by the idea of profit, however. International curricula, for example, will only be offered if international students can afford the fees or if scholarships are made available by external sponsors. The KMN is not interested in issues such as equity and equal access to higher education. The needs and demands of potential target groups are assessed, and manipulated if necessary. This process of needs assessment is rather superficial and ad hoc. Customer influence on quality control will be allowed as long as this is necessary to raise profit margins.

The target groups of the *FGU* are considered partners. This holds for students, as well as those participating in research and outreach programmes. Participative action is realized in curriculum development, research programming, outreach strategies, management and quality control. As the FGU is financed by public means, its policy is directed towards providing access to financially and socially less fortunate groups of students. This policy is international and gender-focused. The influence of the partners of the FGU does not interfere with scientific standards, though. The scientific standards can be subject to discussion with partners, however. To enable target groups to function effectively in contacts with the FGU, they are continuously informed about the internal developments and plans of the universitas. Sponsors are partners as well, but financial sponsoring will not be accepted if it comes with conditions which are not commensurate with the FGU's mission and policies.

Societal role: commoditizer or conscientisizer?

The *KMN* does not feel responsible for societal developments, good or bad. Its mission is to commercially commoditize and market knowledge and information and it is not concerned with the societal impact of the knowledge and information it produces. Its relationship with society is based on image building. Building a positive image amongst a wider international audience is necessary for economic reasons in the first place. As a matter of economic logic, the KMN will work for affluent groups and institutions in the society. It will occasionally carry out altruistic

activities for less fortunate groups if this is financed externally or if it serves its positive image. The KMN will try to influence policymakers and politicians through well-organized lobbying practices. The KMN will try very hard to keep a decent image but it will not engage in ethical discussions about the societal role of science.

The *FGU* is deeply concerned about its societal role and the societal impact of its activities. This shows in its choice of research programmes and strategy, its concern for equal access and its continuous search for social justice. The FGU considers itself some sort of scientific conscience and gatekeeper of ethical standards in scientific development. The FGU realizes, however, that it can never monopolize these standards and that its conscientisizing role can only be meaningful if it is based on participation of target groups. The FGU puts emphasis on serving less affluent and fortunate groups in society and claims the right for affirmative action (i.e. to favour some groups above others). The FGU is critical towards policymakers and politicians but is also involved in policy-oriented research if this is in accordance with its mission. The FGU is concerned about its image but this concern relates to scientific integrity and societal bondage in the first place.

Internal task differentiation: specialists or generalists?

The *KMN* will look for the optimal and most profitable internal differentiation of tasks of its workers. Production work will be organized in holdings: there will be holdings for applied research, for training, for research and development, for publication, and so on. These holdings will be supported by staff units for acquisition, technology, administration and the like. This will be realized by combining institutions of different kinds beyond national borders (see further). The workers within the different production holdings are flexible specialists. Specialists because they are trained as researchers or trainers, flexible because they have to function in multi- or interdisciplinary teams which directly react to market changes. These workers have a commercial attitude and will be subject to continuous in-service training. Their corporate value will not be measured in the first place by the length of their publication list but by their contribution to the turnover of the KMN. Their salaries are not fixed but based on a bonus system. They have to be prepared to be internationally mobile and they speak at least three languages.

The *FGU* will train its personnel in a more generalist way. A solid (multi)disciplinary fundament will remain important, though. Old disciplines will disappear and new ones will emerge (see further). Staff of the FGU will be involved in teaching/communication, research and outreach, but individual preferences will be honoured. Staff members have to publish but scientific quality and societal relevance are considered more important than quantity. Teaching quality is considered as important as research expertise or outreach proficiency. Staff members of the FGU realize that utilizers of their 'products' are important sources of expertise as well. FGU staff will be trained to participate in knowledge platforms consisting of all actors involved in a particular knowledge network/system. All staff members are paid according to a standardized salary system but creative and active staff members can be rewarded additionally by giving them extra time for self-study or

international mobility. All staff members are, in principal, prepared to be internationally mobile. They are trained in intercultural issues and they speak at least three languages.

International task differentiation: grasshopper or backstopper?

The *KMN* can be compared to a grasshopper. It is a very active 'animal', bridging enormous distances but with one important goal: to be where there is green grass! The KMN will be internationally oriented but this orientation will be guided by the most interesting combination of production factors. If contract research can be carried out cheaper in Asia than in Europe, it will be done in Asia. If it is cheaper to train international students in North-America than in Africa, it will be done in North-America, irrespective of the negative consequences such as brain-drain or neglect of local (African) institutional development. The KMN will consist of a conglomerate of functional units: (former) universities, publishing houses, ICT firms, consultants and even religious organizations if such a liaison proves to be beneficial, e.g. in tax-paying. As the KMN produces knowledge products, information and communication technology will be of utmost importance. Irrespective of the mobility of its workers and of ICT, however, expertise will be concentrated in places where the mix of production factors is most advantageous. This implies that relatively simple production functions (e.g. printing of materials) will be realized in other parts of the world. The gap in expertise between different geographical locations of the KMN will become institutionalized.

The *FGU* is not monopolized by economic considerations. It will try to spread its functional activities to enhance local and regional institution building. This means that traditional international task differentiation will change. Foreign students will no longer be trained exclusively in Europe but also in their home country (see, for example, Stigter et al., 1995). European and North-American partners will assist in this process of institution building. The concept of 'reciprocity' is very important in this respect: scientists from the South and from the East will be invited to come to teach and do research in the North and the West. Javanese social scientists will do anthropological research in Denmark and African staff will teach Dutch students in Wageningen. Northern and Southern scientists work together in the FGU to produce textbooks and databases, using the most up-to-date ICT possibilities. Students will be allowed to take modules in virtual classrooms (see further) from different institutions united in the FGU. Modules and study programmes at different levels are internationally acknowledged and included in an international qualification system. Results of scientific research will be made accessible and widely disseminated and discussed with respondents and utilizers. The FGU as an organizational network will monitor and backstop all these activities.

Disciplinary development: demand-driven or problem-oriented?

Conventional disciplinary boundaries are, at least partly, fading away. This is a consequence of the rapidly growing socio-economic and technological complexity of this era. This is especially

true for applied disciplinary areas. Plant pathology gives way to integrated pest management, agricultural sociologists become rural development analysts and so on. The KMN has a keen eye for these disciplinary changes. It will not play a very big role in the definition of new disciplines but it follows the demand for new experts and expertise. Also it translates these new disciplinary demands into curricula offered to customers. It offers training packages to those who have to be retrained in a new discipline. As long as the outside world asks for a functional differentiation in creators, managers, utilizers, brokers or facilitators of knowledge, the KMN will train them (see Van den Bor, 1993). The KMN contributes to disciplinary changes of different sorts, but this contribution is in the first place demand-driven. It is perhaps better to say that the KMN offers new professional orientations by re-arranging conventional disciplinary inputs. That is, if there is sufficient purchasing-power. The *FGU* is also concerned with the changing disciplinary boundaries. The universitas, however, tries to play an active role in this process. It acknowledges its scientific and societal responsibility in stimulating debate, in critically re-examining scientific theories and paradigms, in deliberately developing new (sub)disciplinary lines that do not seem to have much impact at first sight. This strategy of the FGU is not only ruled by scientific considerations but also by normative and ethical standards. If, for example, the FGU acknowledges the worldwide negative consequences of unlimited consumption of animal protein, it will stimulate disciplinary changes in food technology so as to explore alternative resources of protein for human consumption. The FGU focuses on problems rather than disciplines, and this problem orientation is mirrored in teaching, research and outreach. Problem orientation is not in the first place demand-driven but based on a continuous societal alertness and knowledge negotiation with different societal actors. The FGU receives substantial public financing for this critical role. The FGU acknowledges that disciplinary differentiation is time-, place- and culture-specific. It also recognizes that rationality is but one human property with which to tackle societal and even scientific problems. It does not neglect or disqualify the impact of spirituality, intuition and other so-called subjective approaches to problem definition and problem solving.

Information and communication technology: means or meaning?

As stated before, we can safely assume that ICT will play a very dominant role in future higher education. The KMN will use the possibilities of new ICT to its fullest potential. ICT functions as a delivery system for new KMN knowledge products. The KMN uses virtual classrooms to market its products on a global scale. Its staff will be virtually mobile using interactive video-conferencing and teaching. Textbooks and databases will be electronically produced and made available via Internet or CD-ROM. In doing so, the KMN is subject to substantial influence from media-giants, publishing houses and satellite-owners. These industrial powers will participate in the KMN through strategic alliances. In applying the possibilities of ICT, the KMN does not so much use didactic or communicative indicators for quality but looks at cost-effectiveness in the first place. This implies that ICT-advanced customer markets will benefit most from the products of the KMN. The KMN will only invest in ICT-development in ICT-poor areas inasmuch as prospects for future purchasing power are favourable. Thus, ICT is seen as a means to profit making, product differentiation and the elimination or buy-out of traditional knowledge and

information providers. The KMN is not interested in the detrimental societal, educational or scientific side effects of ICT.

The *FGU* is also very interested in looking at the benefits of ICT. It does apply ICT in its teaching, research and outreach but not without scruples. Continuously the FGU will critically analyze the meaning of ICT for its work. It will pose and scrutinize questions such as the following. Does ICT really enrich our education? What is the implication of the unlimited use of ICT for personal communication between our staff, between students and staff, between staff and society? Does the use of ICT narrows the technology gap between North and South, West and East or does it widen the distance? What can personal communication offer that can never be replaced by virtual communication? What are the advantages and setbacks of virtual mobility compared with personal mobility of staff and students? What does the use of ICT mean for the accessibility of our services? In doing so, the FGU will make ICT an object of scientific analysis and ethical validation. Another important question is to what degree ICT enhances learning, learning abilities and knowledge construction abilities amongst learners/teachers (De Jong, 1995; De Jong and Volet, 1995)? The FGU is critical about the influence of media-giants and publishing houses on scientific standards.

Internal human resource development: account managers or science brokers?

Internal human resource development or professionalization of staff is essential for the *KMN*. As stated before, the workers of the KMN have to be very commercially oriented. They must have scientific interest, of course, but their first concern is not the promotion of science, but the selling of knowledge and information products. They will have to be good account managers in the first place. If the KMN cannot meet the demand, these account managers will have to look for external inputs in a flexible way. They are well-versed in ICT and they are internationally mobile. The KMN puts great emphasis on ongoing internal professionalization of staff but if staff training can be contracted from outside more profitably, this will be realized. The management of KMN is commercially trained and has an outspoken entrepreneurial outlook. Salaries and incentives of staff and management are compatible with those in other industrial sectors.

The *FGU* also puts great emphasis on internal human resource development. Staff members are in the first place scientific brokers and mediators, however. They are interested in doing scientific work but especially in bringing groups together in society that can contribute fruitfully to scientific debate and development. Staff members of the FGU realize that sources of knowledge and information are increasingly diversified. Alternately they are generators of knowledge and consumers of knowledge: they are working in the context of a learning organization and the knowledge society (Senge, 1990; Bereiter, 1994; Bereiter and Scardamalia, 1994). They bring people together in 'platforms' to define problem areas and strategies for problem solution (Röling, 1997). Staff is well-versed in ICT but has a keen eye for its societal implications. Staff is highly internationally mobile, culturally sensitive and didactically well-trained. The management of the FGU is a combined effort of well-trained technical administrators and scientific heavy-weights.

Salaries and incentives of staff and management are decent but are not necessarily tuned to the level of industrial sectors.

INTERNATIONAL HIGHER AGRICULTURAL EDUCATION, QUO VADIS?

The simplicity and reductionist character of ideal types, scenarios and megatrends have the advantage of inducing feelings of enthusiasm and/or awe. Prospective thinking about the character of the KMN or the FGU will certainly evoke these feelings. If prompted to make a choice, our reaction will probably be: "We want the best of these two possibilities". This raises a number of important questions:

- What is 'the best'?
- What are the leading criteria in making such a value judgement?
- Who makes these judgements?
- What is the most appropriate strategy to realize the most desirable option?

The first question -what is 'the best'- can only be answered by confronting claims and aims of international higher learning. Claims are influenced by general societal developments, sectoral labour market developments, international division of scientific work and trends and developments in higher education. These developments are partly interconnected, partly autonomous in character. In earlier publications we have analyzed these developments in more detail (see Van den Bor, 1993). The Western European idea of the university, for example, has changed over the past decades from elite institution to mass enroller; from teaching community to 'research factory'; from 'Bildungsuniversität' to entrepreneurial university; from adolescents sanctuary to a 'straitjacket' for students and the management style developed from aristocratic leadership to strategic management (Van den Bor, 1993: 50; see also Teichler, 1991; Neave 1991 and Husén, 1991).

The important thing to stress here is that we have a choice, at least to a limited extent. Those involved in international higher education can formulate their general aims! We can influence enrolment at our universities by trying to solicit sponsorship for less-advantaged international students. We can attach more value to teaching instead of adapting mulishly -or sheepishly- to the 'publish or perish' motto. We can be more critical about the entrepreneurial mission of higher education. We can try to see our students not so much as 'output' but as potential partners in the academic discourse. We can look for a more enlightened management style that enhances a less unilateral definition of strategy.

This brings us to the second question. Making judgements requires a set of criteria. The sources of these criteria are manifold and strongly varied. The general societal role of the university is an important source. This role is reflected both in social demand and manpower demand. The latter demand strongly relates to developments in the sectoral professional domains. Developments in agriculture, food production and environmental care are predominantly independent of what a university chooses to be, but not totally. Universities and their staff are also opinion leaders and

discussion partners of policymakers and industrial entrepreneurs. As such, universities have a role to play in criteria development as well. Another source of criteria is the discourse of what scientific work should encompass. Is our work dominated by a rather reductionist, positivist and technological scientific paradigm or are we susceptible to a more holistic, constructivist scientific approach (Pretty, 1994; Engel and Van den Bor, 1995)? A last source of criteria to be mentioned here is connected to the ethical domain. What are the ethical standards that shape the content and nature of our research, teaching and outreach. Where do we position ourselves on the continuum between being 'social and ethical gatekeepers' and 'academic prostitutes'?

The next important question is: who makes these choices and judgements? This question strongly relates to management style and management strategies. The latest developments in institutional management practices, at least in the Netherlands, are not very promising. Management of higher education tends to become more top-down and command-oriented. This does not preclude participative decision making per se, however. Centralized management of international higher education could be beneficial to a more communicative institutional atmosphere, if our new managers realize that the university is not an industrial firm but a meeting place of responsible and highly trained professionals and emancipated clients. This confrontation of academic professionals and different groups of critical clients can only be fruitful if all actors concerned have at least some common feeling of ownership of what the university is all about. This requires managerial enlightenment and wisdom. More concrete it presupposes proper internal and external information systems, institutionalized possibilities for discussion, consultation and negotiation and transparent procedures for ex post legitimation and control of management activities.

This may all sound rather abstract. Yes, we all want to live in paradise but can we say something about how to arrive there? What are appropriate strategies to realize the most desirable options? This is the subject of our next and last section.

TOWARDS WAGENINGEN UNIVERSITY TRUST ON PROCESS-ORIENTED INTERNATIONAL AGRICULTURE: W-UTOPIA

In this last section we will not present concrete proposals as to where Wageningen Agricultural University or any institution for higher agricultural learning should position itself between the postulated KMN and FGU ideal types. Apart from not being qualified to do so we strongly feel that this should be the outcome of an intensive process of discussion amongst all actors concerned. Instead we propose a framework for strategic discussion and long-term development. The final outcome of this development should be a Wageningen University Trust On Process-oriented International Agriculture. The domain of agriculture should be defined in its wider rural context.

The road to W-UTOPIA will be paved by creating the following platforms or whatever kind of fashionable name one wants to give them. We distinguish four of these different infrastructures, as follows (see also figure 1):

- the Internal Mediator for Innovative Development (IN-MIND)

- the External Mediator for Innovative Development (EX-MIND)
- the Environmental Arena Reader (EAR)
- the Human Energy And Resource Treasury (HEART).

Let us have a closer look at the functions of these four infrastructures. The *IN-MIND* is a platform of actors from within the institution. The IN-MIND includes representatives of academic staff, administrative and support staff, students and institutional management. If the university develops into a consortium of some kind by liaising with other (inter)national universities, colleges, research institutions or commercial enterprises, these external partners are also represented in the IN-MIND. The function of the IN-MIND is to optimize internal communication and consultation. The IN-MIND does not take decisions; it is a think-tank which meets two or three times per year. It discusses all the key issues that have been analyzed earlier in this paper (mission, target groups, societal role, et cetera). The discussions of the IN-MIND are fed by information provided by the EX-MIND, the EAR (see further) and by the formal management of the institution. The IN-MIND is administratively supported by professionals of the central office of the institution. It consults external experts if and when necessary. The IN-MIND may install ad-hoc working groups to do detailed research on certain issues. The *EX-MIND* is a platform of actors from outside the institution. The EX-MIND includes independent international key-persons who are interested in the working domains of the Wageningen consortium. The EX-MIND discusses the ideas and strategic proposals of the IN-MIND by confronting them with international societal developments, sectoral changes and ethical implications. The EX-MIND also presents advice and suggestions for management. The discussions of the EX-MIND are fed by the IN-MIND, the EAR and by the formal management of the institution. The EX-MIND is administratively supported by professionals of the central office of the institution. Members of the EX-MIND receive a reasonable remuneration for their time-input. Their independence, however, is guaranteed by charter. They meet once every year in an 'neutral' setting.

The *EAR* is a functional unit within the Wageningen-consortium consisting of a small team of experts. The main functions of the EAR are:

- to follow developments in the agricultural sector and in rural development, globally, nationally and regionally
- to assess developments in the actual or perceived international labour market
- to take account of developments in international higher (agricultural) education
- to regularly analyze, interpret and 'translate' these developments into digestible information for the IN-MIND, EX-MIND and HEART and, of course, for central management of the consortium.

In general, the EAR will not do research itself. It will make use of scientific research carried out by others. It will, for example, commission departments of the consortium to carry out contract research. The EAR's task is to listen, to interpret and to feed information to the other infrastructures of the Wageningen consortium. Also, the EAR presents a yearly 'Promising Activities and Chances Report'. The EAR enjoys strict independence in its strategy of providing information to the other infrastructures.

The *HEART* is the internal functional unit dealing with the generation of human energy and resources. The following functions are combined in the HEART:

- the development of instruments for internal quality control
- ongoing professionalization of academic staff in terms of research training, didactic training and improvement of outreach proficiency
- providing possibilities for training of support and administrative staff, especially in the areas of liaison, transfer, acquisition and public relations
- developing a flexible reward and incentive system for all staff
- developing a strategic alumni policy as well as a client-follow system
- the development of innovative options and instruments for internationalization of the consortium.

The HEART is fed by the EAR, the IN-MIND and the EX-MIND. It publishes a yearly and independent 'Report on Perceived Human Energy and Resource Needs'. The HEART is financed centrally but can work as a contractor for external clients on a commercial basis. For reasons of cross-fertilization and independence, the HEART is organizationally connected to an appropriate academic department.

The four functional infrastructures are represented in the following figure.

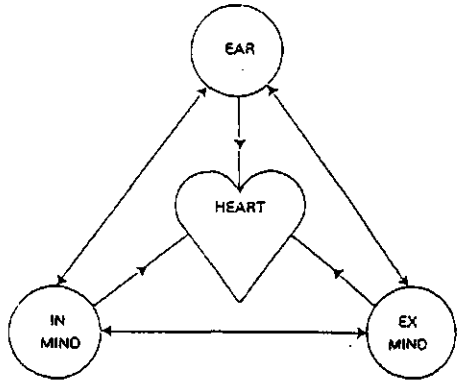

Figure 1 Framework for strategic discussion and long-term development

It goes without saying that the development of W-UTOPIA as a consortium requires strong central management. Future managers have to be daring, creative and imaginative people. They need the ability to involve all actors concerned in a participative process. They will have to accept that the outcomes of such a process cannot be professed or unilaterally decided. They need the ability to motivate people by developing a proper mix of challenges and incentives. Let us call them provisionally the General University Transformation Squad. Yes indeed, GUTS...

CONCLUDING REMARKS

This paper presents a somewhat fictitious image of international higher agricultural education towards 2010. We hope, however, that there is also a visionary element in this contribution. We do believe that our present way of dealing with the 'quantum leap' changes that affect our institutions for higher agricultural learning is rather piecemeal, ad hoc and short-term.

Our strategic thinking is too piecemeal because we have great difficulty in conceptualizing how the different functions of our institutions interrelate and how these functions can enforce each other. We try to innovate the institutional context of research and education by creating graduate schools and schools of education within the university but we have no idea as to how these institutional sub-groups relate to each other and how they can contribute to realizing each other's and our common missions. We try very hard to develop strategic lines for interinstitutional cooperation, but these initiatives are more often based on incidental reports of interested outsiders than on an in-depth discussion as proposed in this paper.

Up till now our strategic thinking has also been rather ad hoc. It was induced by external policy measures, especially financial ones. Also the prospective development of student enrolment has been used as an indicator for strategic thinking. In this way, strategic thinking has become too much of a re-active and incidental tool instead of being pro-active and comprehensive. We will have to accept that change will be the rule, not the exception. This implies that management of change will have to be institutionalized in our management infrastructure.

Like any other utopia, W-UTOPIA will never be realized. The advantage of utopian thinking, however, is that it prevents us from improper short-term action. Long-term thinking about missions and target groups is absolutely necessary, as we have to take short-term organizational decisions with serious long-term consequences for all actors concerned. More haste may easily result in less speed.

The human factor and especially the way individuals and groups can be motivated, con-vinced and rewarded determine the viability of any strategic initiative. People need to know the why's and what's in a longer term perspective. Consequently, it is absolutely necessary to bring people together in a structured, non-incidental and long-term setting. If we manage to do this we might come a bit closer to a truly professional learning organization.

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THE CHALLENGES TO AGRICULTURAL PROFESSIONALS

Niels Röling[5]

INTRODUCTION

Ladies and Gentlemen, my task today is to present some ideas on the challenges to agricultural and environmental professionals. Allow me to start by saying that I feel very honoured to have been asked to address you today. It makes me happy and proud that we now have such a large and flourishing international community here in Wageningen, which brings us so many new ideas and links us to the rest of the world.

Some kid asked me the other day whether I knew the difference between Wageningen and Yoghurt. The answer was: yoghurt has culture.

I protested. It is true, Wageningen does not have an opera house, and I do not think the average inhabitant excels in his/her interest in literature, music or modern painting. Our indigenous sculpture is a cross between a phallic symbol and a budding plant. But if you take 'culture' in a slightly wider sense, we are now a multi-cultural society. So the difference between Yoghurt and Wageningen is that Wageningen has many cultures.

When I turn to the exploration of challenges to agricultural professionals, I do so from a deeply-felt realization that my perspective on the future is strongly coloured by my own culture. That is why I will start explaining my perspective on the future as a continuation of the Copernican Revolution, so that you can assess my future for yourself. I will proceed from there by elaborating on the role of professionals in that future. I will end by using soil fertility management as an example.

Overview
- my future: continuation of the Copernican Revolution;
- what it means to be an agricultural professional in the future;
- the key to professionalism: learning;
- example: soil fertility management.

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MY FUTURE: CONTINUATION OF THE COPERNICAN REVOLUTION

The Copernican Revolution is named after Copernicus, the 16th Century Polish astronomer who demonstrated that, contrary to the Ptolemaic belief at the time, the Earth is not the centre of the universe. Instead, we find ourselves turning around an undistinguished star in one of thousands of galaxies in an immense and unknown space, a cold void which provides no comfort or security.

Since then a series of intellectual revolutions have reinforced what Copernicus started (Tarnas, 1991). Darwin showed that, instead of having been created and elected by a higher Being, we evolved from lower life forms just like all other organisms. It took us many years to accept the evidence of fossil humanoids. And even now the Dutch National Secondary School Exam never sets questions about evolution because students at denominational schools are not told about it. But of course, Darwinism and genetics are important foundations of modern agriculture.

Then Freud came. He shocked us by making plausible the idea that our behaviour is not governed by our manifest will and intellect, but to a large degree by a subconscious which has its roots in a murky animal past.

And now we are in the midst of the latest instalment of the Copernican Revolution. We once thought that we could build a body of objectively true knowledge and effective technology with which we could master our planet and control our environment. That, of course, was the core idea of the Enlightenment. We are now beginning to realize that such a body of knowledge cannot exist (e.g., Knorr Cetina, 1995). Instead, people use language to socially construct knowledge which hopefully leads to effective action. If it does not, they have to de- and re-construct. Our survival mechanism is learning. If we do not learn, we are done for. A fixed body of knowledge is suspicious, it is dangerous to depend on it.

We are in the midst of discovering that our efforts to master and control our environment are turning against us. As a result, we live in a 'risk society' (Beck, 1994), governed by great uncertainty about issues for which the stakes are high (Funtowisz and Ravetz, 1993). We realize that science and technology have greatly improved our lives, but also that they have got us into trouble. As a result we are trying to rethink how we can survive and to reformulate our paradigms and principles. But we are still largely groping in the dark, and most of our technologies, institutions and policies bear witness to the momentum of obsolete enthusiasms.

A great deal of self-renewal is going on and that makes our times very exciting. But it is by no means certain that we will be able to learn our way to a new future. If one looks at the green history of the planet (Ponting, 1991), there is little reason for optimism. We are indeed remarkable intentional and sense-making beings on a finite globe floating in a far corner of an immense space. We create opportunities for living by our wits. Our biggest problem is our greed, our biggest opportunity our ability to learn and collaborate.

That, ladies and gentlemen, is the future as I see it. As you can imagine, such a perspective has many consequences for the challenges which arise to agricultural and environmental professionals. You might well disagree with my view of the future, but I am stuck with it. So let me continue with my exploration of what it means to be a professional in that future.

WHAT IT MEANS TO BE AN AGRICULTURAL PROFESSIONAL IN THE FUTURE

We seem to have four main ways of making a living (e.g., Habermas, 1984 and 1987): technology, strategy, collective action and spirituality. Let me briefly explain each, because they are at the heart of professionalism.

Ways of 'making a living'
- technology
- strategy
- collective action
- spirituality

Technology

Especially in Wageningen, technology has always been seen as a key route to, and the core of, professionalism. Technology allows us instrumentally to manipulate causal relationships. People have been incredibly clever in devising technologies to control the environment so as to make it productive, provide protection and comfort, and remove enemies and competitors, whether other people, animals, plants or diseases.

Most of the staff and students in Wageningen are engaged in technology in one way or another. This used to be even stronger in the past. In fact, the main mission of the University used to be to develop 'the best technical means' to increase productivity and efficiency. Every problem had its technical fix. And science was the source of technical innovation. In fact, technology was, and often still is, defined as applied science. My own field was popular because it focused on technology transfer and multiplied the work of the scientist.

All in, we had a very consistent world view. The university was the top of a scientific pyramid. It was engaged in fundamental research which discovered the secrets of nature. Somewhere down the line were institutes of applied research, experimental stations and experimental farms. The farmers and other natural resource managers were the users of what we had developed. We trained scientists and technical professionals, who could be deployed along the science-practice continuum, the arena for development.

Since then a lot has happened. Wageningen still focuses on technology in many ways, and most of the international students are enroled in technical subjects. But the nature of the focus has changed. In the first place, we now realize that technology is not the only route to professionalism and also recognize professionals in such fields as economics, marketing, and participatory approaches to rural development. In the second place, a narrow technical focus has become unprofessional. The technologist has to be able to take into account socio-economic and political dimensions. In the third place, the nature of technological thinking itself is changing. Let me explain that third point.

We used to focus on simple equations which allowed us to optimize single variables, such as yield, and suppress everything else. We have realized that this approach is unsustainable. We are now dealing with complex, evolving, discontinuous, chaotic, non-linear, if not self-organizing, systems, which require adaptive management, that is, 'flexible diverse and redundant regulation, monitoring that leads to corrective responses, and experimental probing of the continually changing external reality' (Holling, 1995). In other words, the latest instalment of the Copernican Revolution is rapidly replacing simple instrumental thinking also in technical fields, especially where agriculture, ecology, natural resources and environment, our core interests, are concerned.

I see the helping society coming to grips with adaptive management as a major emergent challenge to agricultural professionals.

Strategy

The second way of making a living is strategy. Strategy is not directed at the bio-physical environment, but at other people. In the struggle for scarce opportunities, we use strategy to maximize utility in competition with others.

I still remember the time when the extension service in the Netherlands shifted from technology diffusion to 'enterprise development'. It was sometime in the early sixties. Instead of focusing on only introducing single component technologies, such as fertilizers, the task expanded to helping farmers run their farms as a business. In addition to technology, economic thinking became an important element in the arsenal of the professional. It was no longer enough to be technically competent, one had to be businesslike as well. But technical innovation remained an important condition for staying in the market place. In other words, strategy was added to technology.

Where technology leads to productivity, it leads to profit and competitive advantage. We live in a period marked by enthusiasm for liberalization and the belief that free market forces will automatically guide a society composed of strategic actors in the right direction, much like Darwin expected selective pressures to lead to the survival of the fittest.

Many have realized, however, that the market fails in a number of key areas. It does not ensure that we deal with natural resources in a sustainable manner (e.g., Van Ierland, 1996). It does not

ensure equity and poverty alleviation. It does not ensure development of the South. And it does not ensure that farmers will receive a parity income. In other words, cracks are appearing in the international consensus about the blissful effects of liberalization. I see as the second major emergent challenge to professionals the support of effective and negotiated trade-offs among productivity, competitive advantage, equity, and sustainable use of natural resources (Conway, 1994). These trade—offs will also require adaptive management, and they will require more than the manipulation of incentives through fiscal and other policies which appeal to the selfish, utility maximizing, actors thought to make up society.

Collective action

I believe we are rapidly moving into a period in which the third way of making a living, collective action, is added to the other two as an indispensable dimension of survival. Collective action is needed to deal with two major challenges.

In the first place, the collective effect of our individual activities to control the environment is increasingly seen to have a negative impact on our health and wealth. We are destroying our fishery stocks; clean water is rapidly becoming our scarcest resource; chemical pollution is threatening the reproductive capacity of organisms everywhere, including that of human males; we are losing the genetic diversity of our crops; our traffic is seizing up; our soils are degrading; our climate is disturbed, and so forth. In other words, our own activities are rapidly becoming the major threat to our way of life, if not to our survival.

In the second place, we are becoming all too aware of the fact that there are simply not enough resources on the planet to allow everyone the way of life we have developed in the North. Maintaining our share of the world's resources, and hence global inequity, is a recipe for political instability, war, and moral corruption. That moral corruption is already felt by some of our foreign students in their encounters with European immigration officials. Also in this sense, our way of life is becoming a major threat to itself.

But we have started learning how to deal with the double threat. Technical fixes are recognized to have only limited relevance to these problems. The same can be said for strategies that increase competitive advantage and profit and serve the selfish quest of maximizing utility. In fact, it is technology and strategy that have led to our predicament in the first place. That predicament is a consequence of our success in technology and strategy.

What is required now is collective action to conserve and regenerate the productive capacity of our natural resources. What is required now is negotiated agreement on what we shall call enough and on its distribution. We need to test Ghandi's famous saying that there is enough for everyone's need, not for everyone's greed. Facilitating collective action is the third challenge to agricultural professionals that I see emerging. This professionalism will, again, not replace

technology and economics, but certainly will become an indispensable part of the professional repertoire.

Spirituality

I come to the final way of making a living: spirituality. At present, the enthusiasm for collective action is just beginning to gain momentum in such areas as common property resource management, consensual approaches to conflict resolution, interactive policy development, and global equity. But during the period we are talking about, i.e., the period up to 2015, the enthusiasm for collective action is likely to develop its own cracks. We shall learn that collective action can only solve some of the problems we are facing. What's more, collective action will certainly generate problems of its own, much like technology and strategy have done.

What is beyond collective action is a bit of a guess at the moment. I mention spirituality for two reasons. One is that, in my favourite position as a gatekeeper to higher qualification, I meet young people (e.g., Van Eijk, in prep.) who are keenly interested in spirituality as an essential ingredient of professionalism. The second reason is that, if the biggest threat to our survival is our own behaviour, and if collective action to agree on more sustainable behaviour proves inadequate, then the only recourse is to change our intentionality, our greed. Then we must grapple with the question how we can be happy and fulfilled without making increasing claims on our environment. That is why I mention spirituality.

But perhaps I am totally mistaken in emphasizing it. Perhaps there is a technical fix after all, in that we shall develop electronic virtual reality to a point where we can indulge in consumption and get all our kicks without it having environmental consequences. By developing such virtual gratification for the poor, the rich would be able to continue to enjoy the real thing.

Later today, Professor Van den Bor will elaborate on some of the routes we might take. For me, it is time to draw the lessons for the more concrete challenges facing agricultural professionals. (20 minutes)

FOCUS ON LEARNING

Until some ten years ago, a professor in Wageningen had the honorific title of 'Very Learned Gentleman', a Doctor was called a 'Learned Gentleman', and the MSc a 'Nobly Sincere Gentleman'. Apart from the Queen, there was no need to take women into account. These titles signified that people who had academic qualifications were something very special, elites, and above all, experts, who could solve problems for the rest of us. There was a tremendous difference between those who were learned and everybody else, and professors allowed themselves eccentricities, otherwise only seen among nobility.

Alas, those good old days are definitely gone. Professionals can no longer operate on the basis of acquired status. The knowledge they have gained soon becomes obsolete. The life cycle of expertise is not longer than that of a new generation of computers. The diversity of problems is such that uniform solutions cannot be imposed. What is more, the people for and with whom professionals work are increasingly aware of the value of their own knowledge and increasingly educated to boot. Furthermore, they are increasingly sceptical about expert advice.

In Wageningen we have experienced this, for example, in the international courses organized by the IAC. I have been associated with them since 1970. In the course of those years, the sophistication, the level of knowledge and the self-awareness of the average international participant has continued to rise to a point where the value of what we have to offer is no longer self-evident. Instead of thinking of ourselves as experts, we have come to accept that we can at most help others to learn, and that only if we are prepared to learn ourselves.

There are a number of important consequences for professionals. The first is that instead of only knowledge as regards content, the professional will increasingly need process skills in order to understand the development and interactive processes in which he or she is involved. Such an understanding is essential for making a professional contribution.

The second is that the professional needs to be adaptive. One's tendency is to redefine problems so that they fit what one knows. But increasingly, the challenge is to adapt what one knows to the nature of the problems.

Third, our understanding of the complexity of systems and of the potential of exploiting diversity have made us recognize the need for adaptive management, as I mentioned earlier. This has far-reaching consequences. It means that we cannot, as professionals, rely on uniform solutions which blanket large recommendation domains. Instead, the natural resource managers who are our clients, whether they are farmers, foresters, drinking water company directors, food processors or others, must be looked upon as experts themselves, able to apply principles in diverse situations.

A typical example is the first principle of Integrated Pest Management: the farmer is an expert. IPM is not achieved by experts transferring rules to farmers, but by helping farmers to become experts at adaptive management themselves. From the professional this requires asks not only sound knowledge, but especially an ability to create learning situations for farmers and to learn interactively with them. Instead of FOR, professionals will have to work WITH their clients.

The last point I want to raise here is that professionals are likely to work increasingly in institutional contexts which are different from the centralized bureaucratic structures most of us have been used to. Professional values and bureaucracy have never been very compatible. But increasingly, the monolithic public structures for research, extension and other professional endeavors are being abolished in favour of decentralized networks, marketing chains, projects, matrix structures, and other shifting temporary arrangements. That implies an ability to work in teams of professionals with complementary skills and perspectives.

To bring it all together, I summarize the challenges for the agricultural and environmental situating, by saying that:

the professional has
- an ability to learn rather than a body of knowledge;
- an aptitude for adaptive management rather than a focus on instrumental control
- an orientation towards trade-off among different goals, rather than towards optimization of one goal;
- an ability to mediate collective action as a way of dealing with natural resource dilemmas, rather than a focus on technical control;
- an ability to help others become experts, rather than being an expert oneself;
- an ability to work in teams, rather than in bureaucratic institutions.

SOIL FERTILITY MANAGEMENT AS AN EXAMPLE

Let me conclude my presentation with an example. I have chosen soil fertility management, not only because it is an increasingly critical issue, but also because it is an issue about which we are learning very fast, also here in Wageningen.

Until fairly recently, soil was basically seen as a solution in which a number of nutrient minerals were dissolved. If they had been used up by crops, they needed to be replenished by fertilizers. As a result of this perspective, the focus of research was on the responses of crops to fertilizers. First this focus was purely technical: the best fertilizer dosage was the one that gave the highest yield. Later on, economic considerations led to a revised choice: the recommended dosage was based on the point of highest economic return. The yield gap between experiment station and best farmer practice was adjusted to including what was considered economic sense from the farmers' point of view.

In the field, professionals promoted the adoption of fertilizer as a component technology. At one time, the FAO had a fertilizer programme which used the slogan 'fertilizer is the spear head of development'. We have a course at the IAC, now called 'soil fertility management' which had its origins in those days. It was called 'the fertilizer course'.

The fertilizer recommendations were uniform and blanketed immense areas. One recommendation covered the entire Island of Java in Indonesia, which has a hundred million inhabitants. Even now there are organizations, such as Global 2000, which claim that the only solution to the world's food problems is the use of fertilizers. Farmers are expected to follow the recommendations of scientists and extension workers. The expectation is definitely not that they experiment themselves to figure out what is best in their circumstances. Of course, many of them do. It is interesting to

study what farmers actually do. But that was of no interest to the professionals of those days. They promoted the recommendations based on their expertise, whatever the farmers' situation.

The old approach is still with us in many ways. But things are changing rapidly. In the first place, soils are now considered much more complex than a solution of nutrients. Organic matter and its interaction with the minerals in the particles of the soil is an important source of variation. Soil life, including mycorrhiza, is considered to play a vital role in the ability of the plant to use the available nutrients. Trees are recognized for their ability to bring nutrients from deep layers and make them available to crops. Nitrogen fixation by plants and algae is an area of immense research interest. In other words, complexity, diversity, discontinuity across seasons and rotations, and other complications are now inherent attributes of soil systems. The indigenous knowledge of farmers is considered a potential source of insight into this complexity.

The economic reality is that farmers, especially the poor ones who need to feed their families from as little as a quarter of a hectare in many countries, cannot afford fertilizers. Subsidies have been removed under the impact of structural adjustment. Meanwhile soil fertility is declining rapidly, as is access to biomass.

The FAO (19**) and others (Pretty, 1995; Smaling et al, in prep.) are now engaged in developing an approach called 'integrated nutrient management' (INM) which borrows many aspects from integrated pest management (IPM). INM is no miracle cure. But it is a sophisticated approach which recognizes the need to make use of diversity and farmers' intimate knowledge of that diversity. In other words, INM depends on farmers being experts at managing their soils.

INM does not deny the potential contribution of fertilizers, but recognizes that they are beyond reach of most of the world' s farmers. Fertilizers are simply not feasible so it is no use to keep on saying that they are the only solution. Hence soil fertility is pursued by developing a basket of possible approaches, including recycling, the use of cover crops, animal-crop combinations, agro-forestry, etc.

INM poses many new challenges to the professional. He or she must be technically sophisticated to be in command of the basket of possibilities. But a key additional skill of the INM professional is to help farmers experiment, learn and become experts in their own situation. And INM does not stop at the farm level. Many of the major constraints must be addressed at the watershed, or village territory level and require collective action. The INM professional must be able to recognize and realize the opportunities which can be captured by collective action.

All in, the challenges INM poses to the professional are very different from the days when fertilizer was the core point of development. It is now more difficult to be a good professional, but also much more exciting. With that, ladies and gentlemen, I would like to conclude my presentation.

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