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Agricultural higher education in transforming Central and Eastern Europe

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Abstract

The paper discusses the major changes necessary for the agricultural higher education system in Central and Eastern Europe, including the former Soviet Union, to meet the challenges created by overall reforms in the food and agricultural sector as well as the adjustment of the global system of agricultural education. The issues arising from the need for reforms in the agricultural education system are presented in an overview of the inherited features of the system, an assessment of the current situation, a status report on the reform attempts and a discussion of the critical issues for the future. © 1999 Elsevier Science B.V. All rights reserved.

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1. Introduction

The transformation of the economies in Central and Eastern Europe, including the overall reforms in the food and agricultural sector, have created new conditions and challenges for the whole agricultural knowledge system. Of the various components which comprise this system, this paper will focus on agricultural higher education. Historically the region has had a system of agricultural higher education which satisfied the social and political needs of a centrally planned agricultural sector. The well known difficul-

ties of the economic and political transition are having a significant impact upon agricultural knowledge system throughout the region, and these difficulties are requiring a fundamental adjustment in the area of agricultural higher education. Further complicating the matter is the fact that these adjustments must be made at a time when the global system of agricultural education and research is also undergoing significant changes in approach, funding, and organization (Csaki, 1998).

The existence of an efficient and quality agricultural education system is a vitally important long-term condition for the utilization of the significant natural resources available for agricultural production. In today's information and knowledge-based world, globalization demands that countries adjust fast to new production technologies, otherwise they will lose competitiveness and will be unable to utilize national

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comparative advantages. These technologies cannot be fully imported, especially in the food and agricultural sector. Conditions differ from country to country, and country-specific education and research is needed. Internationally competitive agriculture therefore cannot be developed in the region without quality education and research in the coming knowledge-based century.

This paper intends to discuss the major changes necessary for the agricultural higher education system in the region to meet the above challenges. The issues arising from the need for reforms in the agricultural education system are presented in an overview of the inherited features of the system, an assessment of the current situation, a status report on the reform attempts, and a discussion of the critical issues for the future. The paper deals with the problems of agricultural higher education on the level of the formerly centrally planned economies of Central and Eastern Europe and the former Soviet Union. While some general observations are valid for the whole region, there is a significant difference in the situations of the individual countries, which must always be taken into account when dealing with specific country problems.

2. The legacy of pre-reform period

The Central East European countries have a well established, high quality system of higher education in agriculture, with long established historical traditions. This system was further developed and adjusted during the socialist period according to the needs of central planning, and specifically, according to the objectives of maximizing agricultural production. Apart from all the difficulties and shortcomings, the agricultural education system in Central and Eastern Europe did produce some outstanding and, in general, good results. Local competence, and experience in technical education, and in applied agricultural subjects are beyond question, and were well known. Some of the institutions, established world-wide reputations. The long tradition of agricultural education and research prevailed and, combined with the significant resources available at the time, resulted in generations of well-trained agriculturalists and some world class scientific advances.

In discussing an agenda for future development, one should start from those important general inherited characteristics of the university teaching process in agriculture which represent critical constraints in developing a more effective system that is able to cope with the challenges of agriculture in the 21st century (World Bank, 1997).

2.1. Dominance of central planning system

Higher education governance was based on the dominant role of state government. In agriculture, the ministry of agriculture played a crucial role administering the sectoral higher education, with the marginal involvement of the ministry of education. Up until recently, the agricultural higher education was entirely planned, controlled, and financed by the state. The centralized governance resulted in limited administrative, financial, or professional autonomy for institutions, a government-controlled planning of admissions, enrollment, overall students numbers and graduations. Professional and academic quality was subordinated to quantitative needs, and institutions and training programs were specialized to serve these manpower needs of the planned economy. Enrollment numbers were centrally determined by forecasts by the national planning authorities and the respective ministries (often ignoring other aspects, such as demographic changes, individual aspirations, or academic standards). The socialist governments, had often recognized overproduction in certain fields, but had neither the political capacity, or willingness, to undertake strategic restructuring towards more generalized and demanding professional fields.

2.2. Separation of education and research

In the pre-reform period, research activities became separated from the universities and were carried out by independent research institutes. These research institutes were separately managed by the academies of sciences and by the sectoral ministries. The independent research institutes were often better equipped and more highly respected than university departments. The university system was also effectively weakened by the separate administration of doctoral programs (called 'candidates') by the Committee of Scientific

Qualifications, instead of the university itself. The highest level of scientific qualification (called ‘doctor of science’), was fully subordinated to the academy of science system.

2.3. Rigid training and diploma structure

The agricultural higher education system in the region is traditionally two-tiered, following the continental tradition of a binary system of universities and colleges. Colleges and universities lead to distinctly different diplomas (college diploma and university diploma). Universities, however, may issue both types of diplomas. The duration of studies is 4 to 6 years at universities, and 3 to 4 years at colleges. The college diploma may be presented as a ‘BA’ degree, and the university degree may be presented as a Master’s degree abroad. Both college and university programs start generally at the same age, following the successful completion of secondary school, however, the completion of college education is not a prerequisite for studies in a university program.

2.4. Overspecialized programs

Higher education programs in both agricultural colleges and universities were, and still are, overly specialized, focusing on training for specific professions. These specialized training programs were not based on modular and transferable training blocks, or designed to be built on one another. Instead of starting with general subject matter and heading towards more and more specific skills during the course of studies, the system of higher education consisted of disconnected training tracks leading towards different diplomas and professional careers. Without any central effort to integrate the agricultural training programs and institutions into a unified higher education system, students could not take classes outside their respective institutions and were destined to graduate and start employment in a pre-planned and pre-determined field of study (without options to modify the course of their education at a later date). Interdisciplinary courses were not offered because of inadequate staffing and rigid departmental structures, but most of all, because such provisions appeared to be irrelevant to the specialized manpower needs that higher education was planned to serve in a socialist economy.

2.5. Focus on production and technology

Education in the past concentrated on increasing primary agricultural production. Teaching objectives tended to be focused on the increase of outputs, with little regard to economic efficiency, product quality, environmental consequences, or the safety of agricultural workers. Limited teaching capability was devoted to agricultural economics, agribusiness management, and related social sciences. This fact remains, despite the large number of ‘economists’ working in various universities and institutes. A significant number of courses were also offered in the area of agricultural economics with rather dubious content. For ideological reasons, there was little contact with Western agricultural economists. The lack of knowledge to tackle the problems of market-based agriculture is one of the most significant negative aspects inherited from the former socialist system. The teaching staff at agricultural higher educational institutions had almost no exposure to the concepts of Western-type agricultural economics or farm management. The absence of economic literacy makes it difficult for these older agricultural teachers to understand incentives for farmers to adopt new technologies. Consequently, the introduction of new technologies to students did not reflect the realities of decentralized profit-oriented farm management practices. Teaching capacity and human capital in utilization of farm products, food science, and technology, storage, transportation, logistics, and marketing, was rudimentary at best. The integration of agricultural education with environmental disciplines was also extremely limited. To a degree, this reflects the limited scientific development of agro-ecology throughout the entire region. Some environmentally oriented courses, however, had been developed, especially in soil conservation and land reclamation.

2.6. Selectivity and elitism

For most countries in the region during the socialist period, the development of higher education in general, and the development of agricultural higher education especially, was slowed significantly in the late 1970s, but no new directions emerged. As a result, higher education was stuck at a selective level and remained essentially elitist in terms of access. The

trend between the late 1970s and early 1990s was markedly different from that in the West. In the late 1980s, 10 to 15% of the 18–22 year olds enrolled in higher education. Even including students in evening and correspondence programs, this ratio (at around 15 to 18%), was still low when compared to the Western European averages. Despite the regimes' strong political commitment to support the access of children from low income families, higher education was unable, or unwilling, to increase relative enrollments. Admission to higher education was controlled through entrance examinations, and occasionally special quotas that favored the children of the working class. The number of applicants compared to admittances, showed a significant constant surplus of applicants. Agricultural higher education however, has always been more accessible than most other segments of higher education.

2.7. Fragmentation of institutions

During the socialist period, institutional, professional, and local authorities were strongly limited, and innovative capacities were curbed. Universities were divided, various faculties were either closed or re-established as separate units—such as universities of economics, medicine, agriculture, or horticulture. New colleges were established to serve various branches of industry or the public sector. Thus the institutional structure even of agricultural higher education (which was generally separated from the rest of higher education facilities) was fragmented, consisting of a high number of individual institutions, the majority of which were small with very specialized

profiles. As an illustration, Table 1 provides an overview of the Russian higher education system for agriculture in 1994 (World Bank, 1994). Institutions did not take advantage of potentially common facilities and/or resources such as libraries, computer halls, language departments, or equipment maintenance, etc.

2.8. Constrained incentives and limited use of intellectual capital

The fragmented and over-specialized institutional structure stifled and constrained intellectual capacities, and resulted in serious drawbacks in cost efficiency and in academic quality. Institutions and faculties had limited authority or drive to either diversify or modernize their programs significantly. Similarly, their capacity to engage in innovation was also fragmented. Institutional leaders and faculty members used their intellectual and professional capital instead in active lobbying to preserve their favorable position or to gain more access to public resources. The lobbying and the negotiations virtually assured the status quo in finances, and erosion of the higher educational infrastructure, as well as a lack of responsiveness to any newly emerging social, professional, academic, or local demand. Once trained as educators, faculty members had difficulties in changing professional or academic profiles or improving skills. Chairs and departments were similarly specialized and tied to narrowly defined training fields. These faculties and departments had instead, strong incentives to defend their positions and existing structures.

Table 1
Russian agricultural higher education in 1994

Higher education is conducted in 62 agricultural institutes, of which 13 have been officially recognized as agricultural universities, and branches under the authority of the Main Board of Higher Institutes in the Ministry of Agriculture. The teaching corps consists of about 30,000 scientists, including more than 1000 professors, and about 13,000 docents.

About 50,000 students (31,500 fulltime and 16,000 correspondence), in 50 specialties, enter agricultural higher education institutions each year for an average duration of 5 years. In 1992, the total number of students entering agricultural institutions of higher education was 31,400, and in the same year, 25,800 graduates were produced (1009 in accounting and 'business economics', 2138 in agricultural economics and management, 5248 in 'agronomics', 3723 in zootechnics, 4006 in veterinary medicine, 1383 in hydrotechnology, 418 in land use management, 6092 in agricultural mechanization, 1303 in agricultural production electrification, and 382 in agricultural building).

In addition to agricultural universities, training of the specialists for the agro-industrial complex takes place in agricultural facilities at Moscow, Maryi, Kalmyck, and Petrozavodsk state universities and also in the agricultural department of the economic faculty of Moscow State University and in some polytechnic institutes.

2.9. Inadequate quality control

In addition to the above major features, in the traditional socialist agricultural educational system the evaluation of performance was driven by formal principles related to the objectives set by the central planners. There were no outside reviews of the institutions and the programs and research results were not always reviewed by peer scientists outside the system, much less from outside the country. This suggests that there were problems with ‘inbreeding’ in terms of quality of education and on the whole, the agricultural education was rather provincial in scope.

2.10. Incremental financing and high unit costs

As indicated earlier, higher education in agriculture was fully state owned and financed. Each year, budgetary appropriations for agricultural higher education were decided by a cumbersome process, based on: (a) governmental approval of the budgetary guidelines; (b) proposals of related ministries; (c) negotiations with the ministry of finance; and (d) final approval by the parliament. The actual amount of funding was not based on performance indicators, but rather on the previous year’s level of operational costs, undifferentiating ‘automatists’ (wage and material automatism) to compensate for inflation, and approved increments. Traditionally high unit costs occurred for various reasons: (a) fragmented institutional network, and fragmentation within institutions, resulting in redundancies in educational-organizational units; (b) the dominance of academic considerations in higher education management, as opposed to financial considerations; (c) low staff/student ratios, due to the lack of elaborate and independent institutional employment policies; (d) costly teaching practices such as high number of class hours per week, high proportion of seminars, little independent or self-designed study; (e) costly, overspecialized training; (f) low level of institutional income, and (g) often old, run-down buildings which are expensive to maintain.

2.11. International isolation

The agricultural education systems in the various countries were not integrated into the global stream of research. There was a rather broad, but often only

formal cooperation among institutes and universities in the so-called socialist world, while collaboration with Western institutions was limited, though the intensity of contacts with the developed world varied greatly by country and by the field of science. There was little international exchange of professors and even less international collaborative educational programs. Only a few of the teaching staff were competent in English. Library facilities were outdated and access to modern information systems, e.g., databases and abstracting services were nearly nonexistent. Professional isolation, which was imposed for political reasons, and the absence of rigorous quality control did not mean that all educators in the agricultural educational system were not up-to-date with the world of agricultural science and technology, however.

3. The impact of transition

The economic and political transition of the past several years has had a significant impact upon the agricultural education system throughout the region. The overall impact of these changes is rather similar in every country. It is obvious that agricultural education in the region is undergoing a profound crisis. This crisis is the result of constraining limitations on available funding and of major difficulties in adapting to a radically changing environment. A major feature of the crisis today is also that it has not received much attention inside the respective countries because it has not been seen as an urgent priority in the transition.

The responses to this situation vary widely among the sub-regions and from country to country. In general, the most important, mainly negative, impacts are as follows:

3.1. Loss of traditional customers

The demand for the graduates of the traditional agricultural higher education has declined significantly. The large farms are in serious financial difficulties and are in the midst of a struggle to survive. The delay in agricultural reforms and land privatization has not yet created a large number of genuine private farms with new demand for agriculturalists trained to meet the challenges of private farming and market economies.

3.2. *Serious financial difficulties*

The well known macroeconomic problems of the relevant countries led to a significant decline in budgetary resources allocated for agricultural education systems. Over the past 4 or 5 years, funding support, in real terms, for the agricultural education system, has fallen significantly. The decline in budgetary resources has been 50 to 80% of pre-reform resources in some cases. The budgetary pressure has made the shortcomings of the inherited system more visible and forced the components of the agricultural educational system to find individual solutions.

3.3. *Short-term survival strategies*

In the past several years the agricultural educational community has been fighting to maintain minimum operational funds, or in many cases, has been barely able to survive. Universities and institutes have started special programs on a tuition basis, and have often to rent buildings and laboratory spaces to the private sector, and use the available land of experimental farms for commercial production. Many educators have taken part-time jobs, and research programs at these universities and institutes have also been refocused toward topics of more practical, or local, interest. Some of the best professors established private teaching institutions.

3.4. *Flight of talent from the system*

As one of the most visible impacts, a considerable portion of the highly skilled teachers, especially the younger generation with knowledge of foreign languages, have left the system. Many educators quit for better paying jobs, mainly in the private sector, and frequently outside their field of expertise. A significant number of the scientists and academics with international reputations and world class abilities left the countries altogether to work for international organizations, multinational companies, foreign research institutes, or foreign universities offering better pay and working facilities.

3.5. *Physical deterioration of educational facilities*

The absence of resources has made a significant impact upon the physical conditions of agricultural

education. The necessary maintenance and repair of facilities are put off due to budgetary shortages. Many valuable pieces of laboratory equipment are out of operation for lack of spare parts or have become outdated. There is a significant shortage of new information, library facilities are outdated, and modern information technology is being introduced rather slowly. According to recent estimates, for example, at the Ukraine agricultural educational institutes, over 90% of what is available in the libraries is in the Russian language.

3.6. *Reduced incentives and scientific output*

It is obvious that the difficulties outlined above have resulted in an overall decline of agricultural academic outputs throughout the region. The whole system of traditional priority setting, funding, and oversight is not appropriate for the conditions created by the process of transformation to a market based agricultural economy. A system consistent with the new conditions, however, is not yet fully in place. It is no exaggeration to say that in many of the respective countries, agricultural education and research management is in disarray and is at considerable risk.

3.7. *Increased linkages to the rest of the world*

The new situation created by the political and economic reforms has opened the door for increased contacts and collaboration with the Western world, and with the international agricultural academic community in general. There has been an increased number of donor-sponsored exchange programs and other forms of teaching and research collaboration. Although there are no remaining political constraints to increased international contacts, unfortunately growing financial constraints still prevent the agricultural educational systems from being fully integrated with the rest of the world.

The challenges and the difficulties created by the transition to a market based economy makes the reform and adjustment of the agricultural educational system unavoidable. It is obvious now that the short-term adjustment attempts, as described above, are providing only temporary relief, and the needed overall adjustment is still being delayed in many countries.

4. Agenda for the future

The fundamental challenge facing Central and Eastern Europe's agricultural educational system is to transform itself from a system that worked under central planning to one that works under market conditions. Organizational change or transformation is an extremely difficult process, and psychological change even more so. But it would be imprudent for these countries to choose any other path. The existing investment in the region's entire agricultural knowledge system is significant. There is great potential for institutional reform if human and financial obstacles can be overcome. Starting over is not an option. Further, it would be imprudent to select an existing national agricultural education system, for example, one in use in North America or Europe, and simply pattern local systems after it. The reasons are several. First, each country's system must reflect its unique history, resource base and needs, and second, the agricultural educational systems in most countries are undergoing careful scrutiny and reform as well. Third, agricultural education itself is a moving target, which has its own internal dynamics and inertia.

The region's system of agricultural higher education has to undergo a basic transformation in a period when the global agricultural education system itself is in the process of change and adjustment. In setting the agenda for the reform of the Central East European agricultural educational system it is extremely important to have a full understanding of the directions of the overall change, as well as the likely characteristics of transformed agricultural education systems in other developed countries. According to a recent World Bank review (Willett, 1998), the agricultural education system in general, and agricultural higher education in particular, is facing several challenges:

- *magnitude* of human resources development effort;
- *complexity* of the subject material, including the need to integrate 'new' issues such as population, environment, and farming systems into curricula;
- *dependence* on a wider policy environment that determines such issues as the autonomy, financing, accountability, and mission of agricultural education institutions;
- *ability to trace impact* of educational investments at different levels in agriculture;

- *political will* to support agricultural education at various levels and develop coherent policy, particularly in the context of Ministry of Agriculture and Ministry of Education institutional rivalry and dissimilar agendas, and such factors of urban bias, declining share of agriculture in GDP, marginalization of the rural sector, and low status and priority accorded to agriculture;
- *independence or attachment* of the agricultural education system vis-a-vis the Ministry of Education, or its existence under the Ministry of Agriculture, or other technical ministries;
- *accountability*, specifically with respect to educational standards, access to tertiary agricultural education for rural people, and curriculum relevance to labor market needs;
- *liability of the public sector* as the overwhelming majority of agricultural educational institutions are still under public sector control, and hence insulated from market forces;
- *operating resources and fiscal sustainability* of agricultural education institutions – the high cost of agricultural education (given its need for a broad range of teaching, scientific, and technical equipment and experimental farms) and the environment of budget cutbacks;
- *interaction with knowledge generation*, acknowledged or not, the dependence of agricultural education on feedback from farmers on the findings of research and extension, which is not general under the management control of agricultural education;
- *internal coherence* in order to permit flexibility and mobility across the fields and through the levels of agricultural education systems.

Reform in agricultural higher education obviously is part of overall efforts to modernize higher education in general. Special attention, however, is required in dealing with the problems of agricultural higher education for several reasons (Willett, 1998). These include: its complexity, and the difficult task of integrating many scientific, economic, social, and practical disciplines in a holistic way, requiring a special teaching emphasis on problem solving; its importance in terms of national food security and exports, and for the livelihood and food security of over a billion rural people engaged in the agricultural sector in developing countries; and its significance as the embodiment of rural cultures created by generations of farmers. All

Table 2

Proposed characteristics for the agricultural educational system in Central and Eastern Europe

-
- need or demand driven
 - pro-active
 - efficient:
 - right sized
 - flexible
 - entrepreneurial
 - coordinated with other institutions
 - integrated with the global academic community
 - sustainable, in its ability to:
 - develop new directions
 - maintain an appropriate foundation in basic science
 - generate acceptable rates of return
 - acquire adequate and well-diversified funding levels
 - coordinated and complementary with private educational entities
 - integrated with multiple technology transfer and educational interfaces both public and private
 - decentralized with increased local autonomy
 - accountable to key stakeholders
-

of these issues have to be considered, when setting the agenda for reforming agricultural education at the higher levels.

The general direction of challenges also implies a set of common characteristics for Central and Eastern Europe's agricultural educational systems (Table 2). The implementation of reforms in order to meet the criteria listed in Table 2, and the completion of the transition in agricultural education is a rather complex and difficult task, even in the most advanced and reform-minded countries in the region. The most important tasks include (Ruffio and Barloy, 1995):

4.1. Refocusing teaching activities

Refocusing teaching activities is required to adjust the teaching agenda to more applied disciplines and to broaden activities toward economics, management, natural resource management, and practical aspects of farming. The redefinition of agricultural educational agenda needs to be driven by the two most important international trends in agricultural higher education. One of the major trends is the explosion of knowledge in biology, particularly genetics and biotechnology. The challenge for agricultural education is to harness the advances and potential contributions stemming from this scientific revolution. The other trend is the extension of the agricultural academic domain. At the time of the green revolution, the emphasis was on increasing production through

increasing yields per hectare. Today, that concern remains important, but in addition, teaching on the proper management of natural resources has become imperative. In addition, in the region the rebirth of agricultural economics, management, and marketing is also an important need. International recognized quality standards must be taken into account in realigning the educational agenda.

4.2. Redesigning the program of instruction and principles guiding decisions on student's individual study programs

The redefinition of these principles are far more important than the frequent debates focused on subjects and teaching hours, rather than on the content of teaching, and on its ultimate objectives. In our view, these principles are:

- A strong basic scientific training, sufficiently broadly based to give future graduates a high capacity for abstraction, methods of reasoning, and a greater facility in building theoretical concepts, explaining and stating terms of a problem and expressing technical questions in scientific terms;
- A more limited technical training, crucial indeed, but not aiming at encyclopedic knowledge. It should be based on models illustrating the fields of application of knowledge, giving working methods, developing a sense of reality, an open mind,

and an awareness of the complex nature of biological, technical, and economic problems;

- The development of personal qualities essential in positions of responsibility; communications and managerial skills, ability to organize and adapt, to work hard and rapidly, etc. The student's personality may be developed along these lines by various types of exercises: individual or group projects, written and spoken communication, language learning, and training periods.
- Opportunities for modular individual training programs which are open toward other disciplines and increased interdisciplinary studies according to individual student ambitions.

4.3. Institutional and organizational reform

Institutional and organizational reform which accomplishes the overall institutional adjustment of the system, such as decreasing the number of institutions, integrating some of the agricultural higher education institutions into multi-purpose universities, creating a greater degree of integration of research and education, increasing institutional autonomy, and creating a transparent system of quality control and accountability. There is no one model which can be recommended for implementation of these tasks throughout the region, as there are significant differences among systems of agricultural education in the Western countries.

4.4. Reform of financing

Reform of financing which establishes an output-based competitive mode of financing for agricultural education activities, and creates a sharper focus of public funding for education on public goods, and diversification of funding support for public sector agricultural educational institutes. As an objective, a financing system which includes the following components needs to be developed: (a) the state budget; (b) other sub-systems of the public finances; (c) tuition fees and other charges to students; (d) basic activities as well as from entrepreneurial activity; (e) donations; and (f) state wealth, or own wealth acquired on the basis of a contract or as a donation. Funding restrictions and the decline in government budgetary funding for agricultural education is a reality. Public funding,

however, must remain the major source of financing, even if the delivery of some public services can be privatized. One must recognize that increasing public funding to education, is difficult because of the state of public finance, but also because policy makers and public opinion are not convinced of the urgency of the problem. Without sufficient public funds, even a reorganized system cannot be effective – and if it is not effective, it does not attract public support. The consolidation of public funding needs to be tied to progress in reforming the system of agricultural education, well as the distribution of funding. In the latter regard, a normative system, based on actual numbers of students, seems to be the most efficient solution.

4.5. Increasing the role of the private sector

Increasing the role of the private sector with the long-term objective that public funding for agricultural education remains justifiable only for the core of the agricultural higher education. A number of private institutions should emerge to supplement the public sector institutions. In the short and medium term, however, agricultural higher education will retain essentially a public good nature. The public funds, however, remain limited, therefore partial cost recovery is a necessity. Educational institutions must be able to sell some services and advice to individual farmers, farm organizations, extension services, and other clients.

4.6. Integration into global agricultural education systems

Currently one can observe a massive internationalization of higher education, and agricultural higher education specifically. Many of these have been made possible through the ability to work in networks, facilitated by the rapid development of information technology such as e-mail and world-wide access to databases. It is essential to integrate the region's restructured agricultural educational system into this new, global cooperation, because those who are not well connected will remain removed from the solutions to the most challenging tasks. The agricultural academics in the region must become fully fledged members of the international agricultural academic community. Obviously the students must also have the

opportunity to obtain international experience through foreign study, and exposure to foreign instructors.

5. Current status of reforms: modest progress

The countries in the region have made progress to varying degrees in implementing their reform agendas in agricultural education. The differences between countries regarding the status of agricultural education and the progress in reforms have increased significantly in recent years. Although each country has its own features, in terms of the status of reforms in agricultural education, there are three main groupings of countries that can be identified:

5.1. Significant reforms in the agricultural higher education system: Central and Eastern Europe

Significant reforms in the agricultural higher education system: Central and Eastern Europe (including the Baltic States). These countries can be characterized by significant progress in the reform of their agricultural education systems. In most of these countries, new legal frameworks were created for regulating higher education, providing a greater degree of autonomy for the individual institutions (Table 3). The

adjustment of agricultural educational programs is being carried out, focusing more on the needs of private producers. The reform of agricultural higher education is part of an overall effort to modernize higher education. A new, more competitive, way of financing education has been created, and the universities have begun playing an increased role in agricultural research. Linkages with the rest of the world have improved significantly, together with the linkages to the local and multinational business communities. At the same time, several important items on the research agenda have not been fully completed. These include: creation of multi-disciplinary universities; introduction of a nation-wide credit system; full integration of research and education. Parallel with the resumption of overall economic growth, the partly reoriented agricultural educational systems have also improved their financing in some of the countries, providing the financial base for improvements in facilities and personnel.

5.2. Near to collapse inspires reforms: Caucasus and Central Asia

The most serious situation in agricultural education can be observed in the countries on the rim of the

Table 3
Process of agricultural higher education reform in Hungary

1988	Establishment of the Conference of the Hungarian Rectors.
1989	Reform of curriculum begins at most institutions.
1990	Enactment of the Law on Higher Education which left the structure of higher education basically untouched.
1993	Amendment to the Law on Higher Education integrating all higher educational institutions, including agricultural higher education, under the management of the Ministry of Education.
1993	Creation of the Hungarian Accreditation Committee to provide overall quality control.
1993	Creation of Higher Education Scientific Council to integrate all components of the higher education system into the decision making process.
1993	Ph.D. granting authority is provided to the universities and the phasing out of the candidate degree program.
1994	Establishment of the legal basis for normative financing and tuition.
1994	Law on the Hungarian Academy of Science provides a framework for the reorganization of the research system and leaves only the granting of the 'Doctor of Academy of Sciences' with the Academy.
1995	The 'Bokros Package' resulting in 20% decrease in the teaching staffs and the actual introduction of tuition fees for higher educational institutions.
1996	Second amendment of the Law on Higher Education integrating the post-secondary vocational training into the higher education, setting the framework for a overall academic credit system, and for integrating narrowly specialized higher educational institutes into multi-disciplinary universities.
1997	Some research institutes were integrated into existing universities as a part of the implementation of the reorganizational program for the research system under the Academy of Science.
1998	A World Bank credit program signed to support integration and quality improvements in higher education.
1998	The new government abolishes tuition for any first degree in higher education.

Table 4
Reform in agricultural higher education in Armenia in 1995

-
- Three level structure is introduced: 4 years, BA; additional 2 years, MA; an additional 3 years, Ph.D.
 - The Armenian Agricultural University is created as a single university-level institution for the country.
 - The Agricultural university provides education at all three levels.
 - No major change in curriculum, the teaching process remains overspecialized.
 - The first level training is consolidated into four colleges in the countryside, which also offer programs for farmers.
-

former Soviet Union. Agricultural education has received continuously declining funds in these countries since the beginning of the transition period. The current level of financing is not sufficient to cover acceptable teaching staff salaries (most salaries of instructors are on the magnitude of US\$ 30–50 per month. The conditions of teaching facilities are quickly deteriorating. Most of the younger and more mobile teaching staff have left. The academic isolation has remained much as it was during the Soviet period, as contacts, even with the other former Soviet republics, have declined drastically. Even new Russian literature is only sporadically available. Apart from all of these difficulties, significant reforms of the agricultural educational system have been implemented in a few countries, such as Armenia (Table 4) (World Bank, 1994), while reforms in most of the countries in the region significantly lag behind even those efforts in core CIS countries.

5.3. *Attempts to safeguard the inherited structures: the core of CIS*

Attempts to safeguard the inherited structures: the core of CIS (Russia, Ukraine, Belarus, Moldova, Kazakhstan). Though the transition-related changes created a difficult situation, only limited reform of the agricultural education system has taken place in the core countries of the CIS. After the disintegration of the Soviet Union, the core countries created national agricultural educational systems, but retained the features and structures of the pre-transition systems. There have been significant improvements in the curriculum, and new courses required by market conditions and scientific development, international contacts, and access to outside information, have increased significantly. At the same time, the basic principles of training, such as overspecialization and the management practices, have not changed. Increased budgetary problems and criticism of the

skills of new graduates are becoming more and more common, and the calls for reforms are growing stronger. The ‘old guard’ however, is still firmly in control of agricultural education and to date has been able to delay further reforms.

On the whole, our general conclusion is that there has been more progress in reforming agricultural higher education than in the other components of the agricultural knowledge system. The Central East European countries have made the first difficult steps in reform, namely, new legal frameworks, some restructured institutions and financing, and integration into the flow of global agricultural academic disciplines. In the CIS, however, reforms are still in their initial stages, and the basic tasks of transition have yet to be resolved. In these countries setting up the framework for new system of higher education in agriculture is the priority. The experiences indicate that this task has been more difficult and required a longer time than originally expected. Increased funding for the agricultural educational systems in these countries can only be effective when this framework is fully in place.

The basic tasks in the transition process can be successfully resolved only with the full cooperation and involvement of the people concerned. International support (bilateral and multilateral aid, inter-institutional collaboration, etc.), however, can facilitate this process. The most important role for the international community is to support the implementation of comprehensive reforms. Support might also include the safeguarding the valuable core of education systems in these countries, and support for the training of young teaching staff. Integration of these agricultural education systems into the global educational systems in agriculture should also be an important role for the international community. The international community has realized the importance of these tasks and support of agricultural higher education has become one of the major, and very often the highest priority activity of international

donors in the countries of Central and Eastern Europe and the CIS.

Increasing agricultural productivity is absolutely necessary to bring about agricultural and economic growth in Central and Eastern Europe. It is obvious that there will not be any sustainable increase in agricultural productivity unless the education system is performing well and efficiently. This will not happen unless comprehensive reforms, which have been outlined in this paper, are implemented.

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