

Soil science education in China: present and future

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Abstract

China has seen rapid development of soil science education in higher education institutions since 1978, especially in the 1990s. Presently a complete degree program in the field of soil science has come into shape, formed of colleges, universities and research institutions providing education in all related disciplines to undergraduates, MSc and Ph.D. students, including cultivation of talents of academic and applied type. The numbers of education institutions which have an undergraduate major, MSc program or PhD program in soil science are 53, 45 and 17 respectively with annual enrolments of approximately 4000, 1600, and 250 respectively. The system is adequate to satisfy the need of the country for soil scientists and professionals in national economic and social development. China's soil science education initiative should be able to supply the nation with well trained individuals to satisfy its need in maintaining the sustainable development of the agriculture and the rural areas.

Key Words

Soil science, education, undergraduates, post-graduates, status quo, prospects.

Introduction

Soil science education in higher educational institutions in China began in 1910 when a major in agro-chemistry was established at the former Imperial University of Peking (the present Peking University) (Beijing Agricultural University). The major has been renamed several times, from soil and fertilizer science in 1946, soil science and agricultural chemistry in 1952 and agricultural resources and environments in 1998. In 1935, the first master's student in soil science was enrolled at Sun Yat-Sen University. There have been three rapid development periods in soil science education for undergraduates: 1950s, 1980s (started in 1978) and 1999-the present. Before 1949, less than 200 college students in a soil science major graduated from Chinese universities and at present, the numbers of students exceeds 3,000. For postgraduate education, there were very few master students and no PhD students graduated before 1949. The progress in postgraduate education occurred in term of enrolments in the late 1980s. By then a complete higher learning system comprising of undergraduates and postgraduates was established.

College soil science education

In 1998, Chinese reformed the higher education system and publicized a new list of academic majors. In 1999, new students in soil science education began to be enrolled in the major agricultural resources and environment fields, keeping pace with international trends in higher education and identified world-wide environmental challenges. The major is supported by two disciplines, Soil Science and Plant Nutrition. In fact, the latter was part of the soil science in broad sense, and soil science is the basis for the major. However, in the practical sense, more job positions in the local communities are for plant nutrition. They are equally important in college education. Over the last 10 years, the number of educational institutions that have a major in agricultural resources and environments has been doubled from 25 universities to 53 universities/colleges. Apart from traditional agricultural universities, a few other universities also enrol students in the major. Enrolment of students in the major for each university is between 30 to 90 students, with the average about 60 for each year. In addition, the numbers of students in agriculture taking soil sciences courses has also increased with the increase in the total enrolment numbers.

Graduate school education

An academic degree awarding system was established in 1980 and graduate schools at universities began to organize in early 1990s. Although postgraduate students were enrolled at both universities and research academies, no academic degrees were awarded. Besides, doctoral education was also lacking. The first postgraduates with academic degrees graduated in 1984 in mainland China.

At present, soil science education in graduate schools comprises 1) the first-level discipline, Agricultural Resource Utilization, and 2) the second level disciplines, Soil Science and Plant Nutrition. Numbers of authorized institutions for master degrees are 36 and 37 for soil science and plant nutrition, and for PhD degree programs 16 and 12 respectively. Since 1999, enrolment of postgraduates has increased rapidly, with an annual growth rate of 30% and 24% for master students and PhD candidates respectively. Between the years 1999-2004, growth slowed to 12% and 2.5% respectively in the years 2005 and 2006 (The Yearbook of China's Education). Total numbers enrolled in agriculture were 2,289 for PhD candidates and 12,552 for master students in 2006. About one eighth of these students were enrolled in either soil science or plant nutrition. Apart from academic degrees, professional degrees in soil science have also been awarded since 2005. The total enrolment is about 300 each year.

Problems faced in soil science education

While China has cultivated enough students for current demand, there are some general problems: (1) changes in quality of enrolled students with rapid increases in college enrolment; (2) increases in unemployment; (3) practical skills. The dramatic increase in college enrolment in China since 1999 has resulted in decrease in student quality in agriculture, except for the few national key universities, since other sectors than agriculture are more attractive for young people. Consequently, unemployment increases with the dramatic changes in graduate numbers. In addition, the increase in student numbers has not been kept in pace with increase in the financial budget for most of agricultural universities. Therefore, those university cut some practical courses and less training in this aspect will be expected.

Perspectives in soil science education

More emphasis will focus on improving the quality of education for both undergraduates and postgraduates in order to meet the demands of society for qualified professionals. For undergraduates, more training in practical skill is highly desirable, while for the undergraduates, especially for PhD candidates, the research quality needs to be improved. Training individuals for agricultural production will be the major task for soil science education since food security is a high priority for China now and in the future. With limited land and water resources, the education and cultivation of professionals will focus on the best use of natural resource and the minimization of environmental risks. In the meantime, some attention to environmental problems has to be paid, especially for agricultural non-point pollution. While research-oriented education is still needed, the general consensus is that most educational institutions should concentrate in professional education. Thus, more intensive practical trainings is desirable.

Concrete fundamental knowledge, a broadened view and developed leadership ability by the student are necessary to solve the problems we are facing both in agricultural production and research. As a whole, agriculture in China is still a very import and basic sector in the country's economy. To meet the growing food demands and minimize environmental risks brought about by agricultural production is a great challenge for the nation. Some of the measures are under discuss to attract more qualified youth to the sector, which include waiving the tuition fees for college students enrolled in agriculture and to create more job positions in the local agricultural extension sector and environment agency, both of which have been very weak. For the people working in agricultural higher education institutions, to cultivate qualified professional with applicable knowledge and skill, will be another important aspect to attract young people.

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