

TABLE 4
DISTRIBUTION OF STUDENT OPINION AS TO HOW
PROMOTIONAL PROGRAMS MIGHT BE IMPROVED

	Program				Total Number
	B.Sc. (Agr.)	B.A.	B.Sc.	B.H.Sc.	
Promotion to schools by literature	15%	26%	27%	30%	38
Promotion to schools by staff	12	13	21	20	24
Promotion to students directly	24	19	36	25	38
Promotion to alumni	3	1	0	0	2
Promotion by alumni	15	9	0	0	11
Promotion of non-agricultural aspects	3	3	3	5	5
Promotion by guidance teachers	3	1	0	10	4
Don't know	25	28	13	10	34
	100%	100%	100%	100%	
Total	34	69	33	20	156

¹ See article "Freshmen at Guelph: A Profile of the 1969 Freshmen Class at the University of Guelph" for detailed information regarding the survey methodology and the demographic characteristics of the freshmen class.

² "Science in Agriculture" was first published in 1967 and is a 32 page booklet outlining the B.Sc. (Agr.) degree program, career opportunities for graduates and the basic science aspects of modern day agricultural production.

³ Paul R. Lawrence, "How to Deal with Resistance to Change", in Edward C. Bursk (ed), Human Relations for Management. Harper and Brothers, New York, 1956, p. 357.

Recent Advances and the Immediate Future in Agricultural Education in Colombia

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That the lack of well trained agricultural technical specialists is presently limiting agricultural development in most Latin American countries is well documented (1). Historically, many of the agriculturists trained in Latin America are not adequately trained. The reasons for these deficiencies in quality and quantity vary. Long (2) contends that lack of economic development is in itself largely a consequence of institutional underdevelopment. It is a result of institutions being either non-existent, inadequate, or improperly oriented to the maintenance of economic progress.

Olcese (3) listed several characteristic problems of agricultural education in Latin America as follows: (i) lack of a full time faculty; (ii) training of professors is deficient; (iii) no research is done by professors; (iv) teaching is done in a very theoretical way and is not relevant to the problems of the country; (v) the curriculum offered is rigid; (vi) no specialization is offered; (vii) physical facilities are poor (libraries and laboratories are in short supply); (viii) students and their problems receive little attention from the administration; (ix) professors' salaries are low.

Many of these statements still apply to Colombia, but since 1964 a series of changes has been initiated on some of the agricultural campuses of the country. The purpose of this presentation is to provide specific information regarding these changes as they affect undergraduate and graduate education in Colombia, and to project the effect of these changes into the immediate future.

The Undergraduate Student in Agriculture in Colombia

The competence, background, and outlook of the undergraduate students in agriculture obviously affect the present as well as the future of agronomic (agricultural) education. The typical student in agriculture in Colombia is somewhat older than his U.S. counterpart. His average age on

graduation is 23.4 years. Most students have limited farming experience: for example, 64% of the students in the Facultad de Agronomia at Bogota graduated from a high school in Bogota (population 2,200,000). Only 0.7% graduated from a high school in towns of less than 10,000 population. About one third (31%) have no parents or relatives who have attended college. This statistic represents new technical ability being brought into the service of Colombian agriculture.

The student has a heavy course load — 6 to 9 subjects each semester for a total of some 60 courses in five years. Students attend classes from 8 until 4 every week day, with occasional free hours, night classes, and some hours on Saturday. They are capable. Only about one in five applicants is accepted into the agriculture program at the Bogota branch. The typical student normally has some competence in reading English as a result of 6 years training in English in secondary school.

The typical student is nationalistic, idealistic, and extremely interested in national and international affairs. He is aware of the fact that he is fortunate to be able to obtain a higher education (less than 1% of Colombia's college-age population is enrolled in one of its 33 approved universities), and he believes that the future of his country is in his hands as a member of the educated minority.

When properly motivated he is capable of great effort. His adaptation to memorizing is far superior to his counterpart in the United States, but he is usually deficient in practical experience and the ability to use logic in making decisions. This is because his early educational experience stresses memorization rather than problem-solving techniques.

Undergraduate Education

Degrees in agriculture (the title "Ingeniero Agronomo") are granted by nine faculties in Colombia, three of which (Bogota, Palmira, and Medellin) are branches of the National University which presently graduate approximately 50 percent of all new agronomists (agriculturists) annually.

In the following discussion, each of Olcese's (3) points will be considered. Illustrations will be drawn principally from the Medellin and Bogota campuses.

(i) "Lack of full-time faculty" and (ii) "Training of professors is deficient". Beginning with essentially a part-time staff in 1964, 36 of the 56 staff members of the Facultad de Agronomia in Bogota are now full-time staff members. Of the remaining 20, nine are researchers of the Colombian Agricultural Institute (ICA). Twenty to thirty percent of the faculty are currently studying for advanced degrees on a rotation basis, and within five to seven years the entire teaching staff of Medellin and Bogota will have reached at least the M.S. degree. At present, 10 hold the M.S. degree and 7 the Ph.D.

(iii) "No research is done by the professors". This has been true, but there are indications of change. In the faculty at Bogota 48% of the full-time teaching staff are presently engaged in active research of some type. This relatively low figure is not due to unduly heavy teaching load, since the number of courses taught presently averages only 1.0 per full-time professional. However, the figure is considerably above the university-wide average of 29%.²

Other than teaching and administrative duties, the obstacles to active research participation most often cited in a recent survey of the teaching staff of the National University are the lack of specialized train-

ing in investigation and the lack of technical support (operating budget, technicians, and equipment).³ The former will be partially eliminated when the entire staff reaches the M.S. level. The latter obstacle is being remedied through an arrangement with ICA in which staff members participate in research projects which support the research program of ICA in exchange for technical support.

(iv) "Teaching is theoretical and is not relevant." Problem-oriented teaching and much practical experience are necessary since most students (99.2% in 1968) are of urban background and have limited farming experience. The faculty being developed at Bogota is aware of the criticism that teaching is too theoretical and much attention is being paid to laboratory and practical experience in the development of new courses. For example, the number of extended field trips (more than 1 day's travel away from the central campus) to outlying farms and experiment stations has increased greatly. The beginning course in soil science in Bogota has a higher percentage of its total time devoted to laboratory work than the similar course at Iowa State University, for example. Because of limited agricultural experience this time is necessary. The beginning course in physiology (which is taken by all agronomy students) is entitled Crop Physiology rather than Plant Physiology, and aspects of plant physiology which affect yield are stressed.

(v) and (vi) "The curriculum is rigid" and "No specialization is offered". In the faculty at Medellin a new curriculum has been approved that reduces course requirements by some 25 credit hours and permits 21 hours of electives. In the faculty at Bogota the 5th year undergraduate thesis has been abandoned, and a series of 4-6 courses available as a block of electives to fourth and fifth year agronomy students has been initiated in each of the following areas: Soils, Crop Production and Breeding, Crop Physiology-Weed Control, Plant Pathology and Entomology. Advances in specialization are also being made in allied fields. A degree in agricultural engineering is now being offered at Medellin, and a degree in agricultural economics at Palmira.

In both the Medellin and Bogota faculties the total course requirements are still extremely heavy by U.S. standards. The equivalent of 200 semester hours (15 week semesters with 1.5 weeks holidays included) are required in the most recent re-organization at Medellin. The continuous review that curricula are undergoing insures progress, however.

(vii) "Physical facilities are poor." It appears that the serious deficiencies in physical facilities which have long existed are being recognized and action is being taken to correct them. A building program is underway in the National University, and within one year the charge that physical facilities are inadequate will no longer be true at Bogota. However, books and other reference materials in Spanish will continue to be se-

vere limiting factors for many years to come.

The number of major and minor items of equipment have also been increased, principally by AID and Rockefeller grants. Availability of equipment varies; at present all items of equipment needed for soils and physiology teaching in Bogota are on hand; however, pathology and microbiology equipment is in short supply. Money for consumable supplies is also, generally, insufficient.

(viii) "Students and their problems receive very little attention from the administration." In Bogota the faculty began in early 1968 a student advising program similar to the system which exists on most undergraduate campuses in the United States. This event is significant in that it demonstrates an awareness by the faculty of this weakness. The program has worked reasonably well. It will be continued.

(ix) "Low professor salaries." The University must maintain a competitive salary scale to retain high quality staff. Under present regulation for the National University, the basic salary which is paid a full professor is 7,200 pesos (about \$420) monthly. Small increments are available for additional years of service, and the top basic salary is only twice the entering salary. Leaders on the agricultural campuses are aware that this weakness must be remedied if the current rate of progress toward a high quality education is to be maintained.

The principal change in present salary scales that is needed, other than a general increase in rates, is a greatly increased emphasis on productivity and decreased emphasis on seniority. At present, a rather rigid schedule of promotions based essentially on seniority is followed. The need for a system of advancement on the basis of responsibility, productivity, and graduate degree attained has been discussed, but as yet no tangible results have been obtained. At present no system for rating productivity has evolved, though an informal evaluation of merit and potential productivity is used by a committee which awards scholarships for advanced study.

Graduate Education

The rationale for the creation of graduate schools in the agricultural universities of developing countries has been discussed (1). There are at present at least 7 graduate schools offering a Master of Science in Agriculture or equivalent degree in Latin America. The graduate school in Colombia is a recent addition. The new graduate school opened at the Tibaitata research center (near Bogota) in January, 1967. It is a joint effort of the National University and the Colombian Agricultural Institute, with financial and professional assistance from the Rockefeller and Ford Foundations, USAID, and the Middle American States Universities Association (MASUA). At present it is offering the M.S. degree in agronomy, animal sciences, plant science⁴, agricultural economics, and agricultural

engineering to some 50 students. In agronomy, areas of specialization are offered in genetics and plant breeding, pathology, physiology, entomology, soils, and weed control. The first students graduated in January of 1969, and all were immediately employed in positions serving Colombian agriculture.

The faculty includes some twenty Colombian Ph.D.'s and an approximately equal number from universities of MASUA.

The program and degree requirements for M.S. students in agronomy does not differ greatly from that of M.S. students in the various agricultural schools in the United States. Total course requirements are 30 hours with 10 additional thesis hours. The major professor-committee system is used. All instruction is in Spanish and the program requires approximately two years to complete.

The graduate school is interested in having good students from neighboring countries, and offers a limited number of scholarships to students from outside Colombia. Presently there are students from six countries enrolled in the program.

The M.S. program is firmly established. A Ph.D. program is contemplated, but definitive planning has not occurred, and it appears that such a program will not be initiated for several years.

CONCLUSIONS

Our purpose has been to detail the changes which have occurred in agronomic (agricultural) education in Colombia the past five years. It is both accurate and conservative to state that a quiet revolution is underway. If the present rate of progress is maintained, deficiencies in quantity and quality in training of agronomists (agriculturists) in Colombia mentioned previously will be greatly alleviated within ten years.

Literature Cited

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^{2, 3} Censo del Personal Docente de Dedicacion Exclusiva, Vol. 1, 1968. Oficina de Planeacion de la Rectoria. Universidad Nacional de Colombia.

⁴ A special program for college teachers.