

7. MONOGRAPHS OF THE NATIONAL AGRICULTURAL RESEARCH SYSTEMS OF THE HIGHLANDS REGION

IRAN

TURKEY

THE NATIONAL AGRICULTURAL RESEARCH SYSTEM OF IRAN¹

1. HISTORICAL BACKGROUND

Agricultural Research (AR) in Iran dates back to 1925 when the Razi Institute, the "father" of the current Razi Serum and Vaccine Research and Production Institute (RSVRI), began its research activity in the district of Karaj, about 35 km west of Tehran, by conducting research projects on the production of animal vaccines and the eradication of the contagious cattle plague disease, which had threatened the cattle population of the country. The next year (1926), the first agricultural college, affiliated to the Ministry of Agriculture (MOA), was founded in Karaj. In 1933, the first college of veterinary medicine was opened in Tehran. Three AR institutes were soon founded: the Livestock and Animal Sciences Institute (Karaj, 1933, called later the Animal Husbandry Research Institute, then the Animal Sciences Research Institute: ASRI), the Sugar Beet Seed Institute (Karaj, 1937, currently the Sugar Beet Research Institute: SBRI), and the Iranian Tobacco Center (Tirtash, 1937).

Important changes occurred in the 1950s and 60s. In 1955, the two existing colleges of agriculture and veterinary medicine were transferred to the University of Tehran, and four other colleges of agriculture (Ahwaz, Shiraz, Tabriz and Urumia), followed by another one in 1956 (Ramin/Ahwaz), were created within newly established universities. New AR institutes were created with technical support from international agencies, such as FAO, mainly:

- The Seed and Plant Improvement Institute in Karaj (SPII, 1959) for research and seed multiplication in the main crops (cereals, oil crops, cotton, rice, horticulture, forages, etc.).
- The Directorate General of Pest Control, established in 1943 under MOA in Tehran, was changed to the Plant Pests and Diseases Research Institute in 1962. The mandate of the Institute includes: (i) collection, identification and preservation of harmful agents to plants, together with their host plants; (ii) study of biology and ecology of plant pests, pathogenic agents and weeds and their control; and (iii) evaluation of new pesticides.
- The Soil Institute of Iran was established in 1966 in Tehran with the amalgamation of the General Directorate of Soil Fertility (within MOA) and the Soil Survey Division of the independent Irrigation Authority, with the mandate of conducting research and field studies on soil classification and land suitability evaluation, soil fertility and plant nutrition, irrigation, soil chemistry and biology, and land reclamation.
- The Research Institute of Natural Resources, established in 1967 in Tehran, within the Ministry of Natural Resources, with a wide range of activities (soil, range, forestry, wild life, fisheries); renamed as the Forest and Rangeland Research Institute (FRRI) under MOA.
- The Botanical Garden, Tehran (1968, merged in 1980 with FRRI).

With the ratification of a new Act by the Iranian Parliament in 1961, most of the existing agricultural institutes were officially established under MOA and kept their autonomy, with their own facilities and research projects in the different zones of the country, with very few joint activities. The groundwork for the establishment of a coordinated AR unit within MOA was laid in 1975 with the establishment of the Agricultural and Natural Resources Research Organization (ANRRO) as a separate entity, headed by the Deputy Minister of Agriculture, to formulate policies and make decisions on research priorities and to coordinate the activities of the AR institutes. Then, in 1982, a Central AR Council was created as the highest coordinating and decision-making body, chaired by the Deputy Minister of Agriculture with the participation of directors of the existing research institutes.

After the revolution, the NARS greatly evolved. Some new institutes (the Agricultural Economics Research Bureau: AERB, Tehran, 1985; the Agricultural Engineering Research Institute: AERI, Karaj, 1988) were created.

Two major changes were registered in the last decade:

- In 1990, the newly founded Ministry of Jihad Construction (MOJC) took over from MOA the AR institutes related to forest, range and animal sciences (FRRI, RSVRI, ASRI), and created the Fisheries Research and Training Institute (FRTI, Tehran, 1990) and the Soil Conservation and Watershed Management Research Institute (SCWMRI, Karaj, 1993).

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- Within MOA, ANRRO kept the crop-related research institutes and was merged with the Agricultural Education and Extension Directorate leading to the formation of the Agricultural Research, Education and Extension Organization (AREEO) in 1993. Since then, new research institutes were founded to unload the Seed and Plant Improvement Institute in Karaj (SPII) from its heavy responsibilities, to implement extensive research on some of the major commodities and non-commodity items of economic importance, and to have a more focused research plan with a multidisciplinary approach. These are the Dryland Agricultural Research Institute (DARI, Maragheh, 1991), the Pistachio Research Institute (PRI, Rafsanjan, 1992), the Citrus Research Institute (CRI, Ramsar, 1992), the Rice Research Institute (RRI, Rasht, 1993), the Date palm Research Institute (DRI, Ahwaz, 1994), and the Cotton Research Institute (CRI, Gorgan, 1996).

Simultaneously, the number of colleges of agriculture was growing rapidly: 2 during the 1960s, 8 during the 1970s, and 5 new ones since 1980. At present, there are more than 20 agricultural colleges (and many junior colleges) spread throughout the country, which are affiliated to different universities of the Ministry of Culture and Higher Education (MOCHE). In addition, there are many senior and junior colleges affiliated to the Free Islamic University, which are spread throughout the country.

2. THE CURRENT NARS

2.1 Overview (see Table 1)

The Iranian NARS currently includes a large number of scientific and technical institutions within different ministries; they may be grouped into two main categories:

- The institutions mainly involved in AR: the 12 AR institutes (ARIs) under the governance of the Agricultural Research, Education and Extension Organization (AREEO, MOA); the 7 ARIs under MOJC; and some other small ARIs, affiliated to MOA, MOCHE and the Ministry of Health (MOH): they account for 87% of the potential research years (pRYs or equivalent full-time researchers) and 93% of the total financial resources of the NARS. These institutions are presented in Section 2.2.
- The 19 colleges of agriculture and 5 colleges of veterinary medicine affiliated to MOCHE: they meet around 11% of the pRYs and 5% of the financial resources of the NARS (see Section 2.3).

A few other institutions (scientific institutions and public industrial companies), in which AR activities cover a more or less small part of their mandate, meet the marginal remaining resources of the NARS (see Section 2.4).

NARS coordination is ensured through the National Council for Scientific Research (NCSR) of the country, which was created in 1988 for the formulation of research policies and strategies, and for planning and identification of research priorities at the national level. This Council is headed by the Vice President of the Islamic Republic of Iran. The AR Commission, which is one of the many commissions of NCSR, is comprised mainly of representatives from MOA, MOJC and MOCHE. Some of the important duties of the Commission include: (i) setting up overall policies and priorities; (ii) allocation of funds for national research projects (see Section 3.3); and (iii) supervision, evaluation and coordination of national research programs.

2.2 The AR Institutions

2.2.1 The AR Institutes Affiliated to AREEO, Ministry of Agriculture

Mandate and Organization

AR under AREEO accounts for 39% of the pRYs and 38% of total financial resources of the NARS. The main mandate of its ARIs is research, which mobilizes around 85% of the time of the scientific and technical graduate staff; the remaining 15% is allocated mainly to seed production and studies/technology transfer.

AREEO, with its headquarters in Tehran, is responsible for general management, planning, evaluation, coordination, and international cooperation¹ of

¹ AREEO is also responsible for coordinating technology transfer activities and assessing farmers' needs.

- Twelve semi-autonomous AREEO ARIs listed in Table 2: 6 are commodity-oriented (sugar beet, rice, pistachio, citrus, date palm, cotton), 4 discipline-oriented (soil/water, plant pests and diseases, agricultural engineering, agricultural economics), and one farming systems-oriented (drylands)¹.
- A network of 30 national/provincial AR Centers (ARCs) (at least one in each province), each headed by a Director: they host scientists from all the ARIs, who conduct specialized research (related with the national programs implemented by the ARIs) and integrated or multidisciplinary research to cater for the needs of the eco-region and develop specific technologies².

The linkage in coordination of research activities is at two levels:

- First, at the National AR Council, chaired by the Deputy Minister of Agriculture (for agricultural research, education and extension), and composed of the Directors General of all the ARIs and two senior agricultural scientists, where the research program of each ARI is discussed. Inter- and intra-institutional cooperation is ensured.
- Second, at provincial AR Councils, composed of the heads of different ARC research divisions, extension bureaus, and representatives of the main AR college located in the region and development agencies³.

Human, Physical and Financial Resources

AREEO ARIs have a total number of 1644 scientific and technical graduate staff members consisting of 1639 nationals (including 88 PhD, 634 MS, and 917 BS) and 5 expatriates, who represent 1399 pRYs⁴ (see Table 2). MOA made a strategic decision that the scientific staff must have a minimum qualification of MS degree.

AREEO has made special arrangements with MOCHE to upgrade the qualifications of its existing staff and to overcome the strong competition in admission to MS programs at the universities by improving the knowledge of its staff through extra tutorial help. Furthermore, through MOCHE and other international agencies/organizations, AREEO is sending a large number of its in-service staff outside the country for training at the PhD level. To improve the technical skills of its existing staff, AREEO organizes specialized training courses in Iran in collaboration with centers of excellence. At present, 207 staff members are studying for their PhD at national and foreign universities, and another 200 are enrolled for MS in national universities.

AREEO ARIs and Centers employ 1096 technicians and 3820 other support staff. The ratios of technicians and other support staff to researcher (0.7:1 and 2.3:1, respectively) are much under the general agreed upon standards (2 and 3–4, respectively).

A lot of improvement in research infrastructure, such as the construction of new offices, labs, greenhouses, and growth chambers during the last five years has taken place. The ARCs have modern buildings (labs, offices, greenhouses, growth chambers), a main research farm, and several AR research stations located in different agroecological regions of the province.

¹ The largest ARI is the Seed and Plant Improvement Institute (almost 600 graduate staff members), established in 1959. It has the following mandate: (i) improvement of field crops (winter and summer cereals, oilseed, vegetables, food legumes, forages) and horticultural plants for higher yield, quality, and resistance to biotic and abiotic stresses; (ii) developing improved production practices to realize higher production without damaging the resource base; (iii) conducting basic research (biotechnology, genetic manipulation) and providing technical backstopping to the AR Centers located in different ecological regions; and (iv) seed production and plant propagation. This Institute is playing a regional role (in West and Central Asia) by coordinating a wheat yellow rust network and by extending help and facilities in yellow rust monitoring and race identification.

² The major ARIs (SPII, PPDR, SWRI, DARI) are physically apart from each other.

³ The research projects of the AR Centers (ARCs) are reviewed and preliminarily approved at the provincial AR Council. Then, the approved projects are passed over to the relevant national ARI for technical review and approval. Finally, each research project is sent to the Research Coordination Committee (RCC) of AREEO for coordination at the national level and for ensuring its relevance to national and provincial research priorities. All research projects are financed and implemented only after the approval of RCC. The Bureau of Monitoring and Evaluation assesses and evaluates the ongoing research projects across the country. Members who review AREEO's research projects, together with the research team leaders concerned, are mainly distinguished university professors appointed by AREEO.

⁴ pRYs = Number of researchers × 85% (percentage of the graduate staff's time devoted to AR, mentioned above).

The 1996/97 total budget of AREEO totaled 124 billion Iranian rials (IR) (US\$ 41.3 million), including IR 4.2 billion (US\$ 1.3 million) allocated by NCSR to support research projects approved by its Agricultural Commission. AR expenditures are roughly estimated at IR 115 billion (US\$ 35 million), out of which around IR 75 billion are for salaries and IR 32 billion for operation and capital costs (OCC). The available OCC per graduate staff member amounts to IR 19.5 million (US\$ 6,500), which is relatively low and inadequate, and does not match the financial research needs of the country (see Section 4.3).

From 1990 to 1997, the AREEO government budget increased in accordance with the annual inflation rate; from 1997, the annual increase of the budget has been lower than the inflation rate.

Research Activities and Linkages

Most of the ARIs carry out applied and adaptive AR. The Soil and Water Research Institute (SWRI) provides information on the soil fertility status and balanced nutrient requirements of different crops and fruit trees in various ecological regions; it also provides information on crop water requirements and irrigation schedules of crops. The mono-crop institutes, such as rice and cotton, are carrying out studies on rice- or cotton-based cropping systems to solve the intricate and complex problems retarding the overall productivity, besides conducting research on other aspects of those crops. The Agricultural Engineering Research Institute (AERI) is conducting studies on irrigation systems in view of the agro-climatic diversity to make optimum use of scarce water resources.

Some emphasis has been given recently to basic research at the major ARIs. For example, the Seed and Plant Improvement Institute (SPII) has established a biotechnology department to conduct research on genetic transformation in major crops, genetic analysis, and transfer of desirable genes into desirable agronomic backgrounds. The cereal pathology section of the cereal department is conducting basic research on cereal rusts of wheat (race analysis, identification and isolation of new sources of resistance from wild species of wheat and their transfer to cultivated varieties) and providing backstopping to breeders. Similarly, the Dryland Agricultural Research Institute (DARI) is conducting basic research on mechanisms of abiotic (cold and heat) tolerance from the physiological, genetic and agronomic points of view, and on developing strategies to overcome these stresses and increase productivity.

Relations with extension and development are structurally organized to meet the national agricultural requirements. AR is directed towards developing a research strategy/plan to accomplish the production goals set in the national development plan by the Government.

AREEO has recently set up a growing network of international scientific relations. Relationships with the CGIAR and its International AR Centers (IARCs) were established from the very beginning of the creation of the CGIAR; they are currently very strong (scientific programs, human resource development, scientific exchange visits) with:

- ICARDA: The relationship with ICARDA, established from the day of its inception (one of the major research centers of ICARDA for high elevation areas was in Tabriz, Iran), is very strong and concerns the improvement of agricultural production in the dryland areas of Iran, covering commodity research on bread wheat, durum wheat, barley, chickpea, lentil, faba bean, pea, forage legumes, oilseed crops, natural-resource management, exchange of improved germplasm of ICARDA-mandated crops, and strengthening the research capacity (infrastructure). With the strengthening of AREEO, collaboration with ICARDA is moving to the level of partnership.
- CIMMYT (wheat, maize and triticale germplasm); IRRI (improved, high-yielding, better-quality varieties of rice; rice germplasm for resistance to salinity, blast and other insects); ICRISAT (germplasm lines of sorghum and chickpea; breeding and plant protection program under irrigated conditions and sharing marker-assisted characterization information); CIP (germplasm of potato; joint research projects in Iran for the establishment of a potato seed production unit and technical and organizational assistance for the creation of the best methods of seed tubers); IPGRI (transfer of technology and exchange of information in the field of plant genetic resources); and ISNAR (AR research policy and management).

Recently, in cooperation with ICARDA and CIMMYT, AREEO started providing assistance to the countries of West and Central Asia in the field of wheat rusts (disease monitoring, screening of regional germplasm against various races of rusts, etc.) and cold-tolerant wheat and barley germplasm.

2.2.2 The AR Institutes affiliated to the Ministry of Jihad Construction (MOJC)

Mandate and Organization

This Ministry, beside other activities, has been mandated to develop plans and research strategies for the sustainable use of natural resources and their conservation. MOJC operates through a Central Research Council which is responsible for project approval and formulation of research policies on animal sciences and natural resources (forestry, range, watershed management, soil conservation, fisheries). The MOJC Deputy Minister of Research and Training is

the Chairperson of the Central Research Council, with membership of directors of the relevant ARIs and some professors from the universities.

MOJC AR activities are carried out through seven ARIs in the fields of soil conservation and watershed management, forests and rangelands, animal sciences, serum and vaccine, and fisheries; a center for scientific information services, mentioned in [Table 2](#)¹; and a research center in each province which receives technical backstopping from the ARIs. It also has a Center for Scientific Information Services located in Tehran.

These ARIs account for about 44% of the pRYs and 48% of the total financial resources of the NARS. They are responsible for the promotion, coordination and implementation of research activities. Their main mandate is research, which mobilizes around 75% of the time of the scientific and technical graduate staff.

Human, Physical and Financial Resources

The MOJC ARIs have a total of 2055 graduate staff members, all national, who represent around 1576 pRYs (see [Table 2](#)). Among these graduate staff members, 119 and 698 are PhD and MS holders, respectively. To improve the technical and academic level of its staff, the policy followed by MOJC is very similar to that of MOA.

The number of technicians is 856 and that of support staff 3517. The ratios of technicians and other support staff to researcher (0.4:1 and 1.7:1, respectively) are also much under the general agreed upon standards.

The MOJC ARIs operate through their provincial research centers and a number of sub-stations, as well as pilot project areas, such as sand dune stabilization (Kashan) and water spreading and land reclamation (Fars). The ARIs and provincial research centers have very well-equipped laboratories and field facilities and are staffed with qualified personnel. Since MOJC is also responsible for natural-resource conservation, huge tracts of state land are at their disposal to carry out their natural-resource rehabilitation activities.

The 1996/97 total budget of the MOJC ARIs amounted to IR 166 billion (US\$ 55.3 million), including IR 6.3 billion (US\$ 2.1 million) allocated by NCSR to support the research projects approved by its Agricultural Commission. Around 70% of this budget is allocated to salaries and wages. Operation and capital costs (OCC) are estimated at US\$ 16.6 million, which represent US\$ 8,100 per graduate staff member, very insufficient to match the research needs.

Research Activities and Linkages

Research activities are concentrated on natural-resource (soil and water) conservation, watershed management, forest research, timber research, range management, animal sciences (breeding, nutrition, health, poultry), fisheries, rural development, and medicinal plants.

The linkages between various disciplines and institutions are not very strong. The transfer of technology and extension activities are carried out under another Deputy Minister within MOJC. There is a need for strong linkages between MOJC and the MOA institutions.

International cooperation is limited and developed mainly with two international AR centers: IWMI (implementation of a detailed program of joint research activities for sustainable and productive irrigation in Zayendeh Rood Basin, especially Roudasht area) and ICLARM (identification, prioritization and involvement of the necessary policy and strategy for fisheries).

2.2.3 The Other AR Institutions

¹ The major institute of MOJC is the Forest and Rangelands Research Institute (FRRI) which conducts research and studies on forests, rangeland species and medicinal plant species, with large attention given to *Spruce* sp., *Eucalyptus*, pine species, collection of forest and rangeland species, and *in situ* and *ex situ* conservation of genetic resources. Its mandate also includes research on technologies related to forest and rangeland products; support to national forest development programs in different ecological regions, such as Alborz and Zagros Mountains; and the maintenance of the Botanical Garden of Tehran and a national herbarium.

The second most important institute of MOJC is RSVRI, the oldest research institute in the country, which gained prestige and fame in this region due to its excellent work on production of vaccine and serum. This institute has four stations located in Shiraz, Mashhad, Tabriz and Ahvaz. It has strong collaborative links with the Ministry of Health in the production of several types of human vaccines and is the pioneer in integrating research with commercial production. It has strong collaboration with Merieux Institute, France.

These are the Research Institute for Agricultural Economics and Planning, the Tea Research Center, the Silk Worm Research Center, the Iran Desert Research Center, the College of Agriculture Research, and the Institute of Nutrition Sciences and Food Technology (see [Table 2](#)).

The Research Institute for Agricultural Economics and Planning (RIAEP) - This Institute, established in 1993 in Tehran within MOA, is directly affiliated to the Deputy Minister of Agriculture and not to AREEO. It is responsible for conducting research and studies in agricultural economics (land use and production, producer and input prices, investment policies, marketing/trade policies, farm income, etc.). Research represents about 60% of its activities. RIAEP currently employs 106 national permanent graduate staff members (5 PhD, 33 MS), who represent 64 pRYs, and national consultants, mainly from the universities. Its total 1997 budget amounted to IR 18 billion (US\$ 6 million); IR 7 billion for salaries and IR 11 billion for OCC (US\$ 34,000 per permanent graduate staff member).

The Tea Research Center (TRC) - TRC, established at Lahijan under MOA in 1975, has 40 graduate staff members (including 2 PhD and 8 MS). Its mandate includes tea improvement (quantity and quality) and processing technology.

The Silk Worm Research Center (SWRC) - This Center, established at Rasht under MOA in 1978, has 15 graduate staff members (8 of whom are MS holders) who conduct research on silviculture (mulberry tree) and silk technology.

The Iran Desert Research Center, University of Tehran - Established in 1975, this Center has 20 academic staff members (17 PhD, 3 MS) mainly involved in research related to desert ecology and its protection and desertification, with some training activities at the postgraduate level (PhD, MS). It has stations in Yazd and Semnan.

The College of Agriculture Research, Tehran - Established in 1990, it is run by the National Scientific and Industrial Research Organization (NSIRO) affiliated to MOCHE. Its 55 academic staff members (11 PhD, 40 MS) are also mainly involved in research (80%), with training at the MS level in collaboration with the colleges of agricultural sciences (CASs).

The Institute of Nutrition Sciences and Food Technology (NCRAM), Tehran - This Institute was created in 1990 by the Ministry of Health for conducting research on human nutrition and food technology. Eighty percent of its 22 graduate staff members (7 PhD, 10 MS) are specialized in food technology.

2.3 The Colleges of Agricultural Sciences (CASs)

Overview

Mandate and Organization

Iran has 19 colleges of agriculture (CAs) and 5 colleges of veterinary medicine (CVMs), designated later as CASs, which are under the governance of the Ministry of Culture and Higher Education (MOCHE) (see [Table 3](#)).

Teaching is their main mandate; research and extension activities are generally limited (see below). All CASs provide a BS program. Six CASs (CAs of Gilan, Chamran and Tabriz; CVMs of Mashhad, Ahvaz and Urumia) offer MS programs; and eight (CAs of Karaj, Ferdowssi-Mashhad, Tarbiat-Modaress, Shiraz and Isfahan; College of Natural Resources-Karaj; CVMs of Tehran and Shiraz) offer education up to the PhD level. Besides degree training, all the CASs offer specialized diploma courses from time to time.

Each CAS is usually affiliated to a university, which is headed by a president and supervised by the University Council. The Council, which is responsible for formulation of policies and monitoring university plans and activities, is chaired by the university president and made up of vice presidents (usually five: education, student affairs, research, graduate studies, and administration and finance vice presidents), deans of different colleges, and three university professors.

Each CAS is headed by a dean who is appointed by the university president and is generally assisted by five deputies (homologous to the five vice presidents of the university). The dean chairs the Faculty Council, which consists of deputies, heads of departments and two or three college professors.

All curricula of higher education (BS, MS, PhD) are studied and formulated by the High Council of Curriculum Planning (HCOCP) affiliated to MOCHE and chaired by the Minister. The Council has several specialized commissions, including one for agriculture. Members of the Commission of Agriculture, which represents all fields of agricultural sciences, are appointed by MOCHE from distinguished professors of the main agricultural colleges around the country.

Establishment of new educational departments and colleges is authorized only by MOCHE. There is a special board within MOCHE to review all applications, and authorization is issued after fulfillment of certain criteria by relevant universities and/or colleges.

Human, Physical and Financial Resources

The CASs have a total of 1555 academic staff members (asm), all national, including 597 PhD and 681 MS holders. The most important CASs are generally the oldest: the CAs of Tehran/Karaj (187 full-time asm) and Tabriz (103 asm), and the CVM of Tehran (111 asm). The CASs have 232 technicians and 2740 support staff.

At present, there are approximately 17,500 students enrolled in all the CASs (11.2 students per asm), including 2130 (87 females, 2016 males) preparing MS and 330 (of whom 6 are females) preparing PhD degrees. The average teacher to student ratio is 1:11.2, which varies between the different colleges; 1:10 (CA of Karaj) to 1:20 (CAs of Isfahan and Shiraz).

In 1997, the total budget allocated by the Government to the CASs amounted to about IR 54.1 billion (US\$ 17.8 million) out of which about IR 16 billion (US\$ 5.3 million) was spent on AR. The total OCC was estimated at about IR 8.7 billion (US\$ 2.9 million), which represents IR 5.6 million (less than US\$ 1,900) per academic staff member, which is far from meeting the training and research needs of the CASs.

Research Activities

Officially, the academic staff members allocate 80% of their time to teaching and 20% to research in the diverse fields of irrigation, soil science, horticulture, agronomy and plant breeding, plant pathology, animal science, agricultural machinery, fisheries, etc.

The involvement of the academic staff members (all categories) in AR is relatively low and restricted, primarily due to their heavy teaching workload and limited financial resources for research. Presently, their AR activities are heavily dependent on graduate students. MOA and MOCHE have recently developed closer cooperation to make use of the scientific manpower of the CASs. MOA is encouraging its ARIs to engage academic staff of the CASs in collaborative research. MOA is also funding special projects in specific disciplines (topics) which are important to agricultural production but not being tackled by the staff of the ARIs due to lack of or inadequate technical manpower. MOJC has also pursued similar policies to strengthen research collaboration with the CASs in areas of natural resources and animal sciences.

Until now there has been a shortage of highly qualified academic staff although the Government or the private sector created or upgraded several colleges to provide education on a large scale. The academic staff was encouraged through additional financial compensation to teach at more than one college. The incentive of increased income from teaching may have also, to some extent, distracted the academic staff from engaging in research. Although there is some weight given to research publications and research achievements, the time and resources needed to make reasonable achievements may not be commensurate with teaching benefits. Therefore, the average percentage of human and financial resources allocated to AR activities at the CASs is much less than 20%; 10% should be a more realistic ratio, which would mean that the CASs represent only around 150 actual RYs. However, in recent years, attempts have been made to encourage the university staff to work on high-priority research projects in relation to national agricultural development, especially through the research projects supported by NCSR.

2.4 The Other NARS Institutions

These “other NARS institutions” presented in Table 4 implement AR activities which generally cover a more or less small part of their mandate. They include scientific institutions and public agro-industrial enterprises.

The Other Scientific Institutions

Many other scientific institutions, especially faculties of sciences, civil engineering, and economics, have relatively large numbers of staff members highly qualified in AR-related scientific fields (natural resources, irrigation, plant and animal biology, oceanography and fisheries, agricultural engineering, food processing, agricultural social sciences). Since a precise inventory of this scientific potential is not available, only the Nuclear Research Center for Agriculture and Medicine and the Faculty of Environment, University of Tehran, are mentioned here.

The Nuclear Research Center for Agriculture and Medicine (NRCAM) - NRCAM was established by the Atomic Energy Organization at Karaj in 1988. Forty percent of its 22 staff members (7 PhD, 12 MS) are currently involved in AR (breeding, genetics, food conservation with the application of irradiation; use of isotopes).

The Faculty of Environment, University of Tehran - Established in 1973, it has 20 academic staff members (17 PhD, 3 MS) mainly mobilized by training (at the PhD, MS, and BS levels), with some AR activities related to natural resources (soil, water), rangelands, and desert wildlife and habitat.

The Public Agro-industrial Enterprises

Two public agro-industrial enterprises affiliated to the Ministry of Commerce run specialized research institutes: the Food Grain Organization and the Iranian Tobacco Company.

The Bread Research Institute (BRI), Food Grain Organization – BRI, established at Tehran in 1968, has 21 staff members (including 2 PhD and 4 MS) working (research–development) on bread technology.

The Tobacco Institute (TI), Iranian Tobacco Company – This old institute (created in 1937) has its center at Tirtash-Mazandran and stations at Shiraz, Fars, Urumia, and Rasht. Its 51 staff members (including 4 PhD and 10 MS) conduct research on tobacco improvement and technology.

3. AR RESOURCES

3.1 Human Resources (see Table 1)

More than 5600 scientists (all national except 5 expatriates) are working in the Iranian NARS and represent around 3610 pRYs. The agricultural research and training institutions employ around 96% of this total staff, where 66% work at the specialized ARIs run by AREEO and MOJC and 28% at the CASs. Among these two large categories of institutions, it is worth noting the large differences in the academic level of their scientists: the CASs have the largest number and proportion of the highest trained scientists (597 PhD holders, i.e., 38% of the academic staff at the CASs, and 74% of the PhD holders of the two sets of scientific institutions), while the specialized ARIs have only 212 PhD holders (about 4% of the total scientific and technical graduate staff).

Since 1990, the numbers of scientists with PhD and MS degrees have shown steady growth, and strong attention has been given in the last decade to upgrade the academic level of the scientists in all the NARS institutions. With the expansion of facilities for postgraduate studies leading to MS and PhD in the country, as well as training in reputed overseas universities, a substantial increase of human resources over a period of less than a decade has resulted, and is expected to expand very rapidly in the next five years, especially at the MOA and MOJC ARIs.

Until 1990, the majority of the scientists were located in and around Tehran and Karaj at SWRI, PPDRI, SPII, RSVRI, and some of the other ARIs. Most of the research work was also conducted at these institutes. The ARCs in different parts were primarily used as testing sites for the technology developed in or around Tehran. However, a strategic decision to decentralize the research activities to specific production zones resulted in the creation of several ARIs (Cotton, Rice, Pistachio, Date Palm, Dryland Research Institutes, etc.) as well as upgrading research infrastructure and facilities at a number of ARCs, subsequently resulting in the posting (sometimes relocation) of senior and qualified scientists to those locations. Efforts were and are still being made to recruit young scientists within the provinces to avoid causing disruption in families. Although it is still not the ideal situation, it is improving fast and within 2–3 years it is expected to reach a satisfactory level.

MOCHE also upgraded several universities around the country to offer MS or PhD degree training; considerable efforts have been made to upgrade the technical knowledge of academic staff by sending a large number of young staff members outside the country for PhD degree training.

There used to be a large discrepancy in the salaries and benefits of scientific staff working at the teaching institutions and the ARIs. The scientific staff members at the universities were better paid and enjoyed several other benefits. During the last few years, the Government has taken measures to minimize or reduce these differences, which include improving the academic qualifications of ARI staff and increasing salaries and benefits to be commensurate with qualifications (academic degree), scientific achievements, and publications.

At present, the MOA and MOJC ARIs and the MOCHE CASs employ around 3300 technicians and 12400 other support staff (clerks, laborers, etc.). As seen above, most of the NARS institutions suffer a large deficit of technicians, which may considerably reduce the efficiency of the scientists.

3.2 Physical Resources

The strategic decision to decentralize research into different production zones was accompanied with improving research infrastructure and facilities, equipment (lab and field), and scientific information and documentation facilities. For example, new ARCs buildings (laboratories, offices, greenhouses, etc.) were erected at Tabriz, Urumia, Mashhad, Isfahan, Shiraz, and Kermanshah. New institutes (Rice, Cotton, Pistachio, Date Palm and Dryland Research Institutes) were created in the suitable production areas. Huge investments were made to create farms and to secure technical staff for dryland research at Maragheh, Kermanshah, and Gachsaran. Efforts are still under way, not only to

further improve these facilities, but also to create additional facilities at other locations to cover the diverse agro-climatic areas for the purpose of developing more site-specific technologies to improve agricultural production in the harsher environments and preserve the natural resources.

The Government has taken special note of the degrading biodiversity in the country; therefore, it created several *in situ* conservation sites, such as Mian Jungle (crop plant diversity), Rafsanjan (pistachio), and others for other important horticultural (date palm, deciduous fruits, pomegranate, etc.) and crop plants. Basic research on studying the genetic drift, in collaboration with centers of excellence, has been initiated at these conservation sites.

Since agriculture and conservation of natural resources is on the top of the national priority list, there is no lax or complacent thinking on the part of policy makers. Therefore, a large amount of money is reserved annually to further improve AR facilities to meet the future needs of the country.

3.3 Financial Resources

The total AR financial resources of the NARS are about IR 296 billion (US\$ 98.7 million), including IR 20 billion (US\$ 6.7 million) provided by NCSR to support AR projects of national importance¹. Until now, almost the entire budget and funding are directly or indirectly provided by the Government. However, with the development of the private sector and cooperation with other national and international agencies, there is a scope of securing funds for AR projects. Therefore, efforts will be made to secure additional financial resources as well as develop collaboration with other agencies for integrating the entire AR system in the country.

The national AR expenditure represents 0.49% of agricultural gross domestic product (AGDP, estimated at US\$ 20 billion in 1996/97), which in actual terms represents more than one-third of the total research budget of the country. Such ratio has increased during the last decade, but still remains rather low compared with the 1% ratio recommended by some international organizations (World Bank, European Union, etc.). Further efforts are required to face the challenge of food self-sufficiency in the long term.

Areas of expenditure vary considerably between the NARS institutions; however, in most of the institutions salaries constitute the major portion of the budget (70 to 80% in the AREEO and MOJC ARIs) and the available OCCs are relatively low and inadequate for allowing satisfactory work conditions. In the AREEO and MOJC ARIs, OCC per graduate staff member amount to US\$ 6,500 and 8,100, respectively, which represent around US\$ 7,000 and 9,000 per pRY². Such numbers are much under the "optimal" amount of US\$ 25,000–30,000 per RY used in the long-term plans designed by many developing countries, which means that the AR scientific potential is currently far from being fully mobilized.

According to this last reference, the AREEO ARIs have roughly around 350 actual RYs (25% of its pRYs) and the MOJC ARIs around 520 actual RYs (33% of the pRYs). As seen in Section 2.3, the CASs are facing a similar situation; they represent only 150 actual RYs (instead of 389 pRYs). Most of the other NARS institutions are in a similar position in terms of underemployment of their research potential³. Therefore, the NARS may roughly mobilize a rounded total of 1,100 actual RYs, as opposed to the 3,610 pRYs estimated above.

4. RESEARCH ACTIVITIES

4.1 Research Orientation

In the AREEO ARIs, research emphasis is mostly on breeding of different commodities and germplasm enhancement for maximum yield. Recently, research for enhancing crop tolerance to biotic and abiotic stresses has been emphasized and facilities have been developed for the different types of research.

¹ In 1998, about 99% of these NCSR funds were shared between MOCHE, MOA and MOJC (45% to MOCHE, 21% to AREEO, 32% to MOJC, and 2% to others).

² The numbers of pRYs are smaller than the number of graduate staff members, and part of the OCC is allocated to activities other than research (see note in [Table 2](#) related to the procedure followed for estimating the AR financial resources of the ARIs).

³ For the NARS institutions presented in Sections 2.2.3 and 2.4, under the assumption that 70 to 80% of their AR budget (IR 25 million) is allocated to salaries, the total OCC would amount to around IR 6.3 billion, i.e., US\$ 2.1 million for 248 pRYs or US\$ 8,500 per pRY, and the actual RYs would represent 31% of the pRYs and amount to around 80 aRYs.

Also, due to environmental degradation by application of pesticides and excessive and improper use of chemical fertilizers, research on integrated pest management (IPM), optimum use of fertilizers, and efficient use of water resources has been given high priority.

Rainfed farming systems play an important role in agricultural production. Therefore, in the last three years, a great deal of emphasis has been placed on the development of resource infrastructure on dryland farming systems.

In the MOJC ARIs, land degradation (water and wind erosion, salinization of some irrigated land, desertification, deforestation, etc.) receives high attention, as it is an acute problem in the development of agricultural production and sustainable use of natural resources. The Government has placed considerable emphasis on research as well as on implementation of watershed management projects, particularly in the Zagros Mountain region.

In addition, in MOJC, livestock nutrition, animal breeding and health research activities have been greatly enhanced, and appropriate human resources and funds have been allocated to these activities. Fisheries research has also been greatly developed and given priority.

For the future, it is planned to:

- Pay greater attention to research related to biodiversity and conservation of the agricultural resource-base and optimization of inputs with greater attention to matters related to exportable horticultural crops, vegetables, oilseed crops, industrial and ornamental plants, flowers, medicinal crops, post harvest technology and socioeconomics.
- Strengthen research related to sustainable agriculture, such as soil and water management, range management, agro-forestry, utilization of crops tolerant to biotic and abiotic stresses (diseases, drought, cold, salinity), IPM, fisheries, livestock management, and optimum utilization of agricultural inputs, namely, fertilizers and pesticides.
- Formulate research policies and strategies and set research priorities for long-term (25 years) development.

4.2 National Linkages

Although the research establishments of MOA and MOJC are autonomous within the relevant ministries, there exists a reasonably close relationship between the ARIs and the executive branches of ministries and development agencies. Until recently, research priorities were not strongly reflected in the National Development Program due to other pressing national needs. However, great strides have been taken to direct AR to the needs of agricultural development of the country.

In MOA and MOJC, extension activities are actually incorporated within the same organization which is responsible for research. However, there is a lack of satisfactory communication and coordination between extension and research scientists to implement the research findings under farmers' field conditions. For instance, AREEO scientists are encouraged to implement research-extension field trials in cooperation with extension specialists and with active presence of farmers and fruit producers, whereas in the case of universities, there is no such mechanism for technology transfer.

For the future, recommendations have been made for:

- Strengthening cooperation between MOA and MOJC with the universities for the implementation of multipurpose research and strategies.
- Providing adequate incentives to the private sector and NGOs for their active investments and participation in the NARS.
- Strengthening relations with the extension sector for the transfer of knowledge and technology from the research institutions and universities with active participation of farmers and producers.

4.3 International Scientific Collaboration

International linkages are currently globally limited. They consist mainly of cooperative and collaborative relations, essentially with a number of International AR Centers (IARCs), and are implemented by the AREEO ARIs (relations with ICARDA, CIMMYT, ICRISAT, IRRI, CIP, IPGRI, and ISNAR) and the MOJC ARIs (relations with IWMI and ICLARM).

5. CONCLUSION

The strength of the Iranian NARS lies in its vast extensive network of AR centers and research stations in different agroecological zones. The richness of biodiversity in the major crops, horticultural plants, and livestock is universally recognized, which has provided a solid base to researchers/scientists, not only in Iran, but also in other parts of the world. There is no major financial constraint because of the solid national commitment to improving agricultural production. Due to the vastness of the country and enormous agro-climatic diversity, scientists have the opportunity to conduct research on any commodity/discipline all year round.

Due to the concentration of AR institutions in and around Tehran until recently, the desired impact of research discoveries or new technologies could not be significantly made or felt at the national level. The decentralization of AR activities is relatively new; therefore, the problem of cooperation and coordination among various research centers will have to be tackled carefully. Although, theoretically, the channels and mechanisms of cooperation and coordination have been defined among the different ministries (MOA, MOJC, MOCHE, MOC, MOH) and their ARIs, a lot still needs to be done to break the institutional, and, sometimes, human, barriers. Though some of the institutional walls are crumbling, developing multi-institutional and multidisciplinary research activities and sharing research and achievements will take a little time to overcome the existing situation.

There is also a need to develop farming and cropping systems-based research. Mono-crop institutes have to be brought in line with the farming system-based research. The integration of research by various ARIs, and a coordinated approach for transfer of technology will become more important.

International linkages are limited and need to be improved.

Main Acronyms

MOA: Ministry of Agriculture. **MOCHE:** Ministry of Culture and Higher Education. **MOJC:** Ministry of Jihad Construction. **MOC:** Ministry of Commerce. **MOH:** Ministry of Health. **AREEO:** Agricultural Research, Education and Extension Organization.

CAS: College of Agricultural Sciences.

Main References

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Table 1 - The National Agricultural Research System (1997/98)

Italics: Approximate data. *: See footnotes.

NARS Institutions				AR Scientif. & Technic. Graduate Staff (Units)			AR Potential Res. Years		Total National Budget (Billion IR)*	National AR Expend/Res. (Billion IR)*	
No.	Name - Acronym Head Office - Year Established		Mandates AR Fields	Govern. Ministry	Nationals Total - (PhD, MS)		Exp.	Nat.			Exp.
a	b		c	d	e	f	g	h	i	j	k
2.1	12 AREEO Ag. Res. Institutes Tehran, Karaj, etc. (see Table 2.A)	AREEO 1937-94	AR (85%) - (AD) Crops, fruit, ...	MOA	1639	88 , 634	5	1394	5	124	114
2.2	7 MOJC Ag. Res. Institutes Tehran, Karaj, etc. (see Table 2.B)	1926-93	AR (75%) - (AD) Forest, an. prod., fish,...	MOJC	2055	119 , 698		1576		166	141
2.3	Other AR Institutes (see Table 2.C)		AR - (AD) Diverse	MOA, ...	255	28 , 99		183		29	21
2	Total AR Institutes				3949	235 , 1431	5	3153	5	319	276
3.1	19 MOCHE Colleges of Agriculture Tehran, etc. (see Table 3.A)	Cas 1926-88	AHE - (AR) All	MOCHE	1286	471 , 573		322*		46	14
3.2	5 MOCHE Colleges of Veterinary Medicine Tehran, etc. (see Table 3.B)	CVMs 1935-...	AHE - (AR) Anim. prod./health	MOCHE	269	126 , 108		67*		8	2
3	Total Agr. Sciences Colleges				1555	597 , 681	0	389	0	54	16
4	Total Other Institutions (see Table 4)				114	30 , 29	0	63	0	7	4
5	Total NARS				5618	864 , 2151	5	3605	5	380	296
Exchange Rate: US\$ 1 = IR 3000; IR 1000 = US\$ 0.33 (1997 average rate)					Actual Research Years (aRYs) (Estimate) -->			1100		AR Expend. (US\$ Million) - >	98.7

MOA: Ministry of Agriculture; **MOCHE:** Min. of Culture and Higher Education; **MOJC:** Min. of Jihad Construction; **MOC:** Min. of Commerce; **MOH:** Min. of Health; **AREEO:** Ag. Research, Education and Extension Organization.

c: Mandates: AR (. %): Approximate average % of human resources devoted to ag. research (AR); **R:** Research; **AHE:** Ag. higher education; **AD:** Ag. development/services (for AR and AHE institutes: seed production, soil and water analysis, extension, studies, etc.). **h, i:** Potential research year (pRY) = equivalent full-time researcher; for the FASs, the pRYs have been estimated by multiplying the number of academic staff by 0.25. **k** For the AR institutes, AR financial resources have been roughly estimated through the following formula: Total budget × [ω + 0.5(100% - ω)], ω being the % of time devoted to AR by the graduate staff.

* **Notes: j, k** All financial resources are national.

National/Total AR expenditures = **0.49%** of the AGDP (US\$ 20 billion in 1996).

Table 2 - The Agricultural Research Institutes

Italics: Approximate data.

Agricultural Research Institutes (RI)				Scientific & Technical Graduate Staff (Units)		AR Potential Res. Years		Total Budget* (billion IR)	AR Expend./Res.* (billion IR)		
No.	Name - Acronym Head Office - Year Established	Mandates AR (%)* - AR areas		National Total - (PhD , MS)	Exp.	Nat.	Exp.	Nat.	Total TE		
1	Soil and Water RI - Tehran	SWRI - 1966	90	Soil, water manag.	298	10 , 135		268	16.7	15.9	
2	Seed and Plant Improvement Inst. - Karaj	SPRI - 1959	85	Plant breeding	598	18 , 155	2	508	35.7	33	
3	Sugar Beet RI - Karaj	SBRI - 1937	85	Sugar Beet	75	4 , 35		64	5.3	4.9	
4	Rice RI - Rasht	RRI - 1993	90	Rice	62	2 , 25		56	3.6	3.4	
5	Pistachio RI - Rafsanjan	PRI - 1992	90	Pistachio	27	2 , 10		24	1.4	1.3	
6	Date Palm RI - Ahwaz	DPRI - 1994	90	Date palm	24	0 , 15		21	1.7	1.6	
7	Citrus RI - Ramsar	CRI - 1992	90	Citrus	26	1 , 12		23	1.3	1.2	
8	Dryland Agricultural RI - Maragheh	DARI - 1991	85	For./pastu., cereals, legum.	73	1 , 25	1	62	8.2	7.6	
9	Plant Pests & Diseases RI - Tehran	PPDRI - 1962	90	Crop protection	262	35 , 125	2	236	14.9	14.2	
10	Agricultural Engineering RI - Karaj	AERI - 1988	90	Ag. engineering	90	3 , 55		81	7.1	6.7	
11	Agricultural Economic Res. Bureau - Tehran	AERB - 1985	90	Ag. economics	24	2 , 14		21	0.5	0.5	
12	Cotton Research Institute -Gorgan	CRI-1996	90	Cotton	35	3 , 13		30	1.3	1.2	
13	Agricult. Res., Educat. and Extens. Organ. - Tehran	AREEO - 1975/90	90	AR management	45	7 , 15			26	23	
A	Total AREEO/MOA Institutes				1639	88 , 634	5	1394	5	123.7	114.3
1	Soil Cons. & Watershed Manag. RI - Karaj	SCWMRI - 1993	70	Watersheds	193	19 , 67		135	65.7	55.8	
2	Forest and Rangelands RI - Tehran	FRRI -1968	85	Forest, rangelands	544	30 , 184		462	29	26.8	
3	Animal Science RI - Karaj	ASRI - 1933	85	Animal productions	268	15 , 73		228	17.2	15.9	
4	Razi Serum & Vaccine RI - Karaj	RSVRI -1925	65	Animal health	306	17 , 200		200	21.9	14.2	
5	Fisheries Res. and Training Inst. - Tehran	FRTI - 1990	80	Fisheries	314	21 , 58		251	16	14.4	
6	Natural Res. & Anim. Sc. Engineer. RI -Tehran	NRAERI - 1983	70	Ag. engineering	322	10 , 65		225	12	10.2	
7	Rural RI - Tehran	RRI - 1984	90	Rural economics	83	7 , 41		75	1.4	1.3	
8	Center for Scientific Information Services - Tehran	CSIS - 1993	90	Ag. documentation	25	0 , 10			2.5	2	
B	Total MOJC Institutes				2055	119 , 698	0	1576	0	165.7	140.6
1	Res. Institute for Agric. Economics and Planning	(MOA) - 1993	60	Ag. economics	106	5 , 33		64	18	11	
2	Tea Research Center - Lahijan (Gilan)	(MOA) TRC - 1995	80	Tea (crop, processing)	40	2 , 8		32	1.5	1.3	
3	Silk Worm Research Center - Rasht	(MOA) SWRC - 1978	70	Mulberry tree, silk worm	15	0 , 8		11	1	0.8	
4	Iran Desert Res. Center, Univ. of Tehran - Tehran	(MOCHE) - 1975	85	Desert ecology	17	3 , 10		14	2.9	2.7	
5	College of Agriculture Research (NSIRO) - Tehran	(MOCHE) - 1990	80	Agriculture	55	11 , 40		44	4	3.6	
4	Inst. of Nutrition Sc. & Food Technology - Tehran	(MOH) - 1990	80	Food technology	22	7 , 10		18	2	1.6	
C	Total Other AR Institutes				255	28 , 99	0	183	0	29.4	21.1

* Mandates: AR (%) = Approximate % of time of the graduate staff devoted to AR. All the financial resources are national. The AR financial resources of the AR institutes were roughly estimated through the following formula: Total budget × [ω + 0.5(100% - ω)], ω being the % of time devoted to AR by the graduate staff, except for the ARIs involved in animal health and agroecconomics (see Chapter 3: Methodology Used in Preparing the Monographs).

Table 3 - The MOCHE* Colleges of Agricultural Sciences (1996/97)

* MOCHE: Ministry of Culture and Higher Education.
Note: All human and financial resources are national.

No.	Agricultural and Veterinary Colleges			Scientific & Technical Graduate Staff (Units)		Total Budget (billion IR)
	Name Head Office - Year Established	Degree	Total - (PhD, MS)	Total - (PhD, MS)		
3.1	College of Agriculture/Univ. of Tehran/Karaj - Tehran	1926	BS/MS/PhD	187	69, 67	7.4
3.2	College of Natural Resources/Univ. of Tehran/Karaj - Tehran	1963	BS/MS/PhD	42	30, 10	1.4
3.3	College of Agriculture/Univ. of Ferdowssi - Mashhad	1973	BS/MS/PhD	120	35, 65	3.2
3.4	College of Agriculture/Univ. of Tarbiat - Modares - Tehran	1982	BS/MS/PhD	39	27, 12	1.2
3.5	College of Agriculture/Univ. of Gilan - Rasht	1977	BS/MS	45	10, 24	2.4
3.6	College of Agriculture/Univ. of Shiraz - Shiraz	1955	BS/MS/PhD	79	42, 18	3.1
3.7	College of Agriculture/Univ. of Tabriz - Tabriz	1955	BS/MS	103	46, 36	3.9
3.8	College of Agriculture/Univ. of Technology - Isfahan	1979	BS/MS/PhD	89	41, 27	3
3.9	College of Agriculture/Univ. of Chamran - Ahvaz	1955	BS/MS	67	24, 31	2
3.10	College of Agriculture/Univ. of Zanjan - Zanjan	1974	BS	59	16, 31	1.5
3.11	College of Agriculture/Univ. of Bouali-Sina - Hamedan	1984	BS	41	10, 21	1
3.12	College of Agriculture/Univ. of Mazandaran - Sari	1988	BS	72	25, 40	1.9
3.13	College of Agriculture/Univ. of Urumia - Urumia	1955	BS	68	27, 31	2
3.14	College of Agriculture/Univ. of Bahonar - Kerman	1983	BS	37	7, 18	0.9
3.15	College of Agriculture/Univ. of Gorgan - Gorgan	1968	BS	90	23, 67	5.9
3.16	College of Agriculture/Univ. of Razi - Kermanshah	1983	BS	23	7, 16	1.2
3.17	College of Agriculture/Univ. of Shahre - Kord	1977	BS	26	4, 19	0.8
3.18	College of Agriculture of Ramin - Ahwaz	1956	BS	49	13, 18	1.8
3.19	College of Agriculture of AbuRayhan - Varamin	1972	BS	50	15, 22	1.9
3.A	Sub-total MOCHE Colleges of Agriculture			1286	471, 573	46.5
3.20	College of Veterinary Med./Univ. of Tehran - Tehran	1933	BS/MS/PhD	111	62, 26	3.4
3.21	College of Veterinary Med./Univ. of Ferdowssi - Mashhad	1973	BS/MS	28	13, 11	0.7
3.22	College of Veterinary Med./Univ. of Chamran - Ahvaz	1955	BS/MS	36	8, 23	0.9
3.23	College of Veterinary Med./Univ. of Urumia - Urumia	1965	BS/MS	44	18, 26	1.1
3.24	College of Veterinary Med./Univ. of Shiraz - Shiraz	BS/MS/PhD	50	25, 22	1.5
3.B	Sub-total MOCHE Colleges of Veterinary Medicine			269	126, 108	7.6
3	Total Agricultural Sciences Colleges (3.A + 3.B)			1555	597, 681	54.1

Table 4 - The Other Institutions (1997)

Italics: Approximate data. Note: All human and financial resources are national.

No.	Name – Acronym Head Office - Year Established	Mandates AR (%)* - AR areas	Govern. Min.	Scient. & Techn. Graduate Staff Total - (PhD, MS)	AR Potential Res. Years	Total Budget (billion IR)	AR Budget (billion IR)
1	Nuclear Res. Cent. for Agric. and Medicine Karaj NCRAM 1988	40 Ag. biology	AEO*	22 7, 12	9	2	0.8
2	Faculty of Environ. - Univ. of Tehran Tehran 1973	25 Soil, water, range	MOCHE	20 17, 3	5	2	0.5
3	Iranian Cereal Res. Inst. (State Grain Organ.) Tehran ICRI 1968	45 Cereal technology	MOC	21 2, 4	9	1	0.7
4	Iranian Tobacco Institute (Iran. Tob. Comp.) Tirtash - Mazandaran ITI 1937	80 Tobacco (crop, processing)	MOC	51 4, 10	40	2.2	2
C	Total Other Institutions			114 30, 29	63	7.2	4

* AEO: Atomic Energy Organization. MOCHE: Min. of Culture and Higher Education. MOC: Min. of Commerce.