

# The Entrance Examination System for Agricultural Master's Programs in Japan and its Implications for China

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## Abstract

The entrance examination system for agricultural master's programs in Japan is characterized by advanced concepts and diverse approaches, holding valuable insights for the development of similar systems in China. Japan's agricultural master's entrance examination system employs a diversified approach, emphasizing the comprehensive assessment of individual academic orientations and overall qualities. Placing the candidate as the focal point, it respects personal preferences and choices, seamlessly integrating academic development plans into the entrance examination system. In light of this, China's agricultural master's admission system can draw inspiration by formulating reasonable examination content, establishing diverse examination methods, providing comprehensive examination materials, allowing flexible examination schedules, and implementing a scientific evaluation system, thus constructing a diverse entrance examination system tailored to the national context.

## Keywords

Japan; Agricultural Master's; Entrance Examination System; Talent Development.

## 1. Introduction

As the focus of agricultural work historically shifts towards comprehensive rural revitalization, the multifaceted expansion of agriculture necessitates the involvement of more professionals in the field. Agricultural master's programs, originating from the root of talent cultivation, aim to meet societal demands[1]. In the joint publication by the Ministry of Agriculture and the Ministry of Education titled "Opinions on Deepening the Promotion of Agricultural Technology Extension Services by Higher Education Institutions and Agricultural Research Units," it is emphasized to support agricultural research institutions in moderately expanding the enrollment ratio and scale of agricultural master's degree graduate students. Since the beginning of the 21st century, graduate education has experienced rapid development, with enrollment scales expanding rapidly. The issue of ensuring the quality of source materials while expanding enrollment has become a matter of significant concern[2]. The entrance examination system for agricultural master's programs, as one of the key measures to ensure the quality of admissions and attract high-quality students, plays a pivotal role in selecting agricultural talents, directly influencing the quality of agricultural master's education.

In May 1999, the 17th meeting of the Academic Degrees Committee of the State Council approved the plan for setting up professional degrees in agricultural science. Although agricultural master's education in China has a history of over two decades, its development is still in its infancy, and further research on admissions and related aspects is needed. Kyoto University in Japan, as a world-class comprehensive research university, has developed a distinctive system for agricultural master's education. Many of its mature practices are worth studying and emulating. Through an analysis of Kyoto University's entrance examination

system for agricultural master's programs, this paper aims to draw lessons from its successful experiences and propose suggestions and strategies to improve China's entrance examination system for agricultural master's programs. The goal is to provide references and insights for the development of a distinctive Chinese agricultural master's admissions system.

## 2. Background of Kyoto University in Japan

Founded in 1897, Kyoto University is a world-renowned comprehensive research-oriented national university with its main campus located in the Sakyo Ward of Kyoto, Japan. As one of Japan's premier institutions of higher learning, Kyoto University enjoys a global reputation for its research prowess and is hailed as the "cradle of scientists" in Japan. The Graduate School of Agriculture at Kyoto University was established in 1923, focusing on key global issues of the 21st century such as life, food, and the environment. With keywords like life, food, and the environment, the Graduate School of Agriculture boasts world-class research teams and educational resources in areas related to food, biological resources, production, and environmental protection. The school comprises seven disciplines, each engaging in research related to agriculture and human resource development. The Agricultural Department, in particular, aims to provide education and research across a broad spectrum of agricultural fields, nurturing individuals with advanced professional knowledge and interdisciplinary integration capabilities to address region-specific agricultural challenges.

The entrance examination for the Graduate School of Agriculture at Kyoto University involves subject-specific written tests and interviews tailored to the characteristics of each discipline. The program is a two-year course, attracting a diverse pool of graduate students, including recent graduates, working professionals, and self-funded international students. Kyoto University upholds a culture of free and autonomous research and learning. Each discipline formulates specific educational goals and admission methods based on its educational mission and practical conditions. The educational goals for each discipline have clear career orientations, and the cultivation of agricultural master's students, for example, aims to "cultivate advanced experts who can master the professional knowledge and research methods needed to solve problems and write research papers." Therefore, the admission process for agricultural master's programs places a greater emphasis on candidates' professional knowledge and practical abilities.

## 3. Entrance Examination System for Agricultural Master's Programs at Kyoto University in Japan

### 3.1. General Entrance Examination

Firstly, Kyoto University's requirements for graduate admission fall into three categories. The first category requires applicants to hold a bachelor's degree or have completed a 16-year education program abroad. Alternatively, candidates may meet the standard of a 16-year foreign education through distance education courses offered by foreign schools in Japan. The second category necessitates obtaining a degree from a Japanese educational institution designated by the Minister of Education, Culture, Sports, Science, and Technology, which is considered equivalent to foreign school education systems. The third category requires applicants with three years or more of university experience or those who have completed a 15-year education program abroad with outstanding performance. The latter is subject to evaluation through the graduate school's credit requirements and qualification assessment procedures, determining equivalent or higher academic capabilities comparable to bachelor's degree graduates, and the candidate must be at least 22 years old[3]. Secondly, the general entrance examination for Kyoto University graduate students consists of two components: a

written test and an interview. The written test comprises a specialized subject exam and an English exam, with the content of the specialized subject exam depending on the chosen discipline. The Graduate School of Agriculture offers seven disciplines, including Agricultural Science, Forestry Science, Applied Life Science, Bioresource Economics, Applied Biological Science, Regional Environmental Science, and Food Biotechnology. While there is some overlap in the content of the specialized subject exams for various disciplines, differences also exist, as detailed in Table 1. The English exam is based on TOEFL scores. Both the written test and the interview must be passed to qualify for admission. Finally, Kyoto University's agricultural master's examination allows candidates to apply for multiple disciplines simultaneously, but the order of preference for different disciplines may vary. Agricultural Science, Forestry Science, Applied Life Science, and Bioresource Economics can be listed as the third preference. Applied Biological Science can only be listed as the first preference, while Regional Environmental Science and Food Biotechnology can be listed as the second preference. Each preferred discipline requires a separate interview, as outlined in Table 2.

**Table 1:** Specialized Subject Exams

Discipline	Specialized Subject Exams
Agricultural Science	Crop Science, Breeding Science, Pomology (Fruit Tree Horticulture), Crop Systems Science, Plant Production Management
Forestry Science	Tropical Forest Environmental Science, Biomaterials Design, Tree Cell Biology, Composite Materials Chemistry, Forest Cultivation Science, Materials Biology, Biological Functional Materials Science, Circular Materials Creation Science, Residential Area Environmental Symbiosis Science
Applied Life Science	Cell Biochemistry, Biopolymer Chemistry, Chemical Ecology, Plant Nutrition, Cellular Energy Conversion, Fermentation Physiology and Brewing Science, Controlled Fermentation, Biofunctional Chemistry, Biological Function Control Chemistry, Molecular Biocatalysis Chemistry, Molecular Microbial Science, Forest Ecosystem Gene Control, Forest Metabolic Function Chemistry, Lignocellulosic Biomass Conversion Chemistry
Applied Biological Science	Plant Genetics, Insect Ecology, Insect Physiology, Reproductive Biology, Marine Biological Environmental Science, Marine Molecular Microbiology, Marine Biological Function, Inland Sea Ecology Conservation
Bioresource Economics	Agricultural Food Organization Management, Management Information Accounting, Regional Environmental Economics, Food and Environmental Policy, Comparative Agricultural History
Regional Environmental Science	Comparative Agriculture, Tropical Agricultural Ecology, Soil Science, Microbial Environmental Control, Facility Functional Engineering, Water Resources Utilization Engineering, Rural Planning, Radiation Management, Agricultural Systems Engineering
Food Biotechnology	Organic Chemistry of Life, Nutritional Chemistry, Biofunctional Transformation Chemistry

Source of Information: Kyoto University Official Website

**Table 2:** Order of Preferences for Each Major

Discipline	Order of Preferences
Agricultural Science/Forest Science/Bioresource Economics	Can be accepted as the third preference

Applied Life Science	Can be accepted as the third preference
Applied Biological Science	Admitted as the first choice
Regional Environmental Science/Food Bioscience	Admitted as the first choice

Source of Information: Kyoto University Official Website

### 3.2. International Student Admission

Kyoto University, being an international institution, is committed to providing a high-quality academic and research environment for students from around the world[4]. The admission of international students serves as a significant channel established by the university to promote international academic exchange[5]. The admission process for international students at the Graduate School of Agriculture at Kyoto University covers various aspects, including the evaluation of application materials, academic assessments, language proficiency reviews, and interview sessions. The eligibility requirements for international student admission at the Graduate School of Agriculture are consistent with those for general admission. Applicants must possess a Japanese language proficiency level of N1 or above, and TOEFL scores are accepted as proof of English proficiency. Before the written exam, international applicants are required to complete several steps. First is contacting potential supervisors. Applicants confirm basic information about professors on the school's official website, understand their recent research, express interest through emails, and provide a brief self-introduction. Second is writing a research plan. The research plan consists of six parts: research topic, research objectives, research background, current state of the subject, research methods, and expected results. Third is a professorial interview. A successful research plan can pique a professor's interest, possibly leading to an interview. During the interview, applicants need to articulate themselves and demonstrate foundational knowledge in their research area. The next step in this process is the written exam. Exam subjects vary depending on the chosen discipline, with papers typically in English or Japanese. Finally, there is an interview where professors inquire primarily about the discipline, the research plan, and the applicant's background. The selection method for international student admission involves both the written exam and the interview. Admission is based on the number of positions available, with successful candidates selected in descending order of scores.

### 3.3. Admission for Working Professionals

In the current complex societal landscape, professionals in the workforce aspire to pursue advanced studies at universities, either due to a desire for personal development or to address issues encountered after graduation[6]. To meet this demand, Kyoto University has established a graduate education system for working professionals, divided into "Special Selection for Working Professionals" primarily aimed at cultivating researchers and graduate schools focused on highly specialized professional talent development. The eligibility requirements for working professionals' admission are the same as those for general admission, but applicants must be employed by companies, government agencies, research institutions, etc., at the time of application and must maintain this status after enrollment. The admission process for working professionals also comprises written exams and interviews, with specialized subjects and English being the components of the written test. Currently, only the disciplines of Forest Science, Regional Environmental Science, and Bioresource Economics in the Graduate School of Agriculture are open for applications from working professionals. While there is some overlap in the content of specialized subject exams for different disciplines, there are also noticeable differences. Regarding English proficiency, TOEFL scores are used to assess applicants' English levels. However, native English speakers or those who have received university education in English may be exempt from the English exam, and specific policies will depend on annual

changes in admissions. The selection for admission of working professionals will be based on the content of application documents and academic exam scores. Each subject in the academic exam has corresponding passing standards, and applicants must meet these standards in all subjects to be successfully admitted. In the Forest Science discipline, applicants who meet the English score requirements will not have their English scores used in subsequent selection processes; instead, admission will be determined based on a combination of specialized subjects and interview scores. In the disciplines of Regional Environmental Science and Bioresource Economics, admission will be determined based on a comprehensive evaluation of specialized subjects, English, and interview scores.

#### **4. Insights for the Entrance Examination System of Agricultural Master's Programs in China**

##### **4.1. Develop Rational Exam Content, Emphasize the Integration of Theory and Practice**

On one hand, formulating rational exam content is crucial for ensuring the scientificity and effectiveness of the exams. In the design of exam content, a profound understanding of core knowledge and cutting-edge research in the field of agriculture should serve as the foundation. This should cover a wide range of disciplinary categories. To achieve this goal, the formulation of exam content should comprehensively consider the importance of different disciplines, avoiding neglecting key areas. Simultaneously, it is essential to judiciously gauge the difficulty of exams to ensure an accurate assessment of candidates' actual proficiency, avoiding situations where exam content is either too simple or too complex. On the other hand, emphasizing the integration of theory and practice is a key factor in enhancing the quality of the agricultural master's education system. In terms of setting exam content, it should reflect the requirement for theoretical analysis of practical issues and practical operational skills in finding solutions. This includes not only testing fundamental theoretical knowledge but also assessing candidates' abilities to apply theoretical knowledge to solve real-world problems through practical cases and scenario simulations. The organic integration of theory and practice better cultivates students' practical application abilities, providing them with stronger competitiveness in the agricultural field. To further optimize exam content, collaboration with research teams of industry professionals in the agricultural sector could be established. Close cooperation with industry professionals allows timely feedback on actual issues and demands, ensuring that exam content closely aligns with industry realities. This in-depth integration with real-world scenarios will better serve in cultivating agricultural professionals aligned with industry needs, equipped with enhanced practical adaptability and innovation capabilities.

##### **4.2. Establish Diverse Exam Formats, Enhance Exam Fairness**

Firstly, introducing diverse exam formats helps comprehensively evaluate candidates' overall qualities[7]. While traditional written exams assess theoretical knowledge, they may fall short in evaluating practical application, innovative thinking, and teamwork. By incorporating practical exams, group discussions, project practices, and other diverse methods, a more comprehensive understanding of candidates' practical abilities can be achieved, nurturing agricultural professionals with well-rounded qualities. Secondly, diverse exam formats help address differences in disciplines and individual capabilities, enhancing the fairness of exams. Differences in individual disciplinary strengths and practical skills need to be reflected through more flexible assessment methods. The introduction of interview sessions, open-ended questions, practical case analyses, and other diverse methods allows a more comprehensive and fair understanding of individual differences, avoiding reliance solely on traditional written exams. Differentiated assessment methods align better with the diversity of individual



disciplinary strengths, aiding in the selection of candidates with more potential and practical capabilities. Finally, diverse exam formats can stimulate candidates' interest in the discipline, prompting them to delve more deeply into academic research. Through project practices, practical exercises, and other methods, candidates can apply learned knowledge in real scenarios, further enhancing their practical understanding and interest in the agricultural field[8]. This interest-stimulating approach not only helps cultivate students' professional spirit but also lays a solid foundation for their future academic and professional development, making them more dynamic and creative in the agricultural domain.

#### **4.3. Provide Comprehensive Exam Resources, Establish Academic Support System**

Currently, the rapid transformation of agriculture demands interdisciplinary collaboration and comprehensive abilities that traditional specialized talents may no longer fully meet[9]. Taking Kyoto University as an example, its Master's admission assessment at the Graduate School of Agriculture involves written exams and interviews. It not only evaluates candidates' English proficiency and professional knowledge but also emphasizes their innovation and interdisciplinary collaboration capabilities[10]. Agricultural Master's programs, whether in admission systems or training methods, place a greater emphasis on cultivating comprehensive abilities. Providing personalized academic support for candidates is a crucial way to improve the quality of the student body. Firstly, China's Agricultural Master's entrance exams should establish comprehensive exam resources to support candidates in their preparation process. Schools can offer a rich array of textbooks, mock papers, and subject materials to ensure that candidates are well-prepared and have a better understanding of exam requirements. Secondly, an academic support system tailored to the capabilities of recent graduates, working professionals, and international students should be developed, focusing more on personalized guidance and support. Demonstrating the leadership of teachers, personalized coaching can be arranged based on candidates' language proficiency or professional level, providing specialized subject guidance to enhance candidates' self-adjustment abilities and cultivating sources of students better suited for various institutions[11]. Thirdly, building a more refined subject coaching system to provide candidates with more intimate subject guidance services. Schools can establish specialized counseling organizations for candidates to obtain subject guidance from professors and senior students, address doubts, and help them better understand and grasp the knowledge they are studying.

#### **4.4. Flexible Exam Schedule, Expanding Candidate Choices**

Firstly, Japan's multiple exam opportunities and decentralized entrance exam schedule effectively alleviate the stress of exam preparation for candidates. In contrast, China's graduate entrance exams typically consist of a single nationwide unified exam, usually at the end of December each year, imposing significant time pressure on candidates. Drawing from Japan's experience, China could consider introducing multiple exam opportunities and conducting entrance exams in stages to help distribute the burden of exam preparation and enhance exam fairness. Secondly, allowing candidates to independently choose exam dates and the schools they apply to enables candidates to choose the most suitable time and location based on their individual preparation and interests. This provides inspiration for reforming China's graduate entrance exam system, potentially considering increased flexibility in the timing of entrance exams. This would allow candidates to more flexibly arrange their preparation plans, better leverage individual differences and strengths, and promote graduate education that better aligns with individual needs and professional characteristics. Finally, national supervision should be implemented, with units having autonomous enrollment methods, abolishing the nationwide unified exam, and decentralizing enrollment autonomy. This allows enrollment units to independently determine enrollment majors and plans, formulate enrollment and

admission procedures, highlight the characteristics of the school, and improve the quality of student sources[12]. This reform proposal helps stimulate competition between universities, promotes enrollment practices that better align with individual and industry needs, and comprehensively enhances the diversity and professionalization of graduate education.

#### **4.5. Establishing a Scientific Evaluation System, Emphasizing a People-Centered Philosophy**

Firstly, a scientific evaluation system should comprehensively consider candidates' academic abilities and practical levels. In addition to traditional written exams, diversified methods such as academic paper writing and practical exams should be introduced. Academic paper writing can authentically reflect a candidate's research depth and academic level in a specific field, while practical exams help measure a candidate's ability to apply learned knowledge in practical scenarios. A comprehensive evaluation assists in selecting agricultural professionals with both academic strength and practical experience. Secondly, the evaluation system should value candidates' comprehensive qualities, including leadership, teamwork spirit, and social responsibility[13]. Traditional exam methods struggle to comprehensively assess the development of these soft skills. Therefore, introducing interview segments, group discussions, and assessing project experience can more comprehensively understand a candidate's performance and potential in different contexts. A comprehensive evaluation method helps select outstanding talents who not only possess professional skills but also demonstrate teamwork and leadership potential, better meeting the requirements of modern agriculture for comprehensive literacy. Thirdly, establishing a scientific evaluation system requires staying abreast of agricultural trends, including sensitivity to emerging technologies, theories, and practices, as well as a profound understanding of agricultural social needs. By regularly updating evaluation standards and methods, it ensures that the evaluation system aligns with the latest demands and development directions in the agricultural field. This requires evaluators to have a keen perception of industry dynamics and be closely connected with the actual needs of agricultural professional talent development, ensuring that the evaluation system truly provides scientific and reasonable support for selecting talents in the agricultural field.

### **5. Conclusion**

This article, using the entrance examination system for the Master's program in Agriculture at Kyoto University in Japan as a case study, systematically analyzes the characteristics and examination methods of this system. Based on this analysis, a series of recommendations and insights for China's Master's entrance examination in Agriculture are proposed. However, the study has some limitations. Firstly, the focus is solely on an in-depth examination of the entrance exam for the Master's program in Agriculture at Kyoto University, without conducting a comprehensive comparison with other Master's programs in Agriculture in Japan. Future research should broaden its scope to gain a deeper understanding of the examination systems of different programs, forming a more comprehensive knowledge base. Secondly, although the article provides recommendations and insights, it does not fully showcase the strengths and weaknesses of the entrance exam for the Master's program in Agriculture at Kyoto University. This underscores the necessity for a more in-depth study. A deeper understanding of the inherent mechanisms of the entrance exam at Kyoto University will contribute to more accurately proposing insights for China's Master's entrance examination in Agriculture, promoting continuous improvement and innovation in its system. In-depth research is not only of significant academic value but also provides robust support for the enhancement of China's Master's education in Agriculture and the sustainable development of higher agricultural education.

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