The reform of higher agricultural education institutions in China

A case study

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Foreword to the series

Education for rural people is crucial to achieving both the Education for All (EFA) goals, and the Millennium Development Goals (MDGs) of eradicating extreme poverty and hunger, ensuring universal primary education by 2015, promoting gender equity and ensuring environmental sustainability. In 1996, the World Food Summit in Rome stressed increased access to education for the poor and members of disadvantaged groups, including rural people, as a key to achieving poverty eradication, food security, durable peace and sustainable development. The 2002 World Summit on Sustainable Development, held in Johannesburg, also emphasized the role of education.

As the majority of the world's poor, illiterate and undernourished live in rural areas, it is a major challenge to ensure their access to quality education. The lack of learning opportunities is both a cause and an effect of rural poverty. Hence, education and training strategies need to be integrated within all aspects of sustainable rural development, through plans of action that are multisectoral and interdisciplinary. This means creating new partnerships between people working in agriculture and rural development, and people working in education.

To address this challenge, the Directors-General of FAO and UNESCO jointly launched the flagship programme on *Education for rural people* (ERP) in September 2002 (http://www.fao.org/sd/erp/), during the World Summit on Sustainable Development. This initiative involves an inter-agency approach to facilitate targeted and co-ordinated actions for education in rural areas.

It is within this framework, and to provide inspiration for the flagship initiative, that the FAO's Extension, Education and Communication Service and UNESCO's International Institute for Educational Planning (IIEP) have jointly launched a series of publications. This series is co-ordinated and edited by David Atchoarena (IIEP) and Lavinia Gasperini (FAO).

Gudmund Hernes
Director, IIEP

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List of abbreviations

CAAS	Chinese Academy of Agricultural Sciences
CAU	China Agricultural University
CIAD	Center for Integrated Agricultural Development
CORD	College of Rural Development, China Agricultural University
CTAAC	National College for Training Agricultural Administrative Managers
FAO	Food and Agriculture Organization of the United Nations
HAE	Higher agricultural education
HAEI	Higher agricultural education institution
HE	Higher education
HEI	Higher education institution
IIEP	International Institute for Educational Planning
MOA	Ministry of agriculture
MOE	Ministry of education
MOST	Ministry of science and technology
R&D	Research and development
UNESCO	United Nations Educational, Scientific and Cultural Organization
WTO	World Trade Organization

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Executive summary

The Chinese HAEI reform, implemented as from the beginning of the 1990s until the year 2000, has had a great impact on the efficiency of the HAEI as well as on its organizational structure. It has also provided experience which has not only helped in the reform of the entire education system in China but has also attracted the attention of the international community.

This report is the result of a case study on Chinese HAEI reform conducted by a research group of the China Agricultural University with the support of the IIEP/UNESCO. The study took place over a three-month period and included the collection and review of relevant data and information, the conducting of interviews with officials and students, the analysis of data and information, the drawing up of the findings and conclusions and the writing up of the report.

I. The main findings and conclusions of the study

1. The HAEI prior to the reform

(1) The HAEI institutional structure was established at the beginning of the 1950s by the strict adoption of the former Soviet Union's education system. Setting up the HAEI and internal faculties under the administration of different line agencies resulted in too limited a qualification and a restricted development of skills.
(2) The HAEI operation closely followed the guidelines set out in the national sector development policy within a plan economy system. Such a plan economy, involving centralized policy implementation, gave little scope to the HAEI as far as possibilities for decision making were concerned.
(3) The staff recruitment and administrative systems were seriously affected by the centralized administrative system, and encountered operational problems and constraints during the establishment of a market economy system in China.

(4) The problems and constraints existing in the HAEIs before the reform were: (a) institutional constraints, a lack of both incentives and autonomy in decision-making for the HAEIs; (b) a lack of qualified teaching and research staff due to the lower income and an inadequate staff recruitment policy; (c) a shortage of education funds; (d) traditional teaching methods; (e) an inefficient curriculum and teaching management system; and (f) outdated teaching and research facilities.

These problems and constraints were factors which led to the HAEI reform.

2. The HAEI reform process

(1) Factors which led to the reform

The following external factors were important in stimulating the need for reform:

(i) The labour market required a higher level of qualifications and needed integrated skills for resolving the problems existent in day-to-day management and technical servicing;
(ii) The governmental initiatives undertaken to improve the efficiency of investment in education and to reduce financial pressure;
(iii) The successful experiments of other countries.

Internal factors:

(i) The requests coming from the HAEIs for more extensive decision-making mandates in order to optimize the internal planning of education and curriculum development as well as personnel management mechanisms;
(ii) The need to increase teaching and research capacities by re-arranging the relevant faculties and allocating and utilizing more efficiently the human resources in teaching and research;
(iii) The desire to improve financial efficiency by increasing both the number of students and improving efficiency in education;

(iv) The need to extend vocational capacities by merging the relevant faculties and institutes in order to produce human resources with integrated and diversified qualifications as requested by the employers;
(v) The desire to increase the utility efficiency of the HAEI facilities and other resources;
(vi) The need to reduce staff and personnel costs by optimizing the staff structure.

(2) The HAEI reform process was implemented by taking the following steps:

(i) Identification and diagnosis of the internal and external problems and constraints encountered during the national economic system reform and overall institutional reform. This process was already in progress by the end of the 1980s and was mainly initiated by the HAEI internally and by the MOA through an exchange of information and as a result of both an official conference and of meetings;
(ii) Formulating the strategy, concept and guidelines of the HAEI reform according to the problems and constraints identified and integrating them into the national institutional reform. This was undertaken jointly in 1993 by the MOA and the MOE with the support of the central government;
(iii) Initiating the pilot reform undertaken by certain universities related to internal structural reform and institutional merging, in order to test the reform concept and work out the action plan for a large-scale HAEI reform. This was conducted between 1993 and 1995;
(iv) Summarizing the experiences made during the pilot reform by involving the HAEI, the MOA and the MOE in the piloting. Based on the pilot experiences, the MOA formulated an action plan for launching the national HAEI reform in 1996;
(v) Implementation of the HAEI reform throughout the entire country by multi-institutional co-operation and co-ordination. This took place from 1996 to 2000. This process was guided by the MOA and the MOE in co-operation with the provincial government. The reform process of certain HAEIs is still ongoing.

(3) The following stakeholders promoted the reform:

(i) The Ministry of Agriculture contributed to the formulation of the reform strategy and the action plan;
(ii) The Ministry of Education was involved in the designing and implementation of the curriculum reform and institutional merging;
(iii) Provincial governmental organizations participated in the merging of the HAEIs;
(iv) Graduate employers promoted the curriculum and employment reform;
(v) Students and their parents forced the HAEI to improve internal education management and contributed to the financial reform;
(vi) HAEI staff participated in the internal structural reform;
(vii) Education research institutions provided concepts and guidance with regard to the HAEI reform.

(4) Major changes caused by the HAEI reform

Changes have been made in the following areas through the HAEI reform:

(i) The administrative structure: decentralizing the administration to the provincial government and giving more decision-making rights to the HAEIs;
(ii) Changes in the curriculum and teaching management pattern;
(iii) Changes in the student enrolment and employment management pattern according to the requirements of the labour market;
(iv) Reform of the internal administrative structure and staff recruitment pattern in order to motivate both the staff and the administrators;
(v) Reform of the logistical service for increasing service efficiency and reducing financial pressure;
(vi) Gender issues were not especially of concern in the reform process, but there is no gender discrimination in staff recruitment nor in promotions to academic positions of the professional staff.

3. The HAE institutions after the reform

(i) The HAEIs have greater scope and more decision-making rights to operate the management of education and research according to both the demands of the market and to the governmental education guidelines;
(ii) A performance-linked staff recruitment and payment system has been integrated into the HAEIs' internal management. Education efficiency has been significantly improved by the reform;
(iii) The funding situation of HAE has been improved by charging students tuition fees. Due to this incentive, the HAEIs' annual enrolment is increasing by about 10-15 per cent;
(iv) The curriculum and teaching management mechanism is more flexible and student-friendly since the reform. Students are allowed to select courses according to both their own interests and the demands of the market;
(v) The establishment of a rural development faculty in the current faculty catalogue contributes towards meeting the challenges of rural development. New teaching methodologies introduced by the College of Rural Development (CORD) have set a good example for the further reform of teaching methods in other faculties;
(vi) The reform of enrolment and employment management patterns has not significantly contributed to the improvement of the graduate employment situation. To change this situation, a relevant governmental preferential policy is needed;
(vii) There are still problems and constraints since the HAEI reform, such as the difficulties involved in co-ordinating the various institutions which have been merged; a too rapid increase in the enrolment numbers will create a high level of pressure both on the teaching capacity as well as on the physical conditions of the HAEIs. Employment will be more difficult due to the rapid increase in student numbers. Governmental investments in the local HAEIs, especially in the HAEIs in areas of poverty, are insufficient.

4. Higher education and rural development

Chinese higher education should make a contribution to meet the challenges faced by Chinese rural development in order to:

(i) Meet the challenges of the WTO and of economic globalization;
(ii) Fight rural poverty, food shortages and inadequate rural health and education;
(iii) Resolve the problems of environmental and resources degradation caused by improper management of both the environment and rural resources which are threatening sustainable rural development;
(iv) Guarantee institutional improvement, governance, decentralization and local participation.

Achievements have made in the past 50 years by educating rural development management personnel and providing qualified administrators and senior management staff through undergraduate and post-graduate programmes.

II. Lessons learned and experience gained of use to the international community

1. Experience gained in the HAE reform of use to the international community

(i) Since the professional faculties and physical facilities were established according a plan economy, both the efficiency of education and the utilisation of facilities within the former HAEI were not optimal. Therefore, the restructuring of the internal faculties and the integration into HAEIs became essential in order to improve both the allocation of internal resources as well as education efficiency.
(ii) The decentralization of the administrative authority to the local government and in part directly to the HAEI created an institutional mechanism which gave more incentives to both the local government as well as to the HAEIs to plan and implement the education programme according to local economic development and the internal resources available.

(iii) Merging the relevant independent HAEIs and agricultural research institutions can provide a strong platform for the more efficient education of human resources for rural development. At the same time, it can create a negative impact on agricultural education.
(iv) The change from a plan system, controlled by the central government, to a more open market-oriented HAEI needs both a governmental policy framework and its co-ordination together with the active participation of the HAEIs. However, a multi-stakeholder participation is also needed. The only indicator for assessing the impact of the reform is the market demand.
(v) To ensure the success of the HAEI reform, the whole reform process should be implemented by taking at least the following four steps: (1) A situation analysis in order to identify the problems and constraints existing within the HAEIs; (2) The designing of a concept and action plan, including the alternatives, for the implementation of the reform; (3) The conducting of pilot trials in certain chosen HAEIs and the drawing up of a list of experience gained and lessons learnt which can be used in the modification of the implementation action plan; (4) The implementation of the reform, step by step, according to the current situation and the existing problems as well as in relation to the change in market demand.

2. Lessons learned from the Chinese HAE reform of use to the international community

By reviewing and evaluating the Chinese HAEI reform process and results, we have learnt the following lessons which could usefully be taken into consideration by other countries:

(i) Policy flexibility or alternatives should be considered during the preparation and implementation of the HAE reform. External and internal conditions directly affecting the institutional integration and structural reform should be considered and translated into the reform concept and action plan.
(ii) As mentioned above, the governmental co-ordination of institutional integration and merging is necessary and is irreplaceable. However, this can have a negative impact on the reform process. Nation-wide unified governmental instructions and administrative orders and a relatively short

time schedule for implementation neither provided the appropriate environment nor the necessary scope for the active participation of the HAEIs and the various stakeholders. Therefore, a more open and dynamic governmental framework in the form of guidelines should be prepared by the national authorities, and the co-ordination and supervision of the concrete implementation process should be delegated to the local authorities.

(iii) The experience gained in the process of institutional integration and the merging of divisions has shown that there were no unified solutions for resolving the institutional problems existing in the various HAEIs. There is a Chinese saying which goes: "One cannot cut everything with one knife." Alternative solutions should be found by the HAEIs and the local government in relation to the local situation.

(iv) Last but not least, in order to ensure the sustainability of the impact of the HAEI reform, an effective and preferential national and local governmental HAEI development-policy framework is needed. For the formulation and implementation of this policy a 'bottom-up', transparent and participatory approach needs to be introduced. The reform should be a long-term and dynamic process which accompanies the process of national institutional reform.

Chapter 1
Introduction

1.1 The rationales for and the objectives of the study

Economic development over the past four decades has proved that human resource development, caused by the increased investment in basic and higher education, has contributed significantly to national economic development both in developed and developing countries. The higher agriculture education institution (HAEI), as a sector in the entire economic development strategy, serves to produce qualified human resources for agricultural and rural development. In the Chinese context, the HAE institutions play a most crucial role in the Chinese rural development process due to the extensive areas of poverty that have a high demand in educated agricultural technical and management personnel.

It is known throughout the world that China has made tremendous achievements in rural development since the rural reform initiated at the beginning of the 1980s. However, in the transition from a centralized plan to a market-oriented economy and due to the process of economic globalization, Chinese agricultural and rural development is now being faced with more challenges than ever before. Limited available natural resources, small-scale production and land holdings, the traditional production pattern with its low level of technological and physical inputs as well as a lack of qualified human resources are interrelated active factors in the constraint of Chinese agricultural and rural development. In order to take on these challenges, at the beginning of the 1980s, the Chinese government formulated a strategy of "*promoting agriculture by scientific and technological innovation and education.*"

Within the process of national economic and institutional reform, the institutional structure of HAE, as an important part of the whole national education system, has been in the process of reform, on a step by step basis, since the middle of the 1990s. And this HAEI reform process is still ongoing and intensifying as is the progress of national economic and institutional reform.

The progress and effects of the HAEI reform in China have been followed attentively by the international community, including the FAO and UNESCO as well as by other developing countries. Although the reform has lasted for almost ten years, the implementation process and the achievements of the HAEI reform as well as the positive and negative experiences related to it have not as yet been systematically summarized and presented to the relevant international organizations and other developing countries.

This case study was initiated by the IIEP/UNESCO with the aim of systematically reviewing the HAEI reform process, its achievement, impact and the experience gained. More specifically, the case study aims at:

- Describing and analyzing the process of the HAE institution reform within the broader context of the national economic and institutional reform;
- Describing the major changes and innovations caused by the institutional reform and comparing the major functional differences before and then after the reform;
- Assessing the impacts and efficiency of HAE institutional reform, with a special focus on the impact of both the merging of HAE institutions and of curriculum reform;
- Assessing and predicting the potential contributions of HAE and HE to Chinese rural development, especially within the context of the Western Province Development and poverty alleviation, and sustainable rural development;
- Drawing up, in a broader perspective, positive and negative lessons learned and experience gained from the reform for guiding further HAE reform in China and sharing such experience with other countries of the world.

The case study was carried out by a research team[1] of the China Agricultural University (CAU) in collaboration with Ministry of Agriculture and Ministry of Education officials who were in charge of the design of the reform and its implementation.

1 The study team was composed of Liu Yonggong, Shen Yajing, Xue Shu, Wang Chunlai, Zhang Li, Wang Li, Zhao Zhigang and Luo Rumin.

1.2 Research design

In order to achieve the above-mentioned objectives and fulfil the detailed tasks described in the terms of reference (TOR), the IIEP assigned a local consultant from the China Agricultural University to form a case-study team. Zhang Jingzun, the former division chief responsible for implementing the reform of HAE institutions was invited to act as policy adviser to the study team. After breaking down the entire study into individual tasks, the case-study team was divided into different task forces in order to fulfil certain designated tasks. The entire study was designed to be conducted on a step by step basis in the following detailed manner:

(1) Formulation of the draft outline of the case-study report according to the TOR and discussion of the structure and contents of the document with the officials responsible at the IIEP/UNESCO;
(2) Design of the data-collection lists, check lists and questionnaires for interviewing different institutions. Collection of the relevant data, information and documents from the Ministry of Agriculture for review and indication of the changes needed. The entire study team was involved in this step;
(3) Conducting of interviews with the responsible officials of the Ministry of Agriculture and relevant actors as well as those responsible for divisions and departments of selected agricultural universities. Student interviews were carried out in the China Agricultural University, Beijing;
(4) Analysis of both the data and information collected as well as the results of the interviews, summarizing of the findings and observations for assessing the changes needed and the formulation of the lessons learnt and experience gained for use in carrying out further reform both in China as well as in other countries;
(5) Drawing up of a draft report and obtaining the comments of and feedback from both the relevant officials as well as the key informants interviewed;
(6) Finalization of the report by integrating the comments and feedback into the relevant parts of the report.

The case study was carried out by teamwork. A semi-structured interview method was applied to the interview process, which provided a dynamic

environment for interactive discussion between interviewer and interviewees. The findings were summarized and discussed in a team finalization workshop. Participatory and visualization tools were used in the workshop.

1.3 The structure of the document

This report serves as a country case-study document. It systematically presents the background and context of the case study, the process of the reform and the changes that have taken place in HAE institutions, the impact and achievements of the reform. All findings and relevant analytical steps have been verified and supported by first and second-hand data and special cases collected from various universities and publicized articles. The entire report was structured as follows:

Chapter 1 presents the background and objectives of the study, the research design and methods, so that the readers can get an overall understanding of why and how the case study was conducted.

Chapter 2 describes the HAE institutional structure, its functions and challenges as well as the constraints existing prior to the Education Institution Reform. In this chapter, readers are provided with an overall review of the institutional structure of HAE before the reform which should lead to a better understanding of the historical background and context of the HAEI reform.

Chapter 3 mainly highlights the transformation process which focuses on the background and the factors underlying the changes, the process of change, the forces which supported or resisted change, the impact and results of the changes, the evaluation made by different stakeholders of the change process.

Chapter 4 presents the HAE institutions after the reform. This chapter helps readers to understand the new mandates of HAE, its staff and administrative structure, the curriculum and teaching methodology changes, student enrolment and the employment of its graduates as well as the remaining problems, constraints and challenges existent after the reform.

Chapter 5 places the HAE in the larger context of the entire reform of higher education and tries to review the contribution of higher education to rural development. It also assesses the achievements and impact of HE reform and highlights and proposes some countermeasures for the further improvement of higher education.

Chapter 6, the last chapter of the report, presents the lessons learned and experience gained which can be adopted by those responsible for both Chinese as well as foreign institutions. This chapter also contains relevant recommendations for the further reform of education institutions.

Chapter 2
Description of the HAE institutions prior to their transformation

2.1 Review of the HAE system prior to the reform

In order to gain an overall understanding of the modern Chinese education system it is necessary to know something about the history of the Chinese education system.

Over a period of 2,500 years of China's history, as from 700 B.C. up to 1898, a traditional education system was established and developed. The traditional education system had a mandate both to ensure the competence of governmental officials (mandarins or governors), in accordance with the needs of the various governments, and to ensure political consolidation and stability. In order to achieve this objective in education the teaching methods and curriculum strictly followed the traditional Confucian philosophy of education and focused on Chinese history, politics, ancient literature and Sinology. Mathematics, physics and chemistry, and engineering technologies were not included in the curriculum of the traditional education system. In this traditional form of education, a traditional examination system called the '*Keju Zhidu'* was established for the selection of student candidates.

The founding of the modern Chinese higher education system can be traced back to 1898. After losing the 'Opium War' in 1840, the Qing Government had to open the door to Western countries. The government was forced to allow Western missionaries to open schools in some big cities, like Beijing, Shanghai, and Tianjin. In 1898, as a result of 'Hundred Days Wuxu Reform', led by Kang Youwei and Liang Qichao, the Government of the Qing Dynasty agreed to establish 'new schools' (*xin xue*) or universities, much against its own will, according to the style of Western education institutions. In the first half of the 1900s, due to political instability, particularly because of the Civil War between the Beiyang Warlords (1912-1928), the

Anti-Japanese War (1937-1945) and the Civil War between the Chinese Republican Party and the Chinese Communist Party (1946-1949), Chinese higher education was slow in its development and was seriously affected by the political changes that had occurred. Due to such political instability as well as to a lower level of investment, Chinese agriculture became the weakest sector, run according to an extremely traditional production pattern. During this period, an effective HAE system could not be established. According to a study undertaken by the Ministry of Agriculture, until 1949 there were only 18 agricultural colleges and universities in the whole country, mostly located in the coastal provinces. Throughout the entire country, there were only 928 teaching staff, distributed over 18 agricultural colleges, and in about 30 departments and faculties of comprehensive universities. The total number of students was only 10,726 (*Review of Chinese HAE in the past 50 Years from 1949 to 1999*, Ministry of Agriculture, 1999).

The basic structure of Chinese HAEI was set up at the beginning of the 1950s after the founding of the People's Republic of China. Due to the western 'Isolation policy' against China during the Cold War, the Chinese government had to establish very close relations with the former Soviet Union. In designing and establishing the HAE institutions, the new government adopted the education pattern of the former Soviet Union, which was highly sector-oriented and specialized, in order to fit into the centralized plan economy. Within such a political framework, all higher education institutions were established to serve the governmental plan economy system without taking into consideration the qualitative and quantitative demands of the labour market. The institutional reform of higher education was implemented between 1952 and 1954. In order to comply with the Soviet Union pattern, the existing higher education institutions (including the faculties, the curriculum and administrative structure) were restructured and each specialized according to the institutional organization of the various sector line agencies designed by the central government. According to the development needs of industrial sectors, new universities, colleges as well as faculties were set up by merging similar faculties and teaching staff from the different existing universities. The sector need-oriented HEI restructuring resulted in a high level of specialization of universities, except certain of the most prestigious. After the reform, the HEI could be categorized into universities of natural sciences, universities of technology

and engineering, universities of agricultural sciences, medical and general universities. In this sector-oriented HEI, most of the newly established and specialized universities were administratively affiliated to the relevant line agencies. According to the affiliated administrative level, the universities before the institutional reform could be divided into three different types:

(1) National multi-disciplinary universities, such as Beijing University, Qinghua University, Renmin University, Nankai University in Tianjin, Tongji University and Fudan University in Shanghai, etc., which were directly affiliated to the Ministry of Education without any institutional link with the relevant line agencies. Student enrolment and graduate employment were open to and took place throughout all provinces of the country;
(2) Sector-linked national universities, such as Beijing Agricultural University, Beijing Forestry University, Beijing Technology University, were directly affiliated to different ministries with the mandate of providing the necessary qualifications for technical and managerial personnel in sector development. Student enrolment and graduate employment were also open to and took place throughout all provinces of the country;
(3) Provincial multi-disciplinary and sector-linked universities were also established with the support of the provincial line agencies to provide the necessary qualifications for technical and management personnel to serve the local economic and sector development. Student enrolment and graduate employment related to such local universities were mainly focused on the local market.

Within this institutional structure, both student enrolment and graduate employment strictly followed the plans of the national and local line agencies, and were controlled according to governmental development strategies and sectoral policies. Before the economic reform and the transition from the plan economy to a market-oriented economy, the HE institutions had neither institutional challenges nor internal structural conflicts as long as the governmental plans were implemented.

The HAE institutions, prior to the reform in the 1990s, were set up during the HE institutional reform between 1952 and 1954. Up to 1954, through the reform and reintegration of 18 former agricultural colleges and universities

and 30 agricultural departments and faculties, distributed throughout non-agricultural universities, 30 independent agricultural colleges and universities were founded at national and provincial levels. The former 182 agriculturally-related professional areas and faculties were reduced and integrated into 124 professional spheres and faculties, which were very similar to the way faculties were organized in the former Soviet Union. The regional distribution of the agricultural universities and colleges was also improved through the structural reform and the establishment of new agricultural universities or colleges in the western provinces.

As mentioned above, the HAE reform in 1952 was implemented by adopting the education institutional pattern of the former Soviet Union. Three special features were introduced into the former HAE institutions:

(1) The setting up of subject-related faculties under the departments by forming so-called 'curriculum and teaching divisions' responsible for curriculum and teaching material development, managing the teaching and research activities. Within this arrangement, curriculum and teaching materials were developed which closely followed the unified national curriculum catalogues. The teaching staff had very limited possibilities for modifying the curriculum, even if there was a need to update the contents.
(2) The percentage of the three-year professional-diploma degree students was dramatically reduced since there had been no diploma programme in the former Soviet Union education system. According to research carried out by the MOA, this reduction was in fact hardly rational as in the post-war rehabilitation period of Chinese agriculture large numbers of agricultural technicians, as well as those students undertaking a university extension programme were needed at the community and county levels.
(3) The highly specialized qualification of students in agriculture. In the former Soviet Union education system, students were qualified in very specialized and limited professional spheres, according to the special qualification requirements needed in the planned management and professional positions. This led to fewer problems being encountered within a plan economy system since the labour market was also planned and controlled by the government. In China, such professional spheres specified within

a specific pattern of education were not challenged until the establishment of a market economy system in the middle of the 1990s.

2.2 The mandates of HAE in China before its transformation

As in other countries, serving and promoting the development of ***agriculture***, the development of ***rural areas*** and ***farmers*** through ***agricultural education, research and extension*** programmes are three major institutional mandates of HAE in China. These mandates were designated by the government in accordance with the agricultural and rural development strategy as well as the market demand in human resources coming from the various agricultural sectors. Since the founding of the People's Republic of China, the new Chinese government has always given priority to agricultural and rural development in its national development policy as a large proportion of the rural population lives in poverty. On the other hand, Chinese agriculture always had a special political mission to produce sufficient food for a large population with very limited available natural resources (land and water). The major mandates of HAE were determined according to both the education and the agricultural development policy within the specific context of Chinese rural development.

(1) The education function

Education is the major function of HAEIs and can be classified into five categories:

(1) The undergraduate programme mainly provided by the agricultural universities at national and provincial levels;
(2) The professional diploma programme mainly provided by the agricultural technical colleges at the provincial and prefecture level. The diploma programme was also provided partly by certain agricultural universities;
(3) The postgraduate programme mainly provided by agricultural universities and partly by some agricultural colleges with a sufficient number of qualified senior teaching and research staff;
(4) Adult education and managerial on-the-job training with certificates provided both by the universities and the colleges at all levels.

Among these education mandates the undergraduate programme is a major and fundamental education function of the agricultural universities. According to the MOA statistics, from 1978 to 1998, the HAEIs in China provided 610,000 graduates to the agricultural sector. *Table 2.1* shows the change in the percentage of postgraduates, undergraduates, and diploma students from 1982 to 1998.

Table 2.1 The change in percentage of postgraduate, undergraduate and diploma students in the HAEIs

Year	Total	Postgraduates		Undergraduates		Diploma	
		No.	%	No.	%	No.	%
1982	67,712	1,382	2.0	60,655	89.6	5,675	8.4
1984	87,829	2,666	3.0	67,226	76.6	17,897	20.4
1986	116,909	5,387	4.6	77,709	66.5	33,813	28.9
1988	125,113	4,999	4.0	83,178	66.5	36,936	29.5
1990	121,776	3,875	3.2	81,724	67.1	36,177	29.7
1992	124,567	3,882	3.1	80,309	64.5	40,376	32.4
1994	172,391	5,412	3.1	91,277	52.9	75,752	43.9
1996	183,167	6,878	3.8	108,661	59.3	67,628	36.9
1997	187,115	7,367	3.9	120,789	64.5	58,999	31.5
1998	196,665	8,180	4.2	133,217	67.7	55,286	28.1

Source: Agriculture Yearbooks, 1982 to 1998.

(i) Undergraduate education

The figures in *Table 2.1* show that undergraduate education has always been a major mandate of the HAE despite the reduction in the percentage from 89.6 per cent to 67.7 per cent of the total student numbers. The number

of undergraduate students in the universities has been doubled from 60,655 to 133,217, although it has been reduced by more than 20 per cent. Undergraduate education is the most important task of the HAE institutions in producing management, research and technical personnel for agricultural and rural development.

(ii) Professional diploma education

Since the establishment of the market-oriented economy system, agricultural and rural development has an increased need for agricultural technicians and extension staff with practical skills. To meet this demand, the MOE formulated a policy in 1984 to promote the agricultural diploma as a special programme both in the agricultural technical colleges as well as in the universities. From 1982 to 1998, the total number of diploma students increased from 5,675 to 55,288, i.e. an increase rate of almost ten times the amount. In the meantime, the number of agricultural technical colleges increased from 8 to 12. The percentage of diploma students increased from 8.4 per cent to 28.1 per cent. According to the MOA, in 1998, all agricultural universities (46 in that year) could provide diploma programmes, making up 69.9 per cent of the total number of professional diploma graduates.

(iii) Postgraduate education

Postgraduate education is a mandate of agricultural universities for providing senior teaching and research personnel to agricultural education and research institutions and senior management and administrative personnel for agricultural and rural administration organizations at different levels. The postgraduate education programme in agricultural universities was initially started at the beginning of the 1950s. But rapid development took place as from 1978 to 2000. According to the statistical data of the MOA, from 1978 to 1997, 3,613 PhD students, 23,665 Master's students and 300 professional Master's students graduated from agricultural universities. According to the *Guidelines for the Reform and Development of Chinese Higher Education (1993),* postgraduate education had to be further strengthened and admission had to be increased in the key national universities with good research facilities and qualified teaching staff. Undergraduate and diploma categories should be further consolidated in order to increase both the comprehensive qualification

and the problem-solving capability of the individual students. The capacity of the national key agricultural universities, such as the China Agricultural Universities, Nanjing Agricultural University, Huazhong Agricultural University to provide postgraduate education rapidly has been strengthened by the support of the '211 Programme' funds.

(iv) Adult education

In November 1983, the MOA set up a National College for Training Agricultural Administrative Cadres (CTAAC) with the mandate of training and further qualifying agricultural administrative cadres and management staff. In the same year, the MOA supported 16 key agricultural universities in different regions to establish branches of the CTAAC. These colleges formed an on-the-job training and continuing education network in different regions for training agricultural administrators and management personnel according to their training needs. The CTAAC trainees include provincial governors, directors-general of agricultural and forestry departments, division chiefs and prefecture and county governors, as well as management and administrative staff at township level. The on-the-job qualification of the management cadres strongly helped to promote both policy implementation efficiency as well as its effectiveness. According to the MOA statistics, from 1983 to 1999, 1.6 million agricultural cadres received on-the-job training at the CTAAC and its training branches.

Before the reform, according to the former Soviet Union Education Pattern, the MOE was responsible for both formulating nationally unified curriculum and subject catalogues according to the demands of sectoral development and for the controlling and supervising of the implementation of the curriculum and catalogues. The curriculum and catalogues contained the guidelines for student admission and the design for the setting up of the faculty. This unified planning and control system had the advantage of standardizing the management and monitoring instruments and making sure that the students received qualifications in accordance with the unified teaching objectives and subjects. However, there was very limited scope for the teachers and teaching management divisions to innovate, update and change the teaching methodology or the contents of the curriculum so that it might fall in line with both their own teaching practices as well as the feedback received from the students.

(2) The research function

Technological research and development (R&D) is an integral part of the HAEI. According to the estimates of a Chinese Academy of Agricultural Sciences (CAAS) study group, about 60-70 basic and applied research projects were carried out by the HAEI at national, provincial and lower levels. It was also estimated that more than 2/3 of the agricultural research projects were funded by governmental institutions at different levels and 1/3 were assigned by businesses. The total research funds represent about 20-30 per cent of the total institutional income of HAEI.

The R&D at HAEI not only generates income, but also provides opportunities to the professional staff to transfer the research outputs into their teaching curriculum. The time spent on R&D by professional staff members varies from 30 per cent to 50 per cent of the total, depending on the total staff capacity and individual research experience.

According to research conducted by the CAAS, from 1978 to 2000, Chinese agricultural universities and colleges conducted about 7,000 R&D projects every year. About 40-50 per cent of R&D results have been transferred and applied to production practices. The research facilities for HAEI have been used both for teaching and research purposes.

(3) The extension function

Agricultural universities play an important role in the transfer of agricultural technologies. All agricultural universities and colleges have experimental farms for R&D and for providing facilities for on-the-spot production practices. At the same time, universities also set up their demonstration areas within the regions. For instance, the former Beijing Agricultural University has been involved in the Development Programme of the Huang, Huai and Hai River Plain (3H Region). The university established a partnership with the prefecture and county governments in 3H regions and set up their R&D demonstration areas in the region. At the same time, the university also sent its researchers and young teachers to county level to assist the county government. According to a CAAS survey, from 1985 to

1995, 2,300 agricultural technologies and know-how have been developed and transferred to production by the agricultural universities.

The extension functions of the HAEI before the reform were mainly focused on technological transfer by demonstration, and on-site advice and training. Traditional 'top-down' and 'instructive' extension methods were applied by the HAEI extension staff. Such traditional extension methods were challenged by farmers after the 'Family responsibility system' had been established.

2.3 The staff and administrative structure

2.3.1 The staff and the staff employment system

Before the HAEI reform, teaching and research personnel in agricultural universities were employed as governmental civil servants without any form of employment contract. Once a staff member was recruited by the HAEI the employment period became indeterminate; this means that he or she could continue to work until the official retirement date. The HAEI had no right to terminate the employment relationship, even if the staff member was unable to provide the qualified services expected by their institutions. This represents the so-called 'iron bowl of employment' in a plan economy.

Such a system limits the possibilities for the promotion and development of young staff members. A teaching and research performance-linked salary and payment system was not established, however, until the end of 2000. Such a recruitment and employment policy had no performance monitoring or evaluating mechanism. The salary or payment was fixed according to the governmental salary policy. Criteria for determining the salary categories included the total number of working and service years in the institution, related to the academic and professional position. But the differences between the salary categories were not very large, ranging from 50 to 200 Yuan (US$ 6-25) from the lowest to the highest categories. This payment system did not provide sufficient incentive to motivate the staff. Due to this salary and staff promotion mechanism, a serious brain drain occurred between 1985 and 1995. A number of qualified young teachers and researchers left the universities to go to hi-tech companies and the agro-business sectors in order to increase their salaries. The teachers who remained in

the universities had to find a concurrent job in order to compensate for the low level of income. As a result, highly qualified teachers, especially young teachers who could find spare- time jobs in the market, had no interest in teaching. In such a structure, most of the teaching work was carried out by the staff members who were not highly qualified and could not find spare-time jobs outside. This has had an overall negative effect on education performance as well as on the quality of the teaching.

Since 1995, the staff and personnel management structure has been changed little by little over the period of the reform process. Both the pre-qualification and age combination of the teaching staff have been significantly improved. The figures in *Table 2.2* and *Table 2.3* show the staff structure changes made between1984 and1998.

Table 2.2 The pre-qualification of teaching staff in agricultural universities and colleges

Year	No. of teachers	Staff with PhD degree	Staff with an MSc Degree	Staff with a bachelor's degree	Staff with a diploma and lower
1984	23,027	102	1,369	19,290	2,350
1986	26,324	103	2,150	21,486	2,685
1988	26,121	153	3,122	20,534	2,312
1990	25,427	266	4,206	18,890	2,057
1992	24,870	383	4,542	18,319	1,626
1994	25,715	626	4,957	18,193	1,679
1996	25,394	1,109	6,842	16,773	1,030
1997	24,794	1,108	5,595	16,786	936
1998	23,238	1,348	5,343	15,796	751

Source: *Review of Chinese HAE in the past 50 years*, MOA, 1999.

In making a comparison of the figures in *Table 2.3*, it can be seen that there was no significant increase in total staff numbers. However, there was a significant increase in the number of faculty members with higher degrees, such as PhD and MSc, whilst the number of staff with a lower educational level declined significantly.

Table 2.3 Change of age distribution of teaching staff in the HAEIs

Age	1984		1997	
	Number	%	Number	%
>56	2,550	11.1	3,273	13.2
51-55	2,897	12.6	1,407	5.7
46-50	5,376	23.3	8,61	3.5
41-45	2,634	11.4	1,765	7.1
36-40	1,235	5.4	2,905	11.7
31-35	1,496	6.5	6,946	28.0
<30	6,839	29.7	7,489	30.2

Source: *Review of Chinese HAE in the past 50 years*, MOA, 1999.

By comparing the figures of 1984 and 1997, it can be seen that the average age of teaching staff was reduced and that an increasing number of younger staff graduating after 1982 have been recruited to the key teaching and research positions.

According to the personnel administrators of the CAU who were interviewed, there are two factors which accelerated the age change of the professional staff in the agricultural universities. Firstly, the large-scale retirement of senior staff, who studied during the 1950s and 1960s, took place at the beginning of the 1990s. According to the HAEI staff employment policy formulated in the late 1980s, only professors still supervising PhD

students could remain in their teaching or research positions until the age of 65. This policy accelerated the renewal of staff; secondly, young teachers, who studied right after the Cultural Revolution from the end of the 1970s to the middle of the 1980s, became key staff members both in the teaching and research positions in the universities.

2.3.2 The administrative structure

As mentioned in *2.1*, the administrative structure of higher education before the HAE reform adopted the institutional pattern of the former Soviet Union. This pattern fitted the administrative and institutional structure of a plan economy. We can define this institutional pattern as a 'Line agency-linked administrative structure'.

Before the institutional reform, the Ministry of Agriculture administered the national key agricultural universities. Beijing Agricultural University, Nanjing Agricultural University, Shengyang Agricultural University, Huazhong Agricultural University, Beijing Agricultural Engineering University were all directly subordinate to the Education Department of the Ministry of Agriculture. These universities were categorized as MOA-affiliated agricultural universities with a higher institutional status compared to the HAEIs at the provincial and lower levels.

The administrative and management functions of the MOA include:

(1) Approving the budget and allocating funds for the operation and the physical construction of the HAEIs;
(2) Guiding the formulation of and approving the curriculum and education programmes and supervising their implementation according to the sectoral development strategy of the MOA;
(3) Formulating the agricultural R&D programmes and designating them to the HAEI and the CAAS according to the overall agricultural technology development strategy;
(4) Approving the student enrolment and graduate employment plans submitted by the HAEIs;

(5) Recommending and approving as well as recruiting the university presidents and staff for the other key administrative positions in consultation with the local responsible line agencies.

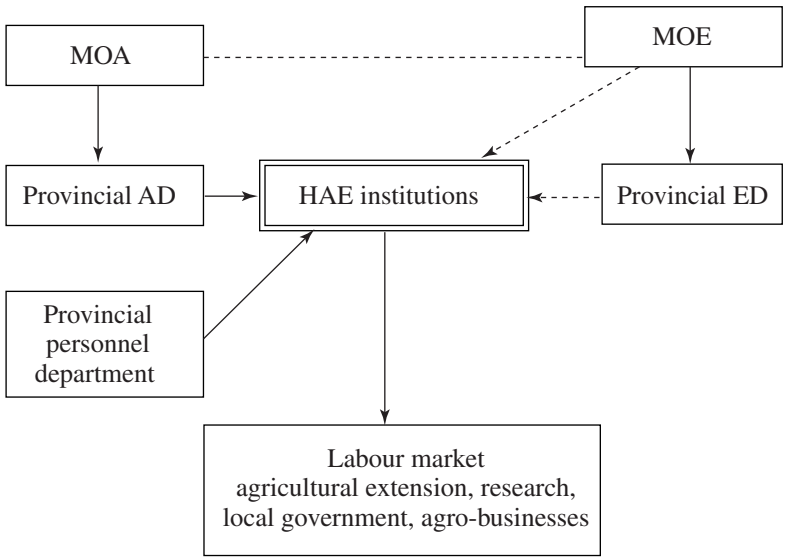
The relevant departments in the previous MOA institutional structure which fulfilled the above-mentioned administrative functions included the Education Department, the Department of Science and Technology and the Personnel Department.

In the line agency-linked HAEI administrative pattern, there existed a professional supervision relationship between the MOE and the HAEI. The main functions of the MOE were to provide consultation and guidance for the design of the curriculum and for the modification of the organization of the faculty as well as the co-ordination of the compilation and publication of textbooks. According to the education administrative policy, the undergraduate and postgraduate programmes of the HAEI had tot be developed according to the curriculum development guidelines and the unified subject catalogues formulated by the MOE. In order to organize such professional and pedagogical consultations, regular co-ordination as well as consultations between the MOE and the MOA became necessary. The departments responsible in the MOE were the State Higher Education Degree Administration and the Department of Higher Education.

The HAEI at the provincial level were administered both by the provincial Department of Agriculture and the Department of Education. The administrative functions were quite similar to those of the national key agricultural universities.

The administrative structure of the HAEIs at various levels is illustrated below in *Figure 2.1*.

Figure 2.1 The HAE administrative structure before the reform



2.4 Funding and funding sources

In the plan economy, the HAEI were 100 per cent funded by the central and local governments. The education fund was allocated directly from the governmental fiscal budget at a level of approx. 3.3 per cent of the total GNP. The operation funds for national agricultural universities were funded at a level of 100 per cent by the central government, and allocated by the Ministry of Agriculture and the Ministry of Education –whilst the operational funds for provincial agricultural universities and colleges were shared by the central and local governments at the respective percentages of 30 per cent and 70 per cent. There were no private fund investments in the universities before the institutional reform. In principle, no income was generated from student

education before the reform because no tuition fees were paid by the students to the universities.

Fund sources prior to the reform:

- Governmental education funds for teaching activities, also covering operations and building construction, represented 60 per cent, on average, of the total funds.
- Research funds from governments and other clients, enterprises and extension agencies. This part covered about 30 per cent of the total annual budget.
- Self-generated funds from the university enterprises and income from the technical services provided to other clients made up approximately 10 per cent of the total budget.

The research funds for HAEI were mainly provided as follows:

- The MOA and local governments represented 60 per cent of the total research funds. Research programmes designated by the MOA mainly stressed the production technologies, breeding new varieties, practical technical packages, such as fertilizers, pest management, cultivation techniques, irrigation schemes for local extension institutions.
- The Ministry of Science and Technology (MOST) provided funds for basic scientific and High-Tech research programmes, such as gene technology and bio-engineering. The China Agricultural University and the Nanjing Agricultural University were both involved in the '863' High Technology Research Programme, implemented between1986 and 1991. The National Key Biology Laboratory is located in the China Agricultural University and 80 per cent of the research funds were allocated by the MOST. Research funds from the MOST represented 20 per cent of the total.
- The State Natural Science Foundation was another fund provider for young researchers. The funds were available for all research staff and teachers of universities and colleges. The foundation mainly supported the small basic scientific research programmes, which represented about 10 per cent of a share in the fund.
- Research and development funds invested by business and enterprises (technology users) represented approximately another 10 per cent.

Construction funds for national key agricultural universities before the reform were mainly provided by the Ministry of Agriculture, budgeted from the governmental education infrastructure funds. Infrastructure construction funds for the provincial agricultural universities were mainly provided by the provincial government.

The basic education funds provided by the provincial government varied in different regions.

In 1990 the MOE initiated a national education promotion programme, named the '211 Programme'. The objective of this programme was to support 100 key universities so that they improve their teaching and research capacity. The former Beijing Agricultural University, Nanjing Agricultural University and Huazhong Agricultural University have received support from this programme.

Before the HAEI reform, the funds for higher education allocated by the central government were reduced each year. According to statistical data, education funds declined from 3.05 per cent of the GNP in 1990 to 2.8 per cent in 1993, and 2.46 per cent in 1995. (Liu Hailong, *Research for the reasons for or countermeasures to fund shortages at agricultural institutes,* HAE, No.1, 1998: 34). The decline in funds deteriorated the financial situation of the HAEIs and forced them to reform the financial structure.

2.5 The student enrolment trend in HAE before the reform

Before 1995, both enrolment and graduate employment were operated entirely according to governmental plans. Graduate employment was guaranteed by the government. Therefore, the annual enrolment number was fully controlled by the government and did not reflect the labour market demand.

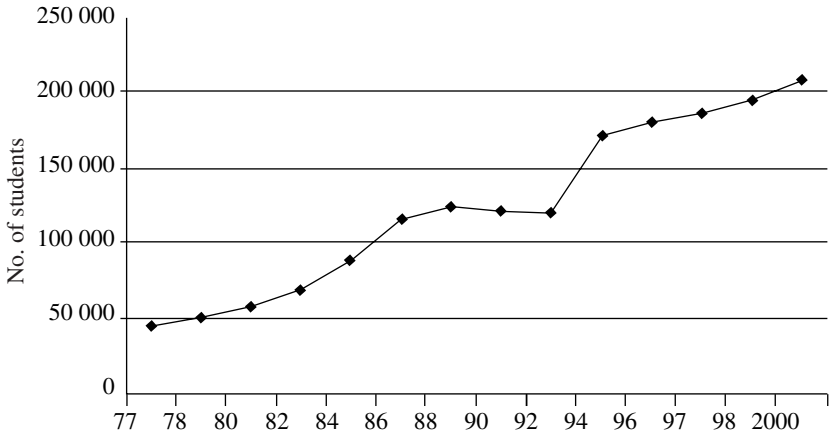
Table 2.4 and *Figure 2.2* show the increase and changes in the numbers of student enrolments in the HAEI. Before the establishment of the market economy system, between 1983 and 1986, annual enrolment increased considerably by about, on average, 8-10 per cent.. From 1986 to 1992, the rate of annual increase slowed down to 1.0 per cent, or sometimes even

stagnated. The reason for this stagnation was that there were fewer incentives available to the universities due to the lower level of governmental investment. Between 1992 and 1994 another high increase of 20 per cent took place due to the reform of the admission and graduate employment system. Between 1994 and 2000 annual enrolment maintained an average increase of 8-10 per cent without a large-scale increase in the physical investment or in the number of teaching staff.

Table 2.4 Total student enrolment in agricultural universities and colleges

Year	Number of students
1977	43,793
1978	49,516
1980	57,531
1982	68,403
1984	87,898
1986	116,313
1988	124,623
1990	121,505
1992	120,685
1994	172,107
1996	181,994
1997	187,044
1998	196,665
2000	210,000

Figure 2.2 Student enrolment in HAE from 1977 to 2000



2.6 The main constraints and challenges existing in HAE before the reform

During the case studies, the research team reviewed relevant articles as well as documents published between 1994 and 2000. It also interviewed the Student Administrative Department, the Curriculum and Teaching Management Department, and the General Administration Office of the China Agricultural University. The constraints and challenges involved have been summarized below from the findings of both the review and the interviews:

2.6.1 The constraints

The institutional constraints

The following institutional constraints have been identified through interviewing the relevant administrative staff of the HAEIs:

- In the plan economy system, which existed for more than 40 years, higher education institutions had very limited authority to make decisions for themselves, everything was planned and controlled by the higher level administrative institutions. The HAEI, as a manufacturing company for producing qualified personnel to meet the demand of the market, did not have the right to decide in what branch nor how many students should be trained. This had a depressing effect on internal motivation and the innovatory mechanism of the HAEI. In general, there were too many administrative authorities as well as other bodies which supervised and managed the HAEIs (see *Figure 2.1*). Some HAEI presidents complained about this multi-line administrative structure: "There were too many *mothers-in-law* telling me how to do my job; as subordinated institutions, we have very limited rights in making decisions".
- Taking away the agricultural faculties from the general universities and setting up new HAEIs with highly specialized agricultural faculties constrained faculty development and disciplinary integration. This also constrained the scale enlargement of the HAEIs and caused repeated and overlapping investments to the different higher education institutions.
- According to the interview with MOA officials, the two-tier administration by the MOA and the provincial departments caused institutional conflicts. This was the reason for the decentralization of the administrative authority from the MOA to the provincial government.

The lack of motivation of the qualified teaching staff

In the 1980s, since the average salary for HAEI staff was considered to be too low, some of the young qualified teachers and researchers tried to leave universities and transfer to the high-payment sectors, such as joint venture enterprises, agricultural research institutions or agro-businesses. Some of the young staff left the country immediately after their studies in order to take a Master's Degree or a PhD elsewhere and later found jobs in foreign countries. Both the housing and working conditions in the HAEIs in the 1980s were very poor. There was no incentive to attract graduate MSc and PhD students to return to China. According to the survey carried out by the MOE, only 35 per cent of Chinese students who studied abroad between1980 and the middle of the 1990s came back to China. Between 1985 and 1995 the lack of motivation of the teaching and research staff was one of the constraints to the

improvement of teaching and research qualities. Due to the diminished enrolment capacity of the HAEIs, before the reform of the staff recruitment structure, there had been a very low teacher/student ratio. According to a survey of the MOA carried out in 1996,education effectiveness and efficiency over this period were both at a low level.

The shortage of funds for teaching and research activities.

Between 1985 and 1995, the annual governmental allocated education fund for HAE covered about 60-65 per cent of the total annual budget. The research funds allocated by governments and partly by enterprises made up approximately 30-40 per cent of the budget. The annual budget increase over this period was only about 2-3 per cent, whilst the annual inflation rate was at the higher level of 5-8 per cent. In the technological universities and the well-known national universities, such as Qinghua University and Beijing University, the university-affiliated technological enterprises made significant financial contributions to the total budget, whilst the income generated by the HAEIs from HAEI-affiliated enterprises was small (2-5 per cent in average) and varied from university to university. For instance, before 1995, the self-generated income of the former Zhejiang Agricultural University contributed approximately 15-20 per cent of the funds to the total university budget, whilst in the former Beijing Agricultural University it made up only 3-5 per cent of the total budget, although the policy framework favoured the technical development of the universities. Over the same period, however, the operational costs for staff salaries, the administration, and logistical services for students increased by about 50 per cent. This resulted in a serious fund shortage for teaching and research activities. The situation in the provincial agricultural universities and colleges was far worse than in the national key agricultural universities. The fund shortage in the HAEIs seriously constrained the improvement of teaching and research equipment and facilities. This was also the biggest constraint to the increase in admission numbers of undergraduate and post-graduate students.

The traditional teaching methodology

Over the past 2,000 years, the Chinese education system has been dominated by the Confucian philosophy of education, which is characterized

by a teacher-centred teaching methodology. This traditional teaching methodology has been proved to be highly efficient within the traditional feudal education system. Characteristics of the traditional teaching methodology are called: 'teacher-centred instructive', 'mono-communication' and 'feeding in'. In this teacher-dominated teaching model, students had a very limited opportunity of becoming involved in such a teaching and learning process. They passively received the theoretical presentation made by the teachers without challenging the relevance and applicability of that which was taught. In such a pedagogical pattern, students could develop their theoretical thinking and logical analysis capabilities, but there was a lack of development of social communication, group presentation and problem-solving competency. In the traditional teaching pattern, professional practice, case studies and group work were not deemed to be the priorities of the curriculum. Before 1995, throughout the entire curriculum, the length of time given over to practice was very limited. The theory-oriented and teacher-centered teaching model restricted the students' practice of skill development. The students lacked the capacity to solve problems independently, to think in an innovative manner or to challenge the existing theories and laws due to such a traditional teaching pattern. Consequently, students educated within this pedagogical pattern did not meet the employers' qualification requirements. According to the CAU and the MOA, 60-70 per cent of employers were dissatisfied with the practical experience of the graduates. This was a key constraining factor in graduate employment.

Another reason for the teacher-centred teaching methods is that teachers who graduated before the 1980s had received very limited pedagogical training. They were not familiar with the new instructional methods. They could not facilitate group discussion or visualize the key issues that he or she wanted to present. In 1995, the MOE launched a national programme called: 'qualification-oriented education', trying to introduce modern teaching methods into higher education. However, the teachers who had been trained ion to teach by using traditional teaching methods were not systematically trained in the new teaching methods. Therefore, this situation will continue for another 10-15 years.

The constraints existing in curriculum and teaching management

As mentioned above, the nation-wide unified curriculum and faculty catalogues were formulated by the MOE in co-operation with the relevant line agencies and implemented as strict guidelines for the relevant universities. In such a curriculum management mechanism, universities had neither the possibility nor the mandate to modify the curriculum. The official curriculum catalogue is normally updated every five years by the MOE. The HAEIs are not allowed to establish new faculties if the curriculum has not been approved and included in the curriculum catalogue. In such a management system, applications submitted must wait for 2-3 years until the MOE officially approves the new faculties. This nation-wide unified curriculum administration placed a constraint on the innovation of the curriculum so that it was impossible to take into account the qualifications needed in the human resource market, although this provided an easy basis for nation-wide monitoring of the quality of the teaching.

Within this unified curriculum management pattern, the curriculum management division of the universities had very limited flexibility as far as modifying the curriculum was concerned. Before the 1990s, there were no optional courses for students who wanted to diversify their professional spheres according to the needs of the labour market. The credit allotted to a certain faculty were strictly aligned to the unified curriculum leaving no room for flexibility. This pattern provided a good basis for organizing the courses and monitoring the score of the students, but placed a constraint on the amount of knowledge and skill diversification the students were able to obtain.

Outdated facilities and infrastructure due to a lack of investment funds

During the Cultural Revolution from 1966 to 1976, for political reasons, most of the HAEIs located in the cities were decentralized to remote rural areas. During this period, most of the teaching and research facilities were badly destroyed. For about ten years no maintenance of the infrastructure took place. After their return to cities, both central and local governments supported the rehabilitation of the teaching and research capacities. This was carried out between 1980 and 1985. However, between 1985 and 1995 the facilities were insufficient to match the needs of the teaching and research

activities due to the increase in student numbers. During this period, governmental investments in the education sector were also reduced. The outdated facilities in the HAE institutions seriously constrained both the improvement of the quality of teaching and research and the increase in student admissions. Important facilities, such as teaching buildings and equipment, research laboratories and internal facilities and equipment, the university library and the information processing and delivering as well as the campus sports facilities could not meet the needs of research and education. This is also the reason why the MOE launched the '211 Programme', of which the aim was to promote the improvement of the facilities in key universities. However, the local HAEIs ran into a serious shortage of funds that were needed for the improvement of the facilities.

All the constraints resulted in the inefficient use of the educational and research resources of the HAEIs and formed a vicious circle within the reform of the national economic structure.

2.6.2 The challenges

Challenges from the labour market

The labour market's challenge regarding the qualifications of graduates was a major force in the reform of the admission and graduation employment management pattern of the agricultural universities.

In a plan economy, student admission and employment after graduation both took place according to the government's plan. In these governmentally-controlled HAE institutions, employment was guaranteed by the government through fixed admission and employment plans. In such a planned admission and employment management system, universities were under neither pressure nor the obligation to find jobs and positions for their graduates. Since the government was responsible for finding jobs for the graduates, the universities did not need to take into account the market demand neither in terms of the quantity nor the quality of their graduates. However, since the beginning of the 1990s, the Chinese government has initiated the reform of the economic system by changing over from the plan economy system to a market-oriented economy system. Due to market competition, producers have to improve the

quality of their products according to market demand. This can only come about by improving management and technological development skills. According to a survey of the employers of former HAEI graduates, only 40-45 per cent of the employers were satisfied with the capacity for initiative and the performance of newly recruited graduates from the HAEIs during the period between 1990 and 1995 (*The labour market survey of HAEI graduates between 1990 and 1995*, Higher Agricultural Education, 1997). According to the statistics concerning the employment of HAEI graduates, the most frequent challenge is for graduates to improve their capacity to solve problems and to obtain sufficient practical experience during their studies. Practical experience gained during university undergraduate studies has proved to be far off target from that which is required by the employers. The reason for this is that the universities were not sure which qualifications were needed by the employers. According to the interview with the CAU Student Administration, up to the present, the university had never systematically conducted a labour market analysis for the planning of enrolment. As a consequence, graduates could not find jobs in the institutions and enterprises where they wanted to work. Since the beginning of the 1990s, a so-called 'structural surplus of undergraduate students' has represented a challenge to the HAE institutions. It was because of this that the enrolment and employment mechanism has been under reform since 1995.

The employment preferences of HAEI graduates for the urban areas

The major mission of the HAE institutions is to produce highly-qualified management and technical personnel who will serve as technicians and advisers to assist farmers in resolving the problems that exist at both farm and community levels. The local community requires a large number of graduates of agricultural universities and colleges. However, a social-economic challenge to the HAE institutions exists in that their graduates are not willing to dedicate themselves to agricultural and rural development, although most students (approximately. 60 per cent in the provincial agricultural universities) originate from rural areas (about one third from areas of poverty). As a result of this, graduates prefer to find jobs in urban areas which are not necessarily as relevant to their original professional spheres rather than staying to find a job in their remote and poor hometowns. Although the government has called on and promoted the idea that the graduates should return to or go to the rural and remote areas over the last few decades, the situation has changed very little up to

the present. According to the students interviewed in the CAU, the following reasons have been given by the interviewees:

- Poor working conditions at county and lower levels in comparison with the conditions in the big cities of the eastern and coastal areas. This placed a restriction on the further personal development and on the qualifications of the employees;
- Counties and townships and communities in the remote areas are isolated from economic centres and big industrial cities due to poor transport infrastructure resulting in constraints in efficient communication with the outside world. Such poor communication facilities place a restriction on the personal development of graduates;
- Poor living and social service conditions in the countryside, lack of community facilities, such as a medical service, education facilities, etc.; and
- Poor payment of the technical and management staff due to the shortage of funds at county and township levels, especially in the poor and remote areas.

This caused serious brain drain from rural to urban areas. The individuals, whose education had been financed by their parents, always fled the poor communities without making any contribution to the development of poor areas. This provided an obstacle to the reduction of poverty and to rural development. Such a social-economic constraint was a vicious circle in rural development: the development of poor areas needed highly qualified and dedicated young people, but those highly-qualified individuals were not willing to work in areas of poverty, and in the long run,, this meant that there would be a lack of trained people in such rural areas. In order to change this situation, the government reformed the admission policy: they enrolled student candidates who were already working at county and township levels of rural areas and who were committed to return to their hometowns for three years of professional diploma studies. This mechanism is regarded as an 'employment-oriented admission system' and is one element of the institutional reform of HAE.

Challenges from non-agricultural universities to the HAEIs in the enrolling of highly qualified student candidates

Due to the lower level of competitive employment opportunities compared to other sectors, such as information technology, the electronic industries and other high-tech sectors, the HAEIs are likely to attract fewer student candidates than other universities.. The best students will not select enrolment in an HAEI as a first option after having passed the national enrolment examination. This affects the overall quality of education in HAE. The main reason for this problem is that agriculture is still the weakest sector in the entire national economic development process. Agricultural universities were not efficient in publicizing themselves before the enrolment process of student candidates took place. Neither student candidates nor their parents had received sufficient information about agriculture and agricultural universities. In the meantime, integrated science and technological universities, especially the MBA, IT and high-tech faculties have entered into fierce competition for student candidates. The competition particularly dealt a blow to local agricultural universities. For this reason some local agricultural universities have been merged with provincial science and technology universities.

The constraints and challenges led the HAE institutions to run into structural and institutional constraints. To overcome the problems and constraints and in order to emerge from the crisis, both the government and the HAE institutions themselves tried to reform the institutional structure and internal mechanism.

Chapter 3
The process of the HAE reform

As an important part of the higher education institutional reform in China, the HAE reform has been implemented parallel to the reform of both the Chinese economic system and its institutional reform. In fact, the reform of HAE can be traced back to the beginning of the 1990s. The reform process was initiated by the governmental line agencies.

3.1 Factors causing the need for change

The HAE institutional reform process was initiated by both eternal and internal factors when the HAE ran into an institutional crisis and was facing challenges that occurred as a result of the reform of the economic system at the beginning of the 1990s. Although challenges and crises were encountered during the national economic and institutional reform, the causes and constraining factors had been in existence for about 40 years within the centralized plan economy system. In order to remove such long-term constraints and problems, the institutional reform of HAEIs has taken about 10 years.

3.1.1 External factors

In the middle of the 1960s, Theodore Schultz, a Nobel Prize winner, proved the positive contribution of education to the post-war economic development in various countries, and defined educated human resources as being human capital for economic growth. The world economic development in the last four decades has proved his theory to be correct. It is recognized throughout the world that human capital is the most important and irreplaceable resource for national economic development. Education institutions, including HAEIs, have the mandate to produce highly qualified, management and technical human resources which are demand-oriented for the different sectors. Just like manufacturing enterprises, in order to fulfil the mandate, education institutions must define their 'production' objectives, the process, methods and techniques, according to the customer's demand. Within this context, the

HAE institutional organization and its internal management mechanism should reflect the demand of agricultural and rural development and prepare human resources to face up to the challenges caused by changes in the entire economic system. Therefore, we have to review the reform process in a wider perspective, taking in both the market and the policy changes.

The five external factors for initiating and accelerating the HAEI reform have been identified as follows:

(1) **The market force**. The employers of university graduates are the main external factor which forced the universities to change their education objectives and methodologies. The qualifications demanded of the graduates by the employers have changed since the establishment of a market economy system. Since the intensification of the reform of the economic system, institutions and enterprises are facing even more challenges due to increased market competition. To meet the challenges, employers need an increasing number of highly-qualified and innovative human resources in order to solve the problems existing in daily management and in strategic development planning, instead of human resources with theoretical knowledge but a lack of practical experience. Obviously, graduates educated by means of the traditional curriculum and teaching methodology do not meet the requirements of the employers. The increased demand for graduate qualifications created a challenge and forced the universities to change their current curriculum structure and teaching methodology.

(2) **A high demand for higher education from the high school graduates**. Due to the development of the national economy as well as the increase in population, the demand for the higher education of high school graduates increased annually by 5-6 per cent. More places are now needed for study. This market demand is an attractive commercial factor, encouraging the HAE institutions to increase their educational capacity, thereby covering the operational costs from the income generated through education.

(3) **The government initiatives**. The government is a dynamic factor in the reforming of the university educational structure. During the reform of the Chinese economic system, the economic efficiency of the HAEIs was declining due to the irrational education resource allocation, lower governmental investment and the limited education capacity of the HAEIs.

As the economic system reform intensified, the financial pressures and administrative burdens of the responsible administrative line agencies have increased due to the challenges represented by the market economy. A centralized administrative pattern and the governmental plan-oriented curriculum and teaching management system have been proved to be an inefficient instrument of administration. In middle of the 1990s, the governmental institutional reform was initiated by reducing staff numbers and decentralizing the administrative functions to the provincial level. As part of the reform in government functions, the HAE administrative functions had to be moved out of and decentralized from the MOA to the provincial government. In the 1980s, a number of agricultural colleges had been established at the provincial level with insufficient teaching and research capacities. These universities and colleges were run inefficiently with regard to the education market competition. The governmental education investment in these newly established colleges (some of them were upgraded from vocational schools) was very limited. In addition, the '211 Education Promotion Programme' forced the candidate universities to increase their interdisciplinary functions, making them use more efficiently their teaching and research facilities and optimize their internal organizational structure. Some universities with an insufficient number of professional spheres and faculties had to increase their capacity by merging with other relevant institutions. This was in fact a trial in institutional reform before launching the overall reform process.

(4) **Experience gained from other countries and international organizations**. The European universities experienced the same challenges and problems in the 1980s. To combat the challenges, some universities, like Wageningen University, reformed its institutional structure by merging teaching, research and training institutions together and changing the traditional academic education mission into an open and market demand-oriented education model. At the same time, certain universities in South-East Asian countries, especially in the Philippines and Thailand, also experienced the same challenges and the necessity for reform. These successful experiences encouraged Chinese universities to change their internal institutional structures.

(5) **The reduction of the governmental funds to the HAEIs forced the HAEIs to increase their education efficiency**. The central and

local governmental investment capabilities to the HAEIs were decreased year by year as a result of the increase in the HAEIs' financial demand. According to statistical data, the total governmental education investment was increased year by year, but the percentage of the GNP declined from 3.05 per cent in 1990 to 2.8 per cent in 1993, and 2.46 per cent in 1995. The declining trend lasted up to the recent past. (Liu Hailong, *Research for the reasons for or countermeasures to fund shortages at the HAEIs.* Higher Agricultural Education, No.1, 1998: 34). The decline of the governmental investment capacity is an important factor which influenced the need to reform the fund-raising mechanism.

3.1.2 Internal factors

The HAEI reform is a result of the interaction of external factors and internal factors. External factors first created the challenges to the existing HAEI's internal organizational structure and management patterns. In the process of change, internal factors became active in accelerating the HAEI reform. These internal factors include:

- In order to combat the above-mentioned challenges, universities require additional decision-making mandates for the optimization of internal education planning and the curriculum development and personnel management mechanism. A better staffing policy is required which contains more incentives as requested by the teaching and research staff, in order to overcome internal constraints;
- Increasing the teaching and research capacities by re-arranging the relevant faculties along with a more efficient allocation and utilization of the teaching and research human resources;
- Improving financial efficiency. Small-scale enrolment together with a low level of financial efficiency forced the universities to enlarge their education capacity. The shortage of governmental funds forced the HAEIs to improve their education economic effectiveness and efficiency by reforming the fund-raising mechanism, for example, by charging tuition fees;

- Widening the professional spheres covered by merging the relevant faculties and institutes together to produce human resources with integrated and diversified qualifications as requested by the employers;
- According to the investigations carried out in certain HAEIs, in the two decades before HAE reform, teaching-related experimental and research facilities were established and purchased independently by departments and institutes within the same institutions. The efficiency of use of these instruments and facilities was of a very low level. The merging of institutions within universities can improve the scope of the facilities and increase their efficient use;
- Reducing the staff and personnel costs. According to MOA officials, before the reform, the average size of HAE institutions was small but they had high personnel costs. By restructuring the institutions, the number of administrative personnel in each HAEI has been decreased by at least one third, according to the estimates of the MOA and the MOE.

3.2 The process of change

According to an official of the Ministry of Agriculture, the HAEI reform has been carried out by taking the following steps:

- The identification and diagnosis of the internal and external problems and constraints encountered during the national economic system and overall institutional reform. This process began at the end of the 1980s and was mainly initiated by the HAEI internally and by the MOA through an exchange of information and through both an official conference and meetings;
- The formulation of the strategy, concept and guidelines of the HAEI reform according to the problems and constraints identified and their integration into the national institutional reform. This was done jointly in 1993 by the MOA and the MOE with the support of the central government;
- The initiation of the pilot reform by some universities for internal structural reform and institutional merging in order to testing the reform concept and work out the action plan for a large-scale HAEI reform, this was conducted between 1993 and 1995;

- Summarizing the experiences made during the pilot reform by the pilot HAEI involved, the MOA and the MOE. Based on the pilot experiences, the MOA formulated an action plan for the launching of the national HAEI reform in 1996;
- The implementation of the HAEI reform throughout the entire country through multi-institutional co-operation and co-ordination. This took place from 1996 to 2000. This process was guided by the MOA and the MOE, in co-operation with the provincial government. The reform process of certain HAEIs is still ongoing.

Although the reform implementation lasted for ten years, the preparation and planning work had already been set in motion five years before the implementation of the HAEI reform. The experience gained by the HAEI reform provided both positive and negative examples for the initiation of the overall HEI reform throughout the country. Institutional merging and structural reform are ongoing in certain non-agricultural universities.

3.2.1 The initiation of the HAE reform by the government

In order to react to the above-mentioned constraints and challenges and to improve the efficiency and effectiveness of education in the higher education institutions, at the beginning of the 1990s, the central government decided to reform these institutions. In 1993, the former State Commission of Education formulated the 'Guidelines for the Reform and Development of the Chinese Education Institutions'. The guidelines provided a policy and implementation framework for the systematic reform of higher education institutions. The guidelines proposed the following areas of reform in higher education institutions, including the HAEIs:

- Planning the student admission quota according to the market demand and the origins and sources of student candidates as well as the education capacity of the universities. Enlarging the sources of students and abolishing, step by step, the governmentally-guaranteed employment system;
- Curriculum and faculty catalogues will be used only as overall guidelines for setting up new faculties and implementing the curriculum in different

universities. The Ministry of Education and relevant ministries will decentralize, step-by-step, the curriculum management and co-ordination functions to the local education department and line agencies. Unified national curriculum catalogues can be implemented on a flexible basis according to the market changes; Introducing a staff motivation mechanism in order to improve the quality of teaching and research; Removing the burdens of the logistical service by the transfer of the logistical service department to the logistical service companies;

- Giving universities additional decision-making power and responsibility so that they can manage higher education institutions more efficiently according both to the market demand and to governmental development policies. The objectives of HE reform stated in the guidelines are:

  To face up to the challenges and remove the problems and constraints encountered in the transition from a plan economy to a market economy by:

  (1) Optimizing the education resources of the HEIs;
  (2) Improving the HEIs' internal education effectiveness and efficiency.

  The guidelines were publicized in a governmental document and distributed to higher education institutions (universities and colleges) and relevant administrating ministries and line agencies.

  Basing itself on the guidelines, the Ministry of Agriculture formulated implementation guidelines for the HAE institutional reform in 1994.

3.2.2 The pilot reform

In order to ensure the success of the reform and before the nation-wide implementation of the HAEI reform, a number of pilot demonstrations were carried out by selected HAEIs. The following are some examples of pilot reform:

(1) In February 1994, the former North-East China Agricultural College and Heilongjiang Agricultural Administration College, both located in

Harbin, the capital city of the Heilongjiang Province, were merged into the North-East China Agricultural University. This merging was co-ordinated by the Ministry of Agriculture as both institutions were subordinate to the MOA.

(2) In February 1995, as a first trial in the integration of agricultural and forestry education institutions at provincial level, Hebei Forestry College was merged with Hebei Agricultural University under the administrative co-ordination of the relevant provincial departments. Both institutions are located in the Baoding Municipality of the Hebei Province.

(3) In May 1995, as an institutional reform trial for the MOA-affiliated universities, Beijing Agricultural University and Beijing Agricultural Engineering University were merged to found the China Agricultural University with a western campus for agricultural and biological sciences and an eastern campus for agricultural engineering and technology.

(4) In September 1998, Zhejiang Agricultural University, affiliated to the MOA, and Hangzhou University, affiliated to the Zhejiang Education Department, were merged by the former Zhejiang University, affiliated to the Ministry of Education, and thereby formed the largest university in China with the name of Zhejiang University. This was a trial of merging institutions affiliated to different line agencies.

Through these pilot trials in HAE institutional reform, the MOA and the MOE worked out an HAE reform implementation concept for elaborating the reform of the HAEIs and all HE institutions.

3.2.3 The implementation of the reform in all agricultural universities

The HAE reform was implemented between 1996 and 2000. Throughout the entire country, all 69 HAE institutions, including national agricultural universities, provincial agricultural universities and colleges have been involved in the reform. The administrative institutions involved include the MOA, the MOE, the provincial agricultural department and the education department as well as the provincial government.

Reform countermeasures have been implemented in the following areas:

- The merging or integration of smaller HAEIs with larger provincial universities with a large capacity and an integrated and multi-disciplinary faculty organization. Through this reform the total number of independent HAEIs has been reduced.
- The decentralizion of the administrative authority and financial support from the MOA to the provincial education and agriculture departments. Decentralization facilitated the alignment of the HAE objectives with local economic and social development.
- Delegating the routine decision-making and approval mandates directly to the universities, such as foreign exchange approval, annual admission planning, curriculum development and modification.
- Diversification of the financial sources. The government will provide 50-70 per cent of the operational funds to the universities, the rest of the funds being covered by student tuition fees and research funds and by their own income generation, such as through the transfer of research know-how to production and university-affiliated agro-enterprises, including income from the demonstration farms.
- Personnel recruitment structure: a preferential policy was formulated and implemented to promote the development of young scientists by allocating research funds and promoting them to senior positions.
- Integration and restructuring of relevant faculties and professional spheres into colleges or departments so that they might meet the qualification requirements of the market demand.
- Establishment of new colleges and faculties of rural development with the objective of providing qualifications to senior management and administrative personnel in rural development.
- The curriculum and teaching methodology. More scope has been given to the HAEIs for the flexible implementation of the curricula. A higher level of priority was given to practical and field studies. The introduction of optional courses and a credit system for the diversification of student qualifications according to the needs of the market.
- Reform of the student enrolment and graduate employment system. Since 1995, enrolment and employment of the students has been fully opened to the market.
- Commercialization of the logistical service in order to reduce the operational costs and personnel pressures.

After the HAE reform, only the China Agricultural University, the Northwestern China University of Agricultural and Forestry Science and Technology, the Nanjing Agricultural University, the Huazhong Agricultural University, the Beijing Forestry University, and the Northeastern China Forestry University were transferred to be put under the administration of the Ministry of Education. The former 63 agricultural universities were all merged with multi-disciplinary universities or independently handed over to the local education or agricultural department.

3.3 The greatest sources of support or resistance

(1) How was resistance to change overcome or circumvented?

According to the interview with administrative staff and a review of the publicized articles related to the reform, the following resistance and constraining factors were identified:

- Merging the institutions reduced the number of administrative positions, including presidents, vice-presidents and department directors. That meant about 30-40 per cent of administrative staff who had been working in leading positions had to leave their former positions. This caused resistance to the personnel and administrative reform. The countermeasures employed to remove the resistance were to introduce an open, transparent and competitive staff recruitment mechanism both at university as well as at department or college level.
- Increasing the payment and salary differences in order to motivate the teaching and research staff caused social disparity between staff with different qualifications. People who had been working in senior positions risked losing their position in the new staff employment system. Measures undertaken to remove the resistance factor included establishing a flexible contract and performance monitoring system which insisted on the necessary qualifications and efficiency of the professional staff.
- Reducing the senior academic positions meant that some professors would lose their positions and be replaced by better qualified and younger staff members. A certain amount of replacement of personnel was undertaken and exchanges of jobs took place between different staff members.

- The resistance of the staff who had previously been working in the institutions which had later been merged and who formerly had had a better income. They worried that the institutional merging would affect their income. The solution to reduce this resistance was found by creating a flexible income distribution policy and allowing the institutions which formerly remunerated their staff with a higher income to have a flexible salary system.
- Resistance against the unified sharing of the teaching and research facilities was removed by opening the laboratories to all researchers working in the different departments and faculties.

(2) Major stakeholders and their roles in accelerating the reform

The HAE reform is one important element of the entire reform of the system. The reform met with social-economic and institutional resistance as mentioned above. To remove the resistance and in order to implement smoothly the HAEI reform, the HAE-related governmental institutions, the HAEIs themselves and education research institutions all played an important role. *Table 3.1* describes the major stakeholders and their roles and functions in promoting the HAEI reform.

Table 3.1 Stakeholders and their roles and functions in the HAEI reform

Stakeholders	Functions and roles in the HAEI reform
1. Governmental institutions	
Ministry of Agriculture	• Formulate the HAEI reform policy and concept • Design the reform operational plan • Initiate the reform pilot trials in selected universities • Co-ordinate with the MOE and the local governments on institutional merging and the decentralization of the administrative authorities • Carrying out, co-ordinating, supervising and evaluating the HAEI reform process
Ministry of Education	• Design and formulate the overall national HEI reform policy and guidelines • Consultation with the MOA and other line agencies for piloting and implementing the HAEI reform, especially in relation to the HAEI mergers and the change in the administrative links to the MOE and the DOE at provincial level • Formulate the curriculum, catalogue and teaching methodology reform policy and concept, and the guidance of the reform process • Formulate, test and implement the reform concept for student admission and employment instruction • Information publication on the HAEI reform and its impact

Table 3.1 Continued

Stakeholders	Functions and roles in the HAEI reform
Provincial Department of Agriculture	• Co-ordinating the implementation of the HAEI reform at provincial level in co-operation with the DOE and the Department of Science and Technology for the merging of research institutions with universities • Participating in the curriculum, admission and graduate employment reform
Provincial Department of Education	• Co-ordinating the merging between the HAEIs and the multi-disciplinary universities at provincial level in co-operation with the DOA • Guiding the curriculum, admission and graduate employment reform • Monitoring and supervising the reform process and moderating the conflict between the various institutions which have been merged
Ministry of Personnel and the Ministry of Labour and Social Security	• Responsible for formulating the employment policy of universities graduates • Development of qualification standards for employees • Publicizing information on graduate employment
2. HAEI	
Administrators	• Implementing the HAEI reform, especially restructuring the faculties and departments, as well as the personnel and staff recruitment reform • Providing information on the feedback related to the reform process and its impact • Co-ordinating the conflicts between the different institutions which have been merged

Table 3.1 Continued

Stakeholders	Functions and roles in the HAEI reform
Faculty and staff	• Beneficiaries and promoters of the HAEI reform at the college and department levels • Implementing the new curriculum and teaching methodology • Providing information and feedback on the HAEI impact and making proposals for further HAEI reform
Students and their parents	• Providers of information on market feedback related to educational qualifications in the HAEIs • Evaluation of the impact of the curriculum and teaching methodology reform • Teaching performance monitors
3. Education Research Institutions	• Involved in the policy formulation process for the reform of the HAEIs • Providing proposals and professional guidelines on curriculum management • Development of the concept and advising HAEIs on the introduction of a qualification-oriented teaching methodology • Conducting research on pedagogical theories relating to pedagogy for the further reform of the teaching methodology

Source: Processed according to the interview with MOA officials and administrative staff of the CAU.

3.4 The results and the impact of the HAE reform

(1) Decentralization of the institutional administration

By the end of the HAEI reform, most of the administrative functions of the local HAEIs had been decentralized and transferred to the provincial

government or directly to the HAEIs themselves. Decentralization of authority covered the following spheres: the financial planning and investment budget, personnel development planning and recruitment, the planning of enrolment and employment of students, and institutional function development planning. In decentralizing the functions and shifting the responsibilities to the local level, the local government and the HAEI also gained the benefit of additional decision-making scope in the educational sphere. The central government reduced the financial and administrative burdens. Before the reform, the government had been the only stakeholder in the management of the HAEIs, but since the reform, the education market has been enlarged and has become open to all stakeholders, even private investors or enterprises. The diversification of the education market provides a competitive institutional environment. This represents an institutional force which is an inducement to the HAEIs to further improve the quality of their education. The governmental functions since the HAEI reform have been mainly concentrated in macro, institutional and political guidance.

(2) Institutional merging and integration

As mentioned in the analysis of the problems involved, the HAEI institutional organization prior to the HAEI reform was insufficiently compact and had a small educational and research capacity due to the lack of qualified personnel together with poor research and education facilities. In such a diversified institutional organization, the governmental allocation of funds was made to the individual HAEIs with no regard to priorities. The resources therefore could not be put to the most effective use by the HAEIs. The investment burdens for both central and local governments were no longer bearable. To resolve this problem, the existing HAEIs were merged with and integrated into the provincial universities which were operating under relatively better financial and physical conditions. This large-scale merging was initiated in 1998 after pilot merging had been concluded and had provided experience.

Types of merging and integration:

a. **Strong-weak merging:** strong HAEIs or general universities merge with the weaker HAEIs;

b. **Strong-strong merging and integration:** merging several strong HAEIs or faculties to form new stronger and larger HAEIs with additional faculties covering all the professional spheres required by the agricultural human resource market;
c. **Weak-weak merging:** integrating weak HAEIs in order to strengthen the capacities and make a more effective utilization of the relevant resources. The resources thus merged can compensate each other;
d. **Merging of education institutions with research institutions:** before the reform, co-operation between the HAEIs and research institutions was very limited, sometimes they were also in competition with regards to the application of research funds. Merging the HAEIs and research institutions provides more space for practice for students. At the same time, research institutions can also use the HAEIs' facilities for conducting their research activities.

The results and the impact of different types of integration and mergers are quite dissimilar. In a strong-strong merger, efficiency and effectiveness have been significantly improved and further increased, and both have benefited from the merging; In a strong-weak merger, there are certain cases where formerly strong bodies discriminate against the weaker ones in terms of fund allocation and internal resource distribution. In addition, the former social status and educational reputation of the stronger bodies have a negative impact on the quality of student enrolment in the HAEIs that have been merged, because excellent candidates prefer to be enrolled in the formerly well-known faculties and departments. In the merger of education and research institutions located within the same compound (e.g. the Shaaxi Yangling Agricultural and the Forestry Technology University), it is difficult to co-ordinate the allocation of the education and research fund. A good example of weak-weak integration is the Xinjiang Shihezi University which was established in 1996 by merging several weak higher education institutions: the Xinjiang Shihezi Agricultural College merged with the Shihezi Medical College, the Shihezi Economic College and the Shihezi Normal College. Through the merger, the student enrolment capacity, the teaching and research capacity, the qualifications of teaching staff and the social reputation of the newly established university have been significantly improved. In all types of merger, the overall internal administrative and co-ordination costs have been increased as in the case of the HAEIs that

have been merged and which are located in different areas (e.g. the China Agricultural University, where the two campuses are located 10 km away from each other and where the unified co-ordination and administration requires a higher level of inputs).

(3) Internal faculty integration

Another important institutional change is represented by internal faculty integration. Since the faculty and institutional restructuring in the 1950s, the internal faculty structure has been too diversified and has been developed on a separate basis according to faculty objectives without taking into consideration the demands of the labour market and the need for inter-disciplinary combination and co-operation. This has resulted in two disadvantages: (1) the students are qualified in very limited professional spheres which do not meet the demands of the employers; (2) Internal faculty and course overlapping within an individual HAEI. This has resulted in an inefficient use of teaching personnel and education facilities. Therefore, in the later period of institutional reform, the integration of internal faculties was undertaken in the HAEIs. Through internal faculty integration, the number of faculties, departments and colleges has been reduced by 50 per cent. The new faculty organization is better suited to the demands of the labour market. The knowledge and skills of the graduates are better integrated and more diversified. Therefore, the graduates now have a wider range of employment options. This represented a good basis for the reduction of administrative staff both at the university and department level.

(4) The reform of the curriculum management and teaching methodology

- **Introducing the credit system.** The curriculum and faculty catalogues allowed for a very limited level of flexibility before the reform. The HAEIs had to follow the structures and contents closely. Since the reform, a flexible credit system has been introduced. In addition to the courses that have been requested, there are approximately 30 per cent of optional courses which students can select in a flexible manner according to their own interests and time available.

- **Strengthening the practical components.** Due to the challenge of the labour market, employers have high expectations regarding the graduates' practical experiences. The HAEIs, since their reform, have further strengthened practical education. Practical work and experiments have been increased to a level of 20 per cent in the curriculum. A minimum quota exists both for practical work and experimentation in each faculty. In addition, a farm practice and community survey has been carried out in certain HAEIs as in the China Agricultural University, aimed at giving students the opportunity to understand a farmer's living and production conditions in rural areas.
- **Introducing a teaching evaluation and monitoring system to ensure the quality of the teaching activities.** The teaching performance monitoring system was established as a countermeasure in curriculum reform. Each semester, the Curriculum Administration Department will conduct an evaluation survey by using questionnaires for each course. The results of the evaluation will be publicized and linked to both an increase in salary and promotion. Awards will be given to the teachers who received the higher evaluation marks. The marks will also be used for altering their professional positions.
- **Postgraduate programme reform.** The objective of the reform is to provide a more student needs-oriented flexible postgraduate programme to various kinds of candidates. Since 1995, the following flexible on-the-job education programmes have been provided: (1) The introduction of on-the-job postgraduate PhD and Master's study programmes for senior agricultural management and technical personnel. The flexible study programme, with its fixed level of credit, allows on-the-job senior personnel to continue further studies and research closely linked to their current job; (2) Since 2000, 25 agricultural universities have begun the professional agricultural extension Master's programme for agricultural officials, administrators, researchers, technicians and local extension staff who have a BSc degree and at least three years of working experience in agriculture. The education objective of this programme is to further enhance agricultural management and extension skills and improve their on-the-job working performance. The total course credit is 30 points, of which 5 points are for optional courses. The main courses provided by this programme include: extension management, communication sciences,

project management, rural development management and agricultural economics. The dissertation will focus on agricultural extension and policy analysis, which is closely linked with the student's current job. Courses can be carried out in the provincial capital if the number of students is more than 30. The annual enrolment capacity of all universities is about 2,000 candidates. (3) The MPA (Master of Public Administration). This is a three-year professional Master's programme which was begun in 2002. Most of the student candidates are senior agricultural management officials working at national ministries or in provincial departments.

(5) The reform of the student enrolment and graduate employment mechanism

Student enrolment and graduate employment management are two important factors affecting the efficiency of the HAEIs. Actually, the reform of the student enrolment and graduate employment mechanism had already begun by the end of 1980s, before the HAE institutional reform. The market challenge to the planned HAE graduate employment scheme was the key initiator of the reform. Since the reform, a market demand-oriented student enrolment and graduate employment system has been established.

The main reform areas for student enrolment and graduate employment include:

- The unification of the student enrolment categories. Before 1993, there were two types of students, namely governmentally-funded students and self-financed students. In 1993, the MOE conducted enrolment trials in certain universities, aiming at unifying the two enrolment categories. In the new enrolment scheme, both 'planned' and 'unplanned' students had to pay the same amount of tuition fee which covered 20-30 per cent of the total education expenses of the HAEI. Before unifying the student categories, self-financed students with lower minimum enrolment marks had to pay 100 per cent of the tuition fees. In addition, in order to ensure the education of human resources for the poor western provinces, the government encouraged the HAEIs to enrol directly farmers with production experience as employment-orientated students. After

graduation, these student had to return to their own regions to serve agricultural and rural development. Enrolling employment-oriented students at least ensures that poverty areas will receive some of the HAEI graduates. The student enrolment reform has brought about a significant increase in the funds available, which at one time were insufficient. These come mainly from the governmental education fund.

- The establishment of the market demand-oriented graduate employment system within the HAEIs. Before the reform, the government was responsible for allocating employment positions to the HAEI graduates. Due to the establishment of the market economy system and to the increase in the total HAEI enrolment, challenges from the labour market increased. Given such a change in the situation, the government was no longer able to guarantee the employment of graduates. An overall 'structural graduate surplus' occurred in all universities. Therefore, in 1995, the MOE reformed the graduate employment policy by changing the government guaranteed employment system to a market demand-oriented employment scheme. In the new employment scheme, students had to find jobs by themselves according to the market demand, with the assistance of the universities. The market demand-oriented employment system also provided challenges to students' qualifications, including to their professional competence, social, inter-personal communication and innovative and problem-solving capacities. On the other hand, employers could interview the candidates directly and recruit amongst the best. This put the graduates under greater pressure to gain qualifications during their four years of study which complied with the market demand.
- The establishment of a promotion of employment system in the HAEIs. In the new graduate employment system, the universities have reinforced the promotion of and instruction on employment for graduates and give advice on the various functions in order to facilitate the finding of an appropriate job. In March and April, special employment mediation days are organized by the student administration departments to help students bridge the gap between themselves and the employers. In addition, special training in job-finding techniques is offered by the universities to graduates during the final semester. Due to the university's efforts to facilitate employment, the average employment rate immediately after graduation in the key agricultural universities is approximately 70-85 per cent.

According to the interview with the management staff of the CAU Student Administration Division, the establishment of the graduate employment promotion mechanism has not fully resolved the existing employment problems. As the challenges the students and the universities are confronted with come from the outside, the students choose to focus themselves on obtaining jobs in big industrial cities and are unwilling to go and work at the grassroots level as extension staff, being paid very low salaries, in addition to being subjected to bad living and working conditions. These problems must be resolved by relevant student employment policies.

(6) The reform of the internal administrative structure and the staff recruitment and salary system

The major changes that have occurred in the employment and salary payment mechanism are as follows:

- The HAEI internal administrative structural reform is one of the major tasks of the HAEI reform. During the two rounds of the reform, the total number of HAEI internal administrative organizations has been reduced by 50 per cent on average. The integration of the relevant functions of the relevant departments or divisions have increased the efficiency of the service. At the same time, the number of administrative staff has also been reduced by 30-40 per cent. The administrative staff members whose jobs were cut were transferred to the logistical services and to student management at department level.
- As a result of the internal organizational reform, the priority was shifted from administrative staff to the professional staff. Since 2000, most of the universities have reformed the salary and payment mechanism by increasing the salary and income of teaching and research staff. According to the survey, the average income of professional staff after 2000 has been increased by 40-50 per cent of the total income before the institutional reform.
- Breaking the employment 'iron bowl' which had existed for more than 40 years. The introduction of the so-called 'dynamic staff recruitment system' with an average contract period of 2 years. The payment will be linked to the salary categories of the various positions as well as to the

performance of the newly recruited employees. If the student evaluation results and overall annual work performance do not come up to the minimum standard of qualification described as a requirement for the position, the employees will have to be moved to lower positions with lower payment. This dynamic staff recruitment system creates a pressure on staff members to improve their qualifications and work performance according to the requirements of the position as described. In order to promote the development of young scientists, in some key national universities, such as the China Agricultural University and the Nanjing Agricultural University, a special 'Young Scientists Development Promotion Programme' has been implemented. In this programme, young professors and associate professors who have given an excellent performance in both research and teaching and who have worked in the top academic positions can obtain special research funds as well as an additional subsidized premium. By means of this promotion programme, a group of excellent young scientists have become rapidly qualified and play very important roles in key academic positions.

- In order to motivate the college or department directors special job subsidies were provided. This encouraged the deans and directors of the colleges and faculties to improve their management and leadership skills.
- As a result of the personnel reform and the increase in the total enrolment figures since 1997, the ratio between administrative personnel and undergraduate enrolment increased from 1:16 in 1995 to 1:28 in 2000 (*Figures 3.1* and *3.2*). And the ratio between full-time faculty and undergraduates also increased from 1:4 in 1988 to 1:11 in 2000. These changes have improved the personnel efficiency of the HAEIs. However, the ratio is still lower than the faculty/student ratio (20-30) of European and Northern American universities.

Figure 3.1 The proportion of undergraduate enrolment and administrative personnel in HAEIs

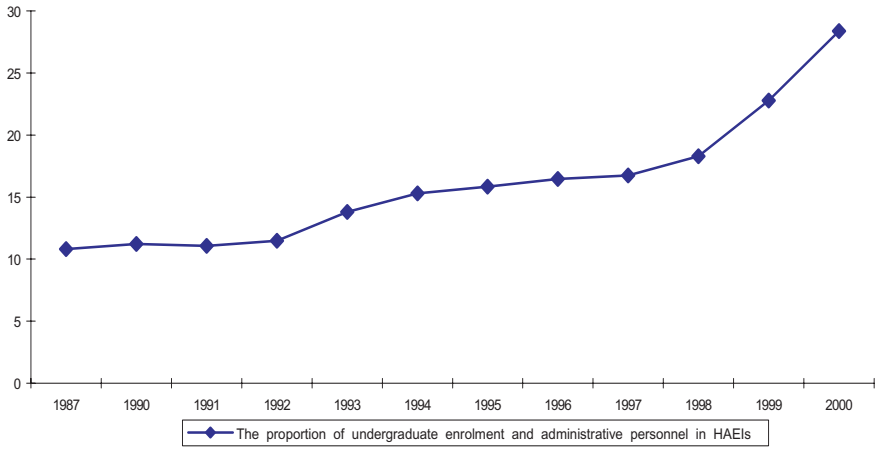
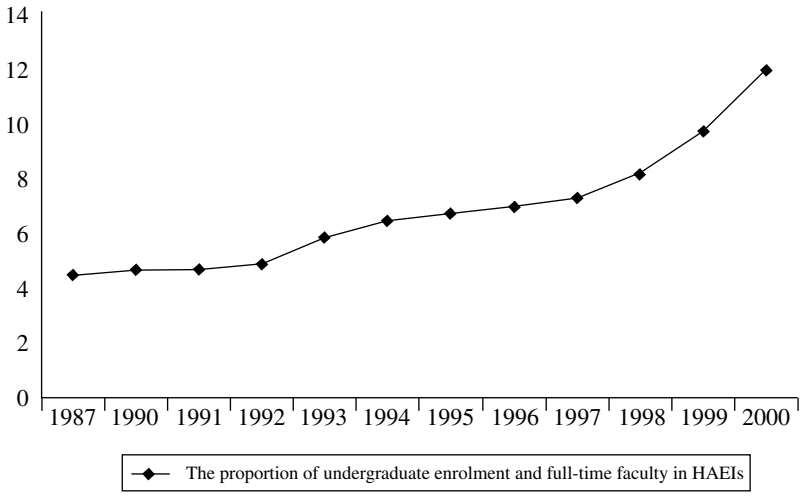


Figure 3.2 The proportion of undergraduate enrolment and full-time faculty in HAEIs



(7) Reform of the logistical service for increasing service efficiency

The logistical service reform is a major area in the HAEI reform. Before the institutional reform, universities were responsible for providing all on-campus logistical services to teaching and to research activities as well as to students, including housing, dining and other services. On the one hand, this was a heavy burden on the HAEIs over a number of years. On the other hand, the departments and students complained of the bad service. The logistical services, which are an integral part of the HAEIs, have less skilled non-professional staff, but they come under a large amount of pressure and demand for service from their internal clients. In order to change this situation, the logistical service departments have been taken out of the universities and have become university-affiliated logistical service companies. This is called the 'commercialization of the logistical service'. The logistical service reform

was initiated in the middle of the 1990s and is still ongoing. Through logistical reform, service quality and efficiency have both been improved. At the same time, the logistical services also absorbed the unemployed staff from the universities.

(8) Gender issues to be addressed during the reform

The gender issue has not been a sensitive factor in the personnel and employment structure reform within the HAEIs. In recruiting professional staff, there is neither a preferential policy for female staff nor any discriminating policy. According to the statistics relating to the gender distribution of the HAEIs, the number the female staff employed both in administrative and professional areas make up 25-30 per cent of the total staff numbers on average. In order to avoid gender imbalance, the gender percentage is described in the personnel recruitment policy regarding certain administrative positions.

There is no gender discrimination against female faculty staff in determining the salary categories and in recruiting the professional and administrative staff. In the China Agricultural University, female staff with higher education degrees and a professional title, professors or associate professors, account for about 35 per cent of the total senior professional staff, whilst at the College of Rural Development of the China Agricultural University, a newly established institution in rural development education and research, female staff make up 50 per cent of the professional staff due to the special preferential personnel policy. In general, the higher the professional position is, the fewer female staff that can be recruited. In the faculties of livestock production and agronomy, in particular, the ratio of female staff is lower, whilst in the departments of biology, sociology, economics, the percentage of female staff is relatively higher.

Although males and females should be treated equally, as described in the national employment policy, outside the HAEI there are still cases of gender discrimination against female employees which come from the labour market. This is an employment problem for female HAEI graduates. According to a labour market survey carried out by the Ministry of Labour and Social Security, about 20 per cent of institutions and enterprises clearly expressed

their preference for the recruitment of male employees. In recruiting the employees, they put gender as a precondition for certain positions. This gender discrimination has made it difficult for female graduates to find proper jobs. In order to compete with the male candidates, female employees must have a significantly higher level of qualifications than the males.

3.5 Comments on the reform made by different stakeholders

3.5.1 Positive comments

- Comments made by university administrators: The university service efficiency and effectiveness to the faculties and departments have both significantly improved due to the personnel structure reform and the decentralization of the administrative power to college and department levels. According to an estimate of the MOA, the total number of administrative staff has been reduced by 30 per cent, therefore the ratio between teaching and research staff and administrative staff since the reform has been significantly increased by at least 20 per cent. Payment and salary are both fixed according to the importance of the position and the performance of the employees. The salary for the newly recruited administrative staff has been increased by about 40 per cent since the reduction in the total number of administrative staff. The additional merging of the relevant departments and colleges provided a positive professional framework for providing the students with qualifications where various spheres of knowledge had been better integrated. At present, based on the results of the first round of reform in 2000, the China Agricultural University has initiated a second round of internal structural reform by merging 21 existing colleges into 12 colleges and integrating 25 administrative divisions, which are distributed over two campuses, into 17 unified divisions. The total number of personnel has been further reduced by approximately. 30 per cent compared with the number after the first round of the reform. By means of the reform, the administrative channels needing to be co-ordinated by the managers have been reduced by 70 per cent compared to the number prior to the HAEI reform. Lastly, the majority of the university presidents pointed out that the reform has significantly optimized the HAEI internal education and research resources.

The effectiveness and efficiency of education have been significantly improved without an increased investment having to be made by the government.

- Comments from deans of colleges and directors of the departments: The departments and colleges, as executing bodies of the teaching and research activities, have more decision-making power to innovate with regard to both the internal management structure and to the modification of the curriculum. They also have more power to influence the personnel recruitment process. Financially, there are more financial incentives for the departments since the percentage of funds allocated to the departments and colleges have been significantly increased compared to the situation as it was before the reform.
- Employers: in the new enrolment and employment policy, the employers can obtain direct access to the highly qualified candidates by interviewing them themselves. Since the supply is much greater than the demand, employers may obtain a high rate of selection, recruiting the best ones by selecting from a large number of candidates whose numbers represent 5 to 10 times more than those required. By means of an interview, the employers can test the overall qualifications, such as in management, innovation, social co-ordination, presentation, and negotiation techniques.
- Teachers: before the reform, an 'iron bowl' system existed. The salary categories of the different jobs of professional staff differed only slightly. Since the reform, the payment and development opportunities privilege both the qualified teaching and the research staff. The payment difference has been increased in order to motivate the staff with high qualifications in and commitments to education and research work.
- Students and their parents: the increase in the enrolment numbers gives more scope to the students to choose; an increasing number of high school students can go to universities or colleges to receive further education. In addition, since the students have to pay the tuition fees for the HAEI, they have the right to monitor and evaluate the quality of education as well as the teaching and living conditions that HAEI provides to the students. This forces the HAEI to make further improvements in the quality of the services provided.

3.5.2 Negative comments

- The HAEI administrators: University presidents interviewed have expressed the following negative opinions concerning the HAEI reform. The institutional management structure was set up 50 years ago and functioned within the centralized institutional administrative system. Within this system, entire institutional missions were broken down into different operational areas and were managed separately for about 45 years. Merging and integrating the different HAE institutions or faculties to cover multi-disciplinary university needs took place over short period of time with higher level administrative guidance. Before the mergers took place, problems and conflict areas were neither sufficiently discussed nor properly co-ordinated by the relevant institutions. Therefore, there are still ongoing conflicts between the various presently merged units. Such conflicts will partially affect the increased efficiency which should have taken place as a result of the integration of the relevant institutions as well as the reallocation of the available resources. Internally, the stronger bodies in the newly established HAEIs have a tendency to devalue the roles and functions of the weaker ones. The weaker institutions have the feeling that they are treated as 'sons of concubines'. In the distribution of funds and allocation of resources, they become marginalized groups. A lot of time is spent by the HAEI managers on co-ordinating these conflicts. Another disadvantage caused by the institutional merging with other universities is that it created a negative impact on the newly enrolled student qualifications. For example, before merging with the Zhejiang University, Zhajiang Agricultural University had a very good reputation in Zhejiang and the surrounding provinces. The university could enrol students with excellent marks in the national enrolment examination. Since the reform, in an agricultural college of the newly established Zhejiang University, the average pre-qualification requirements of candidates haves been reduced, because students prefer to select other relevant colleges rather than Zhejiang University. Some presidents have evaluated the HAEI institutional merger as follows: in a successful merger, one plus one becomes more than two, in an unsuccessful merger, one plus one becomes less than two, or even less than one. According to the MOA officials, fully overcoming the negative impact of the HAEI mergers will take at least 10 to 15 years.

- Comments from employers: The market-oriented enrolment and employment policy provides the competing employers in the industrial sectors and in the big cities, where higher salaries may be obtained, a good market supply of candidates. However, agricultural institutions at grassroots levels have no access to the highly qualified graduates, although a large number of graduates originally came from the rural areas. This policy will probably cause another round of brain drain. Although the government has called on the HAE institutions to meet the requirements of agricultural and rural development and the farmers' demands, over the past three years there has been no change in the situation. In order to provide highly qualified graduates for poor areas, a governmental preferential policy is needed.
- Comments from the HAEI staff: The personnel and staffing structure reform was implemented parallel to the enrolment and employment system reform. Since the total number of teaching and management staff has not risen in proportion to the greater number of students enrolled, the teaching and tutoring work of the teachers has considerably increased. On the other hand, in order to increase the number of students, universities have to reduce accordingly the enrolment pre-qualification criteria. This has caused a large disparity in student qualifications over the period of the study. This negatively affects overall teaching effectiveness and efficiency.
- Students and their parents: Firstly, between 1978 and 1990, students were not asked to pay any tuition fees to the universities, instead of that, the government provided scholarships to students from poor rural areas according to the average income of the family. Due to such a governmentally-subsidized education policy, students from poor areas had no financial problems in relation to their studies. In the new education policy, students have to pay tuition fees which cover about 30-50 per cent of the total education costs. This has created financial pressure on students from poor areas. Since the tuition fee is being considerably increased from year to year, a large number of students coming from rural areas, especially from the poor western provinces, are unable to finance their studies. Although the government has launched an education credit programme since 1998, students from poor areas are still unable to overcome the financial pressures involved. Certain of the students from poor families have had to give up their studies due to financial problems.

Secondly, since the number of students has been increased by around 10 per cent annually, the physical infrastructure is unable to meet the demand, e.g. sports, dining and library facilities, experiment and computer laboratories, classrooms and dormitories, etc., are all overused. Since the number of students extends beyond the available capacity to receive them, some general courses have to be provided to a large number of students so that the participation and communication opportunities for students as well as teaching effectiveness are also reduced.

Thirdly, due to the increase in student numbers, the candidate pre-qualification requirement is very different compared to what it was previously. Some of the students with lower marks in the national examination have difficulty in following the teaching process. The disqualification rate in some courses, especially the natural sciences, i.e. mathematics, physics, chemistry as well as in English, is significantly higher than it was before.

Lastly, the internal and external institutional reform has created an impact on the internal teaching activities. For example, changing the teaching areas, transferring students from their original departments to new ones, has caused a certain amount of disruption to students in their daily studies and in the possibility of learning. The change of faculty names has confused both the students and their parents. They are worried that the change of departments will have an effect on their employment after graduation.

Chapter 4
The HAE institutions since the reform

4.1 The new mandates

The major change that has been brought about by the HAEI reform is in the institutional status. In other words, the HAEIs before the reform were state-owned education institutions entirely run in accordance with the governmental plan. Since the reform, the HAEIs have become market-oriented education enterprises with the governmentally designated mandate of producing qualified personnel for agricultural and rural development. Within this context, the major education mission of the HAEIs throughout the entire education system and in the national development of the economy has not been changed. However, the decision-making power has been decentralized and the HAEIs have been given more autonomy. The main changes in the mandates include:

- The changed role of the HAEIs from being closed governmentally-designated education institutions to open-market, demand-oriented education institutions. The percentage of governmental funds has been reduced compared to the situation before the reform. An institutional feature of HAE, i.e. that of a governmentally-controlled and affiliated institution, has been altered so that it now has an education enterprise status with the mission of producing highly qualified human resources for the employers;
- Since the abolition of the central plan-oriented education institutional structure, the HAEIs have been given more autonomy in decision-making, more institutional operational responsibilities as well as economic incentives. The HAEI can identify their own market position within any given educational and employment market and can react directly to the outside challenges and institutional changes;
- In addition to the governmentally-committed education funds, the HAEI can enlarge and diversify financial sources. Apart from the governmentally-committed education funds, the HAEIs can mobilize social investments and funds in order to compensate for a shortage of funds. The increased

amount of the education fees coming directly from the students has improved the financial situation for the HAEIs, giving them a good reputation. The HAEIs have the right to formulate the annual budget which includes a part of the government's investment funds, the income from the student tuition fees and the income created by the university-affiliated enterprises;

- The HAEIs can look for education co-operation counterparts, such as private investors, enterprises, research institutions, even foreign investors or universities that would like to join in the education and research programmes under the precondition of gaining mutual benefit. This co-operative education model has government support.

4.2 The staffing and administrative structure

As a result of the HAEI internal reform, a performance-linked staff recruitment and payment system has been established in the HAEIs. As mentioned in a previous chapter, the reduction in the total number of administrative staff and the giving of priority to highly qualified and motivated professional staff has increased the overall effectiveness and efficiency of education and research. Introducing the contractual employment system and abolishing employment of an indefinite duration has created pressure on the staff to continuously qualify themselves and improve their performance. As a countermeasure in the selection of staff, a performance and qualification-oriented staff selection and promotion system has been also established in most of the HAEIs. To ensure efficient performance, an internal performance monitoring instrument has been set up. Performance is directly linked to salary and payment. These measures have guaranteed that qualified and highly committed professional and management teams run the HAEIs efficiently. As a result of the internal staffing structure reform, a performance-oriented modern human resource management mechanism will be established in all HAEIs.

Both the internal and external administrative structures of the HAEIs have been changed and simplified by means of the HAEI reform. The most important changes made during the reform are as follows:

- Externally, the decentralization of the local HAEI administration rights from the MOA to the provincial government and the transfer of the

administrative rights of key national HAEIs to the MOE. The decentralization and transfer of the administration have reduced the burdens placed on the MOA, and, at the same time, created incentives for both the local government and the HAEIs. This has been defined by the MOA as the "Decentralization of a package of rights of administration, responsibilities, financial investment and economic incentives to the local government and to the HAEIs" (*extract from a speech made at the HAEI Reform Conference by Minister Chen Yaobang*, January 2000). In such an administrative structure, under the policy guidance of the local government the HAEIs can create their own institutional education strategy and formulate a development plan according to the human resource demands of provincial agricultural and rural development. Decentralization has also reduced the number of administrative layers. This change has significantly improved overall education efficiency. It has thus been described by a university president: "Before the reform, we had more than one mother-in-law to instruct and control the HAEI operation, now we have only one mother-in-law."

- Internally, decentralizing personnel management, financial management rights, economic incentives and the professional decision-making power to the college and department levels with integrated internal administrative guidance on how to do this most efficiently. This simplified and decentralized the internal administrative structure significantly, motivating staff to take initiative at lower levels.

4.3 The funding structure

The financial situation of the HAEIs has been improved by the reform. The most important improvement in the HAEIs' financial situation is the diversification of the financial sources and the income generated by the education and research services provided to the market. The financial structure of the China Agricultural University for the fiscal year 2001, representing the financial structure of the national HAEIs, can be described as follows:

The sources of income:

(1) Education funds are allocated by the government according to the number of students, making up around 31 per cent of the total financial income.

The government subsidizes 6,000-7,000 Yuan as a part of each student's education fee. These education subsidies to the HAEIs have been seen as a governmental investment in stimulating macro-economic growth. This investment is an attractive incentive for the HAEIs to increase the number of admissions;

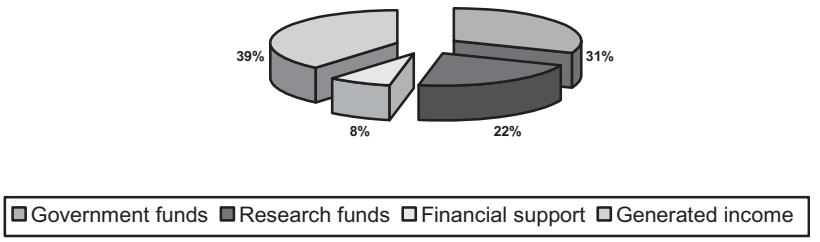
(2) Research funds received from governmental institutions and agricultural and agro-chemical enterprises represent approximately 21.94 per cent of the total available budget, of which the governmentally-allocated research funds represent approximately 90 per cent and funds from other clients approximately 10 per cent. The HAEI-conducted R&D plays an important part in the agricultural research and innovation system. Research funds are mainly provided by the Natural Science Foundation, the Ministry of Agriculture, the Ministry of Science and Technology, and the Research Funds for Young Scientists;

(3) Other funds allocated by the central and local governments for infrastructure improvement, and financial support for daily operations represent approximately 7.79 per cent, of which 79 per cent are from central government and 21 per cent from local government. Central government funds for the HAEIs' infrastructural improvement are mainly allocated to the national key universities; investment in the provincial and lower level HAEIs is very limited. The infrastructure of the HAEIs in the western provinces is still very poor simply because the government funds are very limited;

(4) Income received by charging tuition fees to students and self-financed students, income from the various income-generating education and training activities, such as on-campus short-term training courses, self-financed adult education, distance learning programmes, income transferred by the HAEI-affiliated enterprises. Such income all together represents 39.33 per cent of the total budget. The student tuition fee varyies from 3,500 to 4,500 Yuan/person/year, depending on the faculty.

Compared with 2000, the total funds of the CAU have been increased by approximately 37 per cent. The governmental education investment and the self-generated income have made the biggest contribution to the increase in funds.

Figure 4.1 Funding sources of CAU in 2001



As for the China Agricultural University, the income generated by the university-affiliated enterprises is very limited, representing less than 1.0 per cent of the total annual budget, although a large initial investment of funds has been injected into the various enterprises over the last 20 years. In contrast to the CAU, for some of the HAEIs, such as the Agricultural College of Yangzhou University and the Agricultural College of Zhejiang University, the contribution of the HAEI-affiliated agro-processing enterprises or experimental farms represents more than 20 per cent of the annual income. This contribution compensated for the shortage in education funds. The main problem existing in the HAEI enterprises is that the property rights and ownership of the enterprises and the financial interface between the HAEIs and the enterprises have not yet been defined, clarified and fixed in contractual form. The enterprises use the intellectual property rights and the capital invested by the HAEIs to run their own businesses, but are not committed to making e any financial contribution to the HAEIs.

4.4 The curriculum changes and the founding of a Rural Development Faculty

(1) Changes in the management of the national higher education faculty guidelines catalogue

Formulating, modifying and updating the curriculum structure according to the needs of national economic development and the market demand is one of the most important objectives of the higher education institution reform.

The Ministry of Education is responsible for formulating the national higher education faculty catalogue and supervising the implementation of the catalogue. The National HEI Faculty Catalogue is normally updated every five years. Over this period, universities can submit proposals and applications to the Curriculum and Degree Programme Administration and the Ministry of Education for approval and addition to the national catalogue.

(2) The reform of the HAEI curriculum management pattern

- Introduction of optional courses to a level of 25-30 per cent of the total number of requisite credits. Once the students have taken up 70 per cent of the requisite courses, they can select relevant courses from other colleges or faculties according to their own interests and the qualification requirements of the potential employers;
- Change of the fixed curriculum into a flexible curriculum with a total number of requisite credits;
- Ensuring teaching effectiveness and performance by introducing teaching evaluation instruments. The results of the monitoring are publicized at the end of each semester and will be used as an indicator to decide on an increase in salary or in the teaching subsidy;
- Merging the relevant courses into block modules or seminars.

(3) Establishment of the Regional Rural Development Faculty and the founding of the first College of Rural Development (CORD) at the China Agricultural University

As a result of a year of planning and consultation with the Ministry of Agriculture and the Ministry of Education, at the beginning of 1998, the China Agricultural University prepared a proposal to the MOA and the MOE to introduce a rural development management faculty into the national faculty catalogue and to establish a college of rural development in the China Agricultural University. Within the same year, the proposal was approved by the Ministry of Education and the Ministry of Agriculture. The new curriculum for rural development was officially included in the *national university faculty catalogue* under the name of *regional rural development.*

In October 1998, the College of Rural Development (CORD), the first education institution specialized in rural development was founded within the

China Agricultural University. The College was established by merging the Centre for Integrated Agricultural Development (CIAD), which was established in 1988, and the Agricultural Extension Faculty, a part of the College of Agricultural Economics.

The missions of the CORD, determined according to the needs of Chinese agricultural and rural development, are as follows:

To give the appropriate qualifications to and prepare young rural development and extension and agricultural R&D management personnel so that they are equipped with the interdisciplinary knowledge and practical skills needed in order to undertake rural development studies and management, rural and community development planning, and sustainable resource management. They should know how to work effectively with farmers and community leaders and how to work with various social groups, such as rural women, the rural poor and other vulnerable groups; they must master the participatory methods and tools for creating a dynamic social environment for the reduction of poverty, for sustainable resource and environmental management, and for local institutional capacity building.

In order to achieve these education objectives, the CORD, as the leading institution for rural development education within the HAEI, has set up two faculties related to rural development and extension management:

(1) ***Rural development management***: The education objective of this faculty is to give the necessary qualifications to students to become rural development managers and social development management and research personnel, equipped with the knowledge and skills with which they may assist the rural population, especially the rural poor;
(2) ***Rural extension and innovation management***, aims to give the appropriate qualifications to extension and innovation management personnel so that they are equipped with participatory methods for promoting agricultural and rural development research, technological development and extension management. They should have the ability to assist farmers in making the right decisions according to the market situation.

(4) The undergraduate programme at the CORD

Up to 2001, the two faculties at the CORD enrolled a total number of 350 undergraduates, coming from all of the provinces and autonomous regions of China, giving priority to the inland and western provinces, where more development management and extension management personnel are needed.

In order to achieve the above-mentioned education objectives in the two faculties, the CORD provides the following professional courses to its undergraduate students in the Rural Development Management Faculty and the Rural Extension and Innovation Management Faculty:

Table 4.1 Professional courses for rural development management at the CORD

No.	Course	Hours	Credit	Term
1	**Development theories**	**108**	**6**	
1.1	Introduction of development	36	2	5
1.2	Participatory development	36	2	5
1.3	Gender and development	36	2	5
2	**Development studies and practice**	**108**	**6**	
2.1	Methods of development studies	36	2	6
2.2	Dissemination and communication in rural development	36	2	6
2.3	Training and human resource management in rural development	36	2	6
3	**Development management**	**108**	**6**	
3.1	Community development planning	36	2	7
3.2	Management of rural development projects	36	2	7
3.3	Community organization and management	36	2	7

4	**Seminars on rural development**	**72**	**4**	**8**
5	**Development practice in the community**	**72**	**4**	**6**
	Total		**26**	

Table 4.2 Professional courses for rural extension and innovation management at the CORD

No.	Course	Hours	Credit	Term
1	**Extension and innovation theories**	**108**	**6**	
1.1	Extension theory	36	2	5
1.2	Management of technical innovation	36	2	6
1.3	Communication theory in extension	36	2	5
2	**Extension and innovation methodology and practice**	**108**	**6**	
2.1	Extension methodology	36	2	6
2.2	Methods of extension training	36	2	6
2.3	Extension media designing and production	36	2	6
3	**Management of extension and innovation**	**108**	**6**	
3.1	Extension project management	54	3	7
3.2	Management of extension organization	54	3	7
4	**Extension seminars**	**72**	**4**	**8**
5	**Practical work in the rural community**	**72**	**4**	**6**
	Total		**26**	

Due to its long-term experience in rural development training and research, the CORD has become the focal point of the National University Network for the Rural Development Curriculum. By the end of 2001,

21 agricultural universities and colleges all over China had become members of the network. The CORD has on offer four teaching staff training courses on the development of the curriculum, development training materials, and on the introduction of new teaching methodologies.

(5) The postgraduate programme provided by the CORD

In the meantime, the CORD also has on offer MSc and PhD programmes. The objective of the postgraduate programme is to create senior rural development researchers and action-oriented rural development planners and management personnel. The courses offered in the postgraduate programmes are presently being undertaken by 30 Master's degree students and 10 PhD students who are studying at the CORD and who are fully involved in development studies. The research areas cover: poverty assessment, gender and rural development, participatory resource management, a farmer's technology-adoption behaviour, the decision-making pattern of farmers, and sustainable community development, etc.

(6) The professional Master's programme

To meet the high demand for the improvement of managerial qualifications from agricultural technicians and management staff who graduated at the beginning of the 1980s to the end of the 1990s, the CORD made a proposal to the MOA and the MOE for the establishment of a three-year professional MSc programme for the improvement of their extension skills and development management qualifications. The programme was approved by the Ministry of Education in 2000. The CORD has enrolled 120 students from all Chinese provinces. Now about 25 agricultural universities can offer this programme. The courses provided in the professional MSc include:

- rural extension and innovation management;
- development communication;
- management of development projects;
- development economics;
- methods of development studies.

This special programme provides further qualification opportunities to the agricultural management and technical staff who have been working for a considerable amount of time at the grassroots level. Through the studies they can improve their extension and administrative management ability and research skills.

4.5 The change in teaching methodologies

The change in the traditional 'in-pouring' teaching pattern into the 'enlightening' and student-centered modern pedagogical methods. Since 1995, the MOE has insisted on the qualification-oriented higher education pattern that is a complete change from the traditional theoretically-oriented teaching methods. The methodological reform has been tested in the newly established colleges and faculties, such as the College of Rural Development (CORD) of the China Agricultural University, which has introduced the new teaching methods in its professional courses. The methodology and the teaching philosophy have been changed in the teaching practice as follows:

- The role of teacher has been changed from lecturer to facilitator. During the lectures, students can raise questions and present their points of view. Reducing the length of time of the lecture and increasing it in terms of group discussion give students a greater opportunity for the simulation of the real situations that they will meet at a later date.
- Interactive communication among the students and between professors and the students.
- An increasing number of modern audio-visual aids have been introduced into the teaching process. In order to enhance learning efficiency and effectiveness, the HAEIs, by using their capacity for investment, have installed audio-visual equipment, such as multi-media powerpoints, overhead projectors, TV and video facilities and an on-campus teaching network for the general courses.
- An increase in the number of hours given over to practical work during the teaching. The assignment of certain tasks to the working groups, asking them to conduct the group exercise. These methods can activate the participation of the students in developing the competence necessary for the solving of the problems given to them as an exercise.
- Visualization of the teaching contents by using the flipcharts, pin boards and metaplan cards to assist the learners in understanding concepts and

definitions more clearly and directly. Using the visualization tools is a challenge to the teachers who have not studied pedagogical methods.

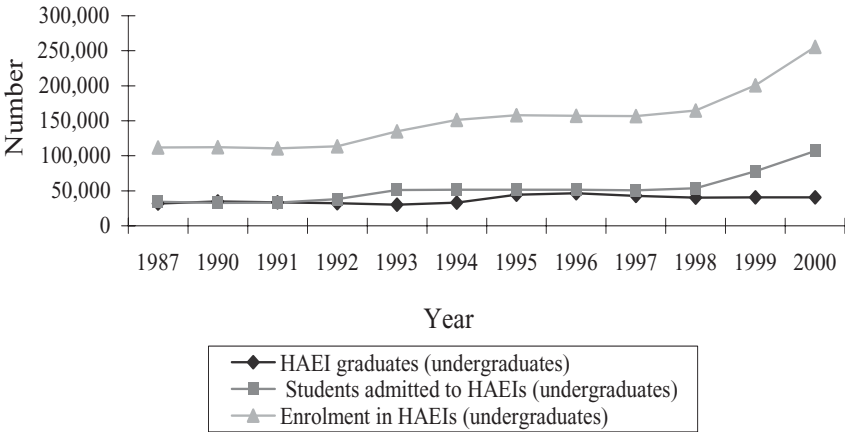
- Problem-solving capability training though case studies and problem analysis during the lecture. Teachers will act as facilitators inr assisting the groups working out the solutions and action plan for the implementation of the strategy.

4.6 Student enrolment and graduate employment

(1) A rapid increase in student enrolment in the HAEIs

Since the universities are subjected to a shortage of funds, increasing the number of students and charging a tuition fee is one of the solutions envisaged to compensate for this shortage. Since 1997, the HAEIs have increased student admission by 10 per cent annually (*Figure 4.2*). Therefore the total student enrolment numbers in the HAEIs have rapidly increased from about 150,000 to 250,000 over the past five years. Due to the rapid increase in student numbers, the infrastructure and current facilities are insufficient. Pressure is also put on them regarding graduate employment which is delayed by several years.

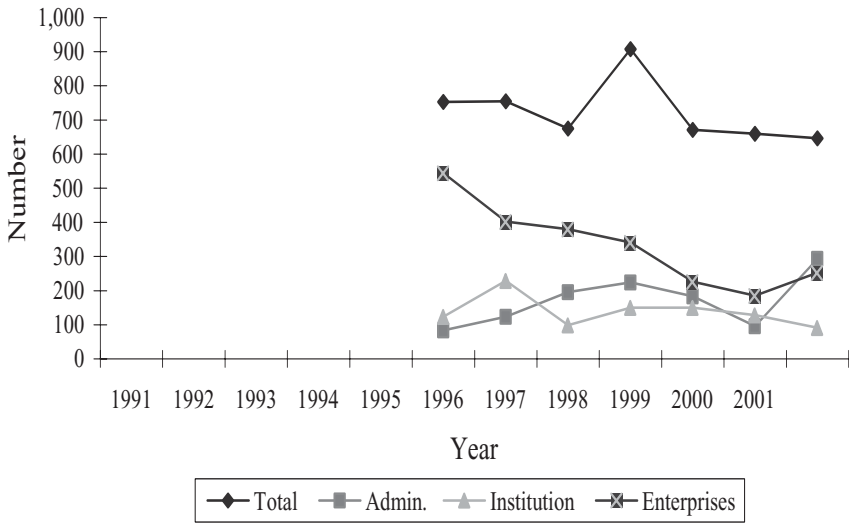
Figure 4.2 Integrated information on HAEI undergraduates



(2) The demand for graduates and the general employment of HAEI graduates

However, the market demand on agricultural engineers and management staff has not been increased at the same rate. Many provincial agricultural research, management and extension institutions increasingly require more MSc graduates with practical experience. This situation forces the universities to enrol an increasing number of postgraduates. However, at the same time, the graduates are disinterested in working at the grassroots level as technicians and extensionists, although the demand from county and township institutions has been very high for the last 10 years. *Figure 4.3* indicates the graduate employment situation of the CAU between 1996 and 2001. For the graduates of a national key agricultural university, there is a good possibility of finding work in the governmental administration or the institutions, but graduates from the local HAEIs work mainly at the county or township levels as administrators and technical staff at extension centres and technical stations.

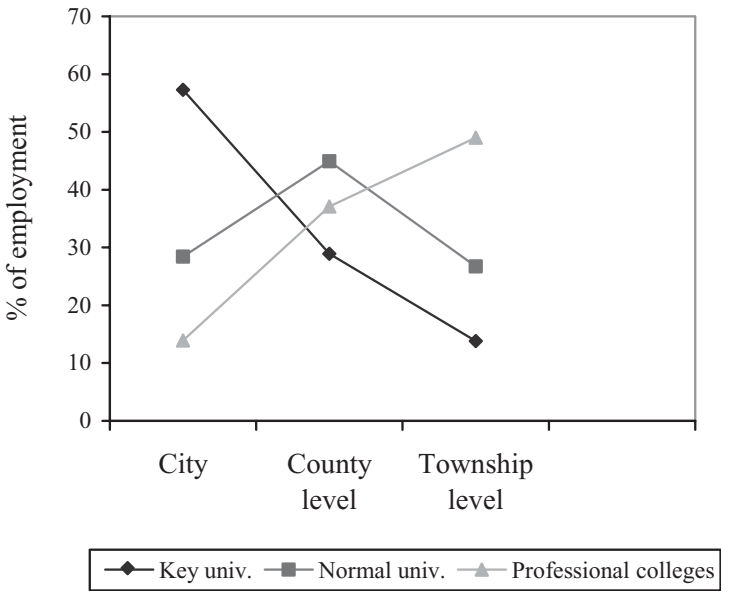
Figure 4.3 Graduate employment of CAU



According to a sampling survey conducted by the MOA, about 77.8 per cent and 79.4 per cent respectively of graduates of the agronomical and animal science areas are working in agricultural sectors, whilst 68.3 per cent and 61.4 per cent respectively of graduates of the agricultural economics and agricultural engineering faculties are still working in the agricultural sectors. That means about 30-40 per cent of graduates from these faculties have changed their jobs to non-agricultural sectors with a higher income and better working conditions.

According to the same survey, the higher the education level is, the fewer the graduates who are likely to work at the grassroots level. This has been the trend of graduate employment over the past ten years. *Figure 4.4* shows the trend in the employment preference of the HAEI graduates.

Figure 4.4 Employment trends of graduates from different HAEIs in 1996



In *Figure 4.4* a significant trend can be seen in the fact that most of the graduates from the key agricultural universities are mainly employed at the big city level (57.3 per cent), 45 per cent of general provincial agricultural university graduates are employed at the county level, whilst 50 per cent of professional college graduates are working at the township level. This situation has not changed significantly since the reform of HAEIs. The survey has shown that about 90 per cent of the HAEI graduates interviewed expressed their wish to work in relevant institutions in big cities at a level above that of the prefecture. This employment selection tendency has resulted in a structural graduate surplus, whereby graduates cannot find the job they want in the big cities, but the institutions at the lower level cannot attract a sufficient number of graduates.

The employment and job preferences of the HAEI graduates:

- agricultural administrative institutions;
- agricultural education (teaching staff for the HAEIs at lower levels);
- agricultural research institutions at provincial level;
- agricultural extension institutions;
- agricultural enterprises and companies.

4.7 The remaining problems and constraints

According to the MOA and the MOE officials and the university management and professional staff interviewed, since the HAE institution reform, problems and constraints remain which need to be considered in the future reform:

- There is a lack of comprehensive countermeasures to support the reform and resolve the new problems which have come about due to the structural changes. In an attempt to solve these new problems, some HAEIs (such as the CAU) have initiated a second round of internal reform.
- The difficulties of and inefficiency in co-ordinating the different sub-institutions which have been merged. There are many interfaces and conflicts of interest between such institutions, as in the allocation of

funds, and income differences between different sub-units due to their different income generation capacities.

- Too large a scale of increase in enrolment without a subsequent increase in personnel or in financial investment might cause a reduction in the quality of education. This will be more serious for certain of theuniversities where the local government has difficulty in increasing the education fund investment.
- The HAEIs will face a big challenge in graduate employment in three or four years time when large numbers of students graduate from the universities. Although a market-oriented enrolment and employment system has been established in the HAEIs, the labour market demand for graduates will depend upon a number of factors, such as the importance of agriculture in the overall economic development process, the governmental policy for motivating graduates to work at grassroots level. The HAIEs can have no direct influence over these factors.
- The governmental investment in the HAEIs has been always a restricting factor in the improvement of their physical condition. The governmental funds for the local HAEIs, especially for the HAEIs in the poor areas cannot be increased on a large scale in the near future; that means, funds for these HAEIs will be a restricting factor as far as their further development is concerned.

Chapter 5

Beyond HAE: the contribution of higher education to rural development

5.1 The reform of HAE within the context of broader changes in higher education

The HAE institution reform was implemented prior to the overall education institution reform. As a pilot scheme for the overall education system reform, it provided both positive and negative experiences for HE reform. The overall HE institutional reform was initiated at the end of 2000. Approaches and models developed and tested by the HAE institutional reform have been adopted by and integrated into the HE reform.

In the wider perspective of faculty integration, the merging of HAE institutions with non-agricultural universities that had better reputations represents a reinforcement of HE functions in promoting human resource development for the economic and social development of the entire country. It also provides a good mechanism for producing management and technical personnel for the non-agricultural as well as the agricultural sectors. Merging or integrating agricultural universities with multi-disciplinary universities has provided opportunities for students who study in the non-agricultural faculties to select agricultural and rural development-related courses. This has provided an opportunity for the students to work in agricultural sectors when they graduate.

5.2 Addressing the needs of rural development: the challenges to higher education

China is the biggest developing country in the world with a total population of 1.3 billion, of which more than 70 per cent are still living in rural areas and living off agricultural activities. According to the statistics, the average increase

in annual income of the rural population (4.0 per cent or less) has been lower than the increase in GDP over the last five years (approx. 7.0 per cent). This means, viewed at the macro level, that the social and income disparity between the urban and rural population increases in line with the national economic growth. Furthermore, Chinese rural development is still facing the following challenges:

- Due to China's accession to the WTO and economic globalization, the current Chinese agricultural sector structure and market system are both facing a high level of competition from the world market. Due to small land holdings and higher production costs, ordinary agricultural products will eventually no longer be able to compete. Import pressure will force the producers to restructure their products and reduce their production costs. To restructure the sector, farmers and local agricultural technical service institutions need to be assisted by more and better qualified human resources.
- Poverty, food security, rural health and education. According to the estimates of the World Bank, in China there are still about 90 million rural poor living at less than 1$ a day. In some areas, farmers cannot produce sufficient food by themselves so they depend on outside support. Poor people still have very poor health and poor medical services. Not all children in the poverty areas can attend the middle schools. To help these vulnerable groups, an increasing number of rural development management specialists are needed.
- Environmental and resource degradation caused by the improper management of the environmental and rural resources are threatening sustainable rural development. Multi-disciplinary and multidimensional interventions are needed in order to resolve the problems in environmental and resource degradation (World Bank, 2001). To fight these problems, both the HAEIs and the HEIs must make their contribution both in human resource education and in finding solutions through research.
- Institutional improvement, governance, decentralization and local participation. Rural development needs support and facilitation. A precondition for the provision of an effective administrative service is an effective and good governance. The central government-centered administrative power must be decentralized and made more transparent.

To strengthen their ability to depend upon themselves and increase their own development capacity as well as to extend their ownership, the rural poor need to receive training in order to become empowered.

The overall institutional mandate of the HEIs is to produce highly qualified and committed human resources for rural development. The above-mentioned challenges and constraints must be addressed in a further curriculum reform and a follow-up in the institutional and policy reforms of the HEIs.

5.3 Achievements

Despite the political movements and negative impact of the Cultural Revolution, over the past 50 years the Chinese HEIs have never altered their mission of 'serving national economic development'. According to the estimates of the MOE and an employment survey conducted by the MOA, since the 1990s, more than 60 per cent of provincial governors responsible for agricultural and rural development, 80-90 per cent of department directors-general of the MOA and provincial administrative departments, and more than 95 per cent of division chiefs are HAEI and HEI graduates. They are playing very important roles in formulating and implementing agricultural and rural development-related policies. The percentage of administrative and technical positions occupied by HEI and HAEI graduates at various levels is still increasing in line with the institutional and personnel system reform.

The establishment of rural development faculties and colleges at 25 HAEIs all over China will make a contribution to resolving the problems and constraints described above. These colleges and faculties have introduced relevant courses and seminars, such as poverty and development, participatory resource management, human resource development for rural development, gender and development, extension and communication in rural development, etc., into their curriculum. Students educated under this curriculum and who graduated from the CORD in 2001 (the first batch in rural development management) are working in both administrative and technical service institutions and are playing very important roles in resolving the above-mentioned problems and constraints.

In addition, achievements have also occurred in professional MSc programmes. Since 2000, key national HAEIs and other key universities coming under the MOE can provide on-the-job MSc programmes such as the Agricultural Extension Professional Master's Programme, the MBA and MPA in Agriculture. These on-the-job professional Master's programmes have provided the opportunity of a further qualification to former HAEI and HEI graduates. The courses mentioned in the previous paragraph have also been introduced into the curriculum of these programmes. Therefore, there is reason to believe that the administrative and technical qualifications as well as the skills of these students will be significantly improved by these programmes.

5.4 Prospects

As part of the development of the Chinese national economy, rural development will become a key issue and priority of the national development strategy. Chinese rural development will need an increased number of qualified human resources and will also provide an extensive pool of specialists to the labour market. In order to make the HAEIs and HEIs more focused on agricultural and rural development demands, the government still needs to strengthen the special policy by which "agricultural and general higher education should serve the individual farmers as well as agricultural and rural development."

With regard to the current working and living conditions in rural areas, special preferential policies should be effectively implemented to attract the HAEI and HEI graduates into the rural areas.

Chapter 6

Experience gained, lessons learned of use to the international community

6.1 Experience gained in the HAE reform of use to the international community

The following experience gained during the Chinese HAEI reform could be considered or adopted in designing and implementing HAEI reform in other developing countries:

- Since the professional faculties and physical facilities were established according the plan economy, neither the efficiency of education nor the utilization of the facilities in the former HAEI were optimal. Therefore, the restructuring and integration of the internal faculties in the HAEIs became essential in order to improve the internal resource allocation and education efficiency.
- Decentralization of the administrative authority to local government and partially directly to the HAEI created more incentives within the institutional mechanism to motivate both the local government and the HAEI to plan and implement the education programme according to local economic development and the internally available resources.
- Merging the relevant independent HAEIs and agricultural research institutions can build a stronger platform for the more efficient education of human resources for rural development. At the same time, it can create a negative impact on agricultural education. For example, the Zhejiang Agricultural University had a very good reputation before its merger with Zhejiang University. However, after the merger, both the quantity and quality of student candidates for agriculturally-related colleges were negatively affected. On the other hand, there are administrative conflicts between the various merged institutions in fund allocation, income distributions.

- In order to change from a plan and central government-controlled system to one that is more open market-oriented, the HAEIs need both a governmental policy framework and the co-ordination and active participation of the various HAEIs. However, a multi-stakeholder participation is also needed. The only indicator for assessing the impact of the reform is the market demand.
- To ensure the success of the HAEI reform, the whole reform process should be implemented in at least four stages by undertaking: (1) a situation analysis in order to identify the problems and constraints existing in the HAEIs; (2) the design of a concept and action plan that includes alternatives for the implementation of the reform; (3) the conducting of pilot trials by selected HAEIs and the drawing up of a list of detailing the experience gained and lessons learnt for the modification of the implementation action plan; (4) the implementation of the reform, step by step, according to the current situation and the existing problems as well as the change in the market demand.

6.2 Lessons learned from the Chinese HAE reform of use to the international community

By reviewing and evaluating the Chinese HAEI reform process and its results, we can learn the following lessons which could be taken into consideration by other countries:

Policy flexibility or alternatives should be considered during the preparation and implementation of the HAE reform. External and internal conditions directly affecting the institutional integration and structure reform should be taken into consideration and translated into the reform concept and action plan. The HAEI reform in China was mainly conceptualized and initiated by the higher level governmental administrative bodies (the MOA and the MOE) according to the macro governmental policy and the problems and constraints identified by some of the HAEIs. The general reform concept was insufficiently consulted and discussed with the HAEIs. The solutions proposed could only partly reflect and represent the situation of certain HAEIs. This caused problems, constraints and even resistance during the implementation of the reform. In order to avoid these problems and to make rational decisions, it is

recommended that other countries, before starting the reform, should undertake the following: (1) a SWOT (Strength-Weakness-Opportunity-Threat) analysis should be conducted for each institution; (2) in order to moderate the conflicts of interest, the HAEI and the staff and faculty should be involved in the entire process of reform; (3) a participatory stakeholder analysis should also be carried out to identify the possible positive and negative impact on each group and relevant countermeasures should be worked out to moderate the social conflicts.

As mentioned above, governmental co-ordination of institutional integration and merging are necessary and irreplaceable. However, this can have a negative impact on the reform process. Nation-wide unified governmental instructions and administrative orders and a relatively tight implementation of the time schedule has neither provided the environment nor the scope necessary for the active participation of the HAEIs and the various stakeholders. Therefore more open and dynamic governmental framework guidelines should be formulated by the national authorities, and the the co-ordination and supervision of the concrete implementation process should be delegated to the local authorities. For the changes that need to be made in the internal structure, the HAEIs should have more autonomy. For example, the curriculum and faculty organization should be designed by the local government and the HAEIs themselves according to the needs of local agricultural and rural development.

- Experience in institutional integration and division merging have shown that there were no unified solutions for resolving the institutional problems existing in the various HAEIs. There is a Chinese saying which states that: "One cannot cut everything with one knife." Alternative solutions should be sought for by the HAEIs and the local government according to the local situation. If too many conflicts, obstacles and constraints arise in the integration, alternative solutions should be identified and a more flexible inter-institutional and internal co-operation mechanism should be considered, such as jointly conducting research programmes, exchanging teaching staff, joint development of the curriculum for mutual benefit.
- The case of the CAU shows that when the locations of the merged HAEIs are too farapart, it is difficult to have a unified administrative headquarters and a unified functional management structure. It is also

difficult to integrate available resources for the use of other campuses. In such a case, the institutions should consider having a 'looser relationship', using the same services but operating as separate entities.

- Last but not least, in order to ensure the sustainability of the impact made by the HAEI reform, an effective and preferential national and local governmental HAEI development policy framework is needed. For the formulation and implemention of the policy a 'bottom-up', transparent and participatory approach needs to be introduced. The reform should be a long and dynamic process to accompany the process of national institutional reform.

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