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The Higher Education Strategy for Agriculture in Yugoslavia

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In recent years, agriculture and the food processing industry have been given increasing emphasis within the development policy and strategy of Yugoslavia.

The aim of education policy in the field of agriculture, food technology and forestry has been to train an adequate number of specialists including technicians, engineers, bachelors, masters and doctors of sciences, although this is not always reached in all specific areas of study. There is a sufficient number of experts in some areas, with a shortage in others. The number of university educated experts in the area of veterinary sciences and livestock breeding, for exemple, is more or less adequate, but this is not the case with phytomedicine and plant protection.

The objective for the year 2000 is to provide all spheres in the agricultural, food technology and forestry sectors with a sufficient number of necessary qualified personnel.

I - Survey of levels at institutions of higher learning

1.1. Advanced schools of agriculture, of which there are six in Yugoslavia, offer two year courses for an agricultural engineering degree. Eligible for admission are secondary school graduates. Compared to foreign educational levels, this would equal the senior level technician standard.

1.2. Bachelors of agricultural sciences, food technology and forestry receive their education at universities during four years. The degrees are either general (in agriculture, forestry or food technology) or specialized in the following:

Agriculture: farming, fruit growing and viticulture, livestock breeding, agricultural engineering, mechanization, land reclamation and development, plant protection, agro-economics, fruit growing and gardening, horticulture;

Forestry: forest protection and development, forest exploitation;

Food Technology : animal products technology, plant products technology, biotechnology, wine, beer and alcoholic beverages technology, fermentation technology, fruit and grape processing technology, cooling technology .

No special courses are offered for graduates interested in development.

Veterinary medicine studies last for five years and upon their completion one is conferred a general veterinary sciences degree - B.V.Sc. There have been suggestions to prolong the study period to six years.

In the field of agriculture, forestry, food technology and veterinary sciences, there are post-graduate courses of various streams (e.g. farming, plant protection, agricultural economics, etc.) which provide instruction leading to the degree of M.Sc. Researcher or M.Sc. Specialist. Post-graduate studies last between one and three years.

No special courses are offered for the doctoral degree. Having completed the M.Sc. courses and published a number of scientific and research papers, the candidate announces his doctoral thesis and submits it to a panel of researchers and academicians upon whose acceptance it is defended before the panel and the title Doctor of Sciences awarded. The work on the dissertation paper should last at least four years after the completion of the M.Sc. courses.

1.3. The diplomas offered are: Engineer, Bachelor of Science, general stream Bachelor of Science, specialist Master of Science, researcher Master of Science, Bachelor of V.S. - general veterinary surgeon, Master of Science specialist in veterinary sciences, Master of Science researcher in veterinary sciences - Doctor of Science - Agriculture, Agricultural Engineering/Forestry/Veterinary Sciences.

1.4. The academic departments have been distinctly separated and include: agriculture, food technology, forestry and veterinary medicine. Fishery and general biology may be studied at the Department of Livestock Breeding and the Faculty of Sciences and Mathematics respectively.

Students are allowed to change the stream they opted for but only after the first academic year and provided they pass extra exams in subjects compulsory for the departments to which they move. This, however, is not a very common practice.

Professors cooperate in the field of research and there is also collaboration between individual departments in providing instruction in various educational areas.

II - Educational objectives

2.1. The importance of particular sectors

All the aforementioned educational sectors are equally important, but the courses for bachelors of agricultural and veterinary sciences, have the greatest appeal.

A large number of students is trained for the actual production process, much less for research in all disciplines, a very small number for further development, a marginal number to be employed in the commune, regional and centre administration and an insignificant number indeed remain at the university. There are not many assignments abroad with either a domestic or a foreign company. Students do not find this area particularly attractive.

2.2. Curricula

The largest number of students opts for courses in crop farming. They are keen on taking specialized courses of all types. Their attitude to fundamental sciences is not the same; chemistry and mathematics are favoured more than physics, which in most cases is not taken as a regular but an elective subject. The aim is to introduce new up-to-date material into it.

The teaching methods are in most cases traditional - *ex cathedra*, but there are also frequent workshops. Practical training is

carried out in work organizations. Audiovisual systems have been introduced, and more recently, data-processing equipment. Students are partly involved in ongoing research projects, primarily while preparing their diploma papers and masters degree and speciality papers.

A period in residency is compulsory only for those fellows who have opted for research work at an institute or faculty. The institutions of higher learning - advanced schools and faculties - located in various parts of the country have different curricula even for the same type of streams, but efforts are underway to equalize them to the extent possible through the Association of Agricultural Faculties and Advanced Schools of Agriculture of Yugoslavia and through the Association of Faculties of Forestry and Veterinary Sciences.

The law stipulates that the curricula of all departments and faculties shall be periodically evaluated, every four years at minimum.

III - Organization

3.1. Institutions of higher learning are generally independent and form part of a particular university. The competent ministries are those in charge of education although other departments also have certain powers within their respective terms of reference.

3.2. Programs

The programs of research and study are decided on by a number of institutions: faculties, schools, self-management communities of interest for edu-cation, enterprises, academic institutions, the administration, but their final approval is by the Republican/Provincial Assembly. The process of decision-making is continuous and step-by-step.

3.3. Interrelationship between Educational and Research Roles

Organizations of higher learning have the obligation to perform educational and scientific work as well as to transfer knowledge to economic organizations. The aim is to upgrade the educational level generally, particularly by producing speciality and master's degree papers and doctoral dissertations.

Research is generally financed by republican/provincial self-management communities of interest for science. The financing of projects dealing with economic development is undertaken by the socio-political communities concerned.

In principle, institutions doing research work coordinate their efforts.

3.4. Teaching staff

In the majority of cases, the staff involved in the teaching process is employed by the organizations of higher learning, although some distinguished specialists from the economic sector are also engaged.

There is also inter-institutional cooperation within Yugoslavia. It is mostly carried out through visits of lecturers in specific fields to faculties where no such staff is available, participation in post-graduate courses, in evaluation panels for the review of doctoral dissertations and in special fields of continuing education.

Foreign professors are invited in the capacity of visiting lecturers or for a specialized branch of study or under exchange programs between Yugoslavia and other countries (e.g. Fulbright programmes, USA or Humbert, West Germany).

Professors in general retire under the conditions applicable to all people employed in Yugoslavia. There are, however, a few exceptions (in Slovenia, for example).

University or advanced school professorships may be obtained by meeting certain requirements, such as holding the title of Doctor of Sciences and having published a number of scientific and research papers. To apply for a teaching post at a faculty, even for the lowest level of teaching (lecturer), one should have a doctoral degree and appropriate academic references.

Specialists from the economic sector may be recruited but this requires a special procedure and they have to fulfill certain conditions.

Nevertheless, they cannot be put in charge of an entire branch of study or scientific discipline. The selection of candidates is carried out after a public invitation for applications. Qualifications obtained abroad do not carry particular weight but it is desirable for aspirants to professorships to have received some education abroad.

IV - Students

Prior to enrolment, students take an entrance exam and are screened for eligibility on the basis of the following criteria: general performance in secondary school and results achieved in subjects of relevance to their particular branch of study. The entrance exam is a selective test and to be admitted to university the candidate must score a prescribed minimum number of points (as a rule 50%). Applications are open on a competitive basis and candidates are required to submit a number of documents which are taken into account in the evaluation process. The procedure is uniform throughout Yugoslavia so that a candidate may enrol at a similar faculty anywhere in Yugoslavia if he/she has been granted admission to one of them.

The number of students is limited for each faculty and advanced school to the *numerus clausus* which is determined by the relevant republican/provincial self-management communities of interest.

Students may be offered a loan or granted a scholarship. A loan is more common. Scholarships are awarded to students who are nearing completion of their studies or who want to proceed to a specialization or a master's course.

5.1. Cost of studying

The cost of studying is defrayed by the appropriate self-management community of interest based on the principle of the free exchange of labour. This is usually a mutually agreed fee covering the scientific and instruction process itself and a portion of the salaries of lecturers and other staff employed at the organization of higher learning. The share for reproduction is obtained from the self-management community of interest for science or from enterprises. Studies cannot be financed by private organizations since they do not exist in Yugoslavia. International organizations do participate, although rarely, in the financing of education, primarily by providing research equipment.

Employed students pursuing in-service or continuing education, cover a portion of the costs themselves, or have their organizations bear these expenses.

5.2. Discussion of Problems

Higher education establishments for agriculture, forestry, veterinary medicine and food technology are an important link in the educational chain as a whole, as the largest number of researchers in those fields work precisely in these institutions and contribute to the promotion of science and education. Of particular significance are their contributions to the development of new varieties of plants, breeds of domestic animals, methods of production, the protection of plants, domestic animals and the environment. It should be pointed out that this contribution is much more significant on the social sector farms than on the holdings of individual farmers.

The problem of employment of graduates with a degree in agriculture, forestry and veterinary science is of a relatively minor nature and exists only in certain regions. At the same time, however, problems crop up in the employment of food technology graduates. With regard to other fields, there is no competition when seeking employment.

Cooperation with international organizations is in every respect very useful, as it not only contributes to the exchange of information, ideas and so on for the purpose of promoting scientific and research work but to the task of educating students at all levels. It is desirable that this cooperation be diversified and mutually beneficial. In addition, this contributes to a better understanding among research workers and the promotion of mutual relations which are of particular importance for the preservation of peace and development.

From the aforesaid, it is logical to expect that cooperation with ICAMAS will be of special significance for its members in regard to the promotion of education and science in the fields of agriculture, forestry, veterinary science and food technology, since these countries have similar ecological conditions and the majority of them are practically neighbours.