

Growth and Development of Agricultural Education, Research, and Libraries in India

K.P. Singh

Dept of Library and Information Science, University of Delhi, Delhi-110 007
E-mail: singhkp_1972@yahoo.co.in

ABSTRACT

Agriculture in India, since ancient times, is the most crucial sector for ensuring food and nutritional security, sustainable development and for the alleviation of poverty. It is the key sector in India for generating employment opportunities for the vast majority of the population particularly in rural areas. The paper aims to explore the many facets related to agricultural education, research, training, and libraries in India in order to provide a historical account on these aspects. The paper discusses in detail the various committees and commissions and their salient recommendations leading to the expansive growth and development of agricultural education, research, and libraries in India. Further, the paper also highlights the critical role of the Indian Council of Agricultural Research in the growth and development of agricultural education, research, extension, and libraries.

Keywords: Agricultural education, agricultural research, ICAR, agricultural libraries, Indian agricultural libraries, Indian Council of Agricultural Research

1. INTRODUCTION

In the growth and development of a society, the human resources certainly play a predominant role. Education is the single most important factor to develop human resources of a country. The constitution of India makes higher education as the responsibility of the centre as well as of the state. However, the co-ordination, monitoring, and implementation of the standards in the institutions of higher education, research, and information support system are exclusive responsibility of the Centre and its agencies. In view of the above, to implement all these rules and regulations in the higher education and research in Indian institutions, the Government of India, by an Act of Parliament, established a statutory body in 1956 known as the University Grants Commission (UGC). The major objectives of the UGC are to undertake, in consultation with universities and other similar bodies, to take essential steps for the encouragement and synchronisation of higher education in India.

The UGC is also empowered to cater to the financial requirements, allocation, and disbursement of grants, recommend measures for improving standards and ensure the follow-up with the institutions of higher education in the country. Till early sixties, the UGC was discharging all these responsibilities for higher

agricultural education and research in India as most of the institutions were associated to general universities. After the reorganisation of the Indian Council of Agricultural Research (ICAR) and the creation of the Department of Agricultural Research and Education (DARE) under Ministry of Agriculture, Government of India, the responsibilities for higher agricultural education, research, extension, and libraries in the entire field of agricultural sciences including veterinary sciences were transferred to the ICAR in 1965¹. Since then, the ICAR has been playing a catalytic role in the field of education, research, extension pertaining to all aspects of agricultural sciences and making India self-reliant, hunger-free, and food-secure.

2. HISTORY OF AGRICULTURAL EDUCATION AND RESEARCH IN INDIA

Agricultural education forms the foundation for the development of requisite manpower for research, education, training, and transfer of technology to the field and extension activities throughout the country. After India gained its Independence from the British, it has recorded a considerable progress in the field of agricultural education and research due to the able leadership and priority for agriculture². There are enough historical evidences, to show that the agricultural education existed

in India even during the medieval period. Agriculture as a discipline was included in the curricula of Nalanda and Takshila which were one of the most well known ancient universities of country². India has always been an agricultural-based country, where the agriculture education and research has had a great significance in the sustainable growth and development of human resources for the agricultural sector. Subsequently, well-organised and structured courses in agricultural education commenced in the beginning of the 20th century, when six agricultural colleges were established across country, notably some of these colleges are College of Agriculture, Kanpur (Uttar Pradesh), Lyallpur (Now in Pakistan), Coimbatore (Tamilnadu), Nagpur and Pune (Maharashtra) in 1905 and 1907 and Sabour (Bihar) in 1908³.

Thereafter several other colleges were established throughout the country for agriculture education and research. These colleges were under the direct control of the State Departments of Agriculture and Animal Husbandry and were involved only in teaching activities³. The establishment of Imperial Agricultural Research Institute in 1905 at Pusa (Bihar) now famous as Indian Agricultural Research Institute (IARI) at Delhi since 1936 was a pioneer and a landmark institute in agriculture education and research in the country. The IARI is the country's premier national institute for agricultural research, education, and extension. It has the status of a Deemed-to-be-University under the UGC Act of 1956⁴. After independence, the Government of India appointed an Education Commission under the Chairmanship of Dr S Radhakrishnan in 1948. Similarly, the Agricultural University Committee was also established in 1960. Based on the recommendations of these two Commissions, the first state agricultural university (SAU) came into existence at Pant Nagar in Uttar Pradesh in 1960, now in Uttarakhand, on the pattern of the Land Grants College, USA. This was followed by the establishment of at least one SAU in each major state of the country³.

2.1 Agricultural Education and Research before Independence

The base of the Indian economy despite some remarkable progress in the field of industry during the British period even till today remains predominantly on the agricultural sector. It was estimated that nine out of ten bread earners in India were engaged in agriculture to earn their livelihood. Even with the lapse of time, when industries started developing in India and people in large number starting seeking employment therein, the number of people dependent on agriculture did not decrease. This fact is indicative from Table 1 showing a significant dependence of Indian population on agriculture before independence.

Table 1. Population depending on agriculture, 1901-1941²

Year	Working population dependent on agriculture (%)
1901	66.0
1921	72.0
1931	74.4
1941	74.0

Further, with regard to the dependence of the work force on agriculture before Independence, the words of the Auxiliary Committee Review are worth mentioning, "The problem of mass education in British India was predominately a rural problem. Only 29.9 per cent of the population of 247 millions lived in towns as compared with 79 per cent in England, 51 per cent in USA, 42.2 per cent in France and 46.5 per cent in Germany. In British India, 74.4 per cent of the population was dependent on agriculture"⁵.

Agricultural education before Independence suffered from a serious set-back due to political reasons and it was also a fact that Britishers', wherever they ruled, somehow could not develop the agricultural education system in India. Although the British Government from time to time set up many Commissions and Committees for improving the agriculture and agricultural education in India, yet they could not reach the grass roots level due to lack of interest in enhancing the agricultural education at every level, be it school, college, or university⁶.

2.1.1 Famine Commission Report (1880)

The Famine Commission Report (1880) was the first report which draws the attention of the Government to the need of agricultural education and research. After examining the famine conditions and its impact on the country, particularly in the rural areas, the Commission recommended that improved agricultural practices should be the mainstay for obtaining food security against such natural disasters. The Commission also recommended that agricultural laboratories should be established in each province for any kind of agricultural enquiry, improvement, and famine relief³.

2.1.2 Dr J.A. Voelcker's Report on Improvement of Indian Agriculture (1891)

The need of an agricultural chemist was felt due to the large tracts of fallow land in the North-West Provinces (presently in Uttar Pradesh) which were infected with noxious chemicals, and it was thought that chemical sciences might aid in reclaiming these lands. In 1889, the Secretary of State (England) expressed his willingness to send a competent agricultural chemist, who could make enquiries on the Indian agriculture and advice upon the best course to be adapted for:

- (a) Applying the agricultural chemistry to Indian agriculture

(b) To effect improvement in the Indian agriculture

Dr John Augustus Voelcker, a Consulting Chemist of the Royal Agricultural Society of England arrived in India in 1889 toured all over the country meeting representatives of all provinces and recorded his achievements in his famous book entitled, 'Improvement of Indian Agriculture'³.

2.1.3 Establishment Of Agricultural Colleges (1905)

With an annual grant of Rs. 2 million, it was decided to establish in each important province, an agricultural college and a research station adequately equipped with modernised laboratories, class rooms and an agriculture farm. These were established at Coimbatore (1906), Kanpur (1906), Lyallpur (1906), Poona (1907), Nagpur (1907), and Sabour (1908) with a mission to develop education and research in the areas of agriculture such as Botany, Chemistry, Entomology, and Agronomy. These colleges offered diploma/certificate courses in agricultural sciences. Later the degree level was introduced and these colleges were affiliated to general universities¹.

2.2 Agricultural Education and Research after Independence

Soon after Independence, an emergent need of bringing about a rapid increase in food grains production necessitated a re-examination of the existing pattern of agricultural education and research in the country. For achieving quick benefits from new agricultural technologies, closer linkages between research, extension, and teaching programmes were considered to be important. It was also realised that achieving all these objectives was not possible under the general university system. Therefore, a network of education, research and extension was sought to respond to the diverse needs of different production systems, which concentrated on the agro-climatic situations and the socio-economic conditions of the farmers. This location and situation specificity of agriculture led to the setting up of one agricultural university in each state of the country³.

2.2.1 University Education Commission (1949)

In 1948-49, the University Education Commission under the Chairmanship of Dr S. Radhakrishnan recommended that a system of rural universities be established to supply skilled persons that would be needed by the country and to meet the requirements of an educated citizenship on the pattern of Land Grants College of USA. The Commission observed, "A new beginning is desirable, with freedom to create a distinctive tradition as to purposes, spirit and methods"³. The Commission in general terms mentioned principal features of the proposed rural universities. A rural

university should include a ring of small residential undergraduate colleges, with specialised and university facilities in the centre. While the need for a common core of liberal education in the basic sciences and social sciences was recognised, it was stressed that the curriculum should fit the needs of individual students and should provide for specialisation and selection of courses from more than one college. Each rural university should be autonomous and free to work out in its own way, in terms of syllabi, curricula, examinations and discharging all academic works³.

2.2.2 First Joint Indo-American Team (1955)

The first Joint Indo-American team was set up on the advice of Dr Frank W. Parker, an Adviser to the Ministry of Food and Agriculture, Government of India. The team had a total of eight members, five Indian and three Americans. The Indian members of the team visited the US from January to March 1955, while the American team members came to India in July 1955. The team approved the recommendations of the University Education Commission that wherever possible, each State should develop a rural university and initially Uttar Pradesh (Tarai), West Bengal (Haringhatta), Bihar (Patna), Orissa (Bubaneswar), Travancore (Cochin), and Bombay State (Anand) were identified for establishment of agriculture universities to cater the requirements of education and research. They suggested that the Government of India should start post graduate (PG) teaching IARI and Indian Veterinary Research Institute (IVRI)³.

2.2.3 Hannah's Blueprint on Agricultural Universities (1956)

The work of this team was greatly facilitated by a blueprint on agricultural universities prepared by the H.W. Hannah in 1956. On the basis of this blueprint, the Uttar Pradesh Government submitted a proposal to the Government of India in September 1956 to establish an agricultural university at Rudrapur in Tarai, now known as Pant Nagar. The Government of India agreed to the setting up of the agricultural university in Tarai only as an experimental measure in the second Five Year Plan (1957-1961). However, there were demands from many more states for such universities, and in 1961 the Government of India accepted the need for a few more of these kinds of universities during the third Plan Period (1962-1967) and suggested that the existing colleges/institutions, which had strong departments for teaching and research in agriculture, should serve as the nuclei for such universities³.

2.2.4 Report of Education Commission (1964-66)

The profound impact that the scheme of agricultural universities made on policy-makers is evident from the

report of the Higher Education Commission (1964-66), headed by Professor D.S. Kothari, the then Chairman of UGC. The Commission recommended the establishment of at least one agricultural university in each state. It further recommended that all aspects of research on agriculture should be the concern of the agricultural universities. The implementation of these recommendations further widened the area under the control of these universities. It further led to the integration of teaching, research and extension education activities where it did not exist. The Commission also observed that an agricultural university provides a better environment for research than a state department of agriculture³.

2.2.5 Report of Review Committee on Agricultural Universities (1977-78)

The ICAR set up a Review Committee in January 1977, under the chairmanship of Dr M.S. Swaminathan, Father of Green Revolution in India. The main objective of this Review Committee was to review the growth and development of agricultural universities in India. The Committee submitted its comprehensive report in June 1978. The Committee's overall assessment was that the agricultural universities together had made a tremendous impact on the agricultural production during the short span of their existence. The Committee, however, stated that there was a high degree of variation amongst agricultural universities in achievement and output, quality of leadership and competence of faculty, the degree of institutional development and maturity, the magnitude of financial support from the state governments, extent of transfer of research responsibilities to the university, quality and relevance of teaching and research programmes, operational efficiency, and commitment to public service. The quality of leadership, degree of commitment and support from the State Government had been identified as the major factors responsible for this variability in the vertical growth, performance and potential.

3. PRESENT STATUS OF AGRICULTURAL EDUCATION AND RESEARCH IN INDIA

The journey of agricultural education and research started with the establishment of only 17 agricultural colleges, three veterinary colleges and one agricultural engineering college in 1950. The National Agricultural Education System (NAES) under the control of ICAR, New Delhi is the largest network of agricultural education and research in the whole world. It comprises of SAUs and their constituent colleges and the research institutes partially funded and controlled by ICAR, which impart education, research and extension in all fields of agriculture science and technology and their allied fields.

At present there are 210 constituent colleges of 44 SAUs and one central agricultural university (CAU), 5

deemed-to-be-universities (DUs), 17 national research centres (NRC), 50 central research institutes (CRI), 6 national bureaus (NBs), 25 project directorates (PDs) and 78 All India Coordinate Research Projects (AICRP) all functioning under the control of ICAR⁷. This can be viewed from the Table 2. In addition, the Faculty of Education Banaras Hindu University (BHU); Varanasi; Aligarh Muslim University (AMU); Aligarh; Shanti Niketan Kolkatta (WB) about 50 agricultural colleges affiliated to 16 general universities, and 7 Indian Institutes of Technology (IIT) are also imparting education and research in agriculture science and technology.

Table 2. Agricultural research and education system (ARES) in India⁸

1. State Agricultural Universities (SAUs)	44
2. Central Agriculture University (CAU), Imphal (Manipur)	01
3. Deemed-to-be-Universities (DU)	05
4. National Research Centres (NRC)	17
5. ICAR Institutes	50
6. National Bureaus (NB)	06
7. Project Directorates (PD)	25
8. All India Coordinate Research Projects (AICRP)	78
Total	227

3.1 State-wise Distribution of ICAR's Research & Education

The ICAR is the national apex organisation of the country for imparting graduate to doctoral education in the entire domain of agricultural sciences and technology. It consists of a variety of institutions, which are located in 27 states of the country. The entire network of the ICAR research and educational institutions with their numbers is shown through the given Table 3.

3.2 Indian Council of Agricultural Research

The Government of India appointed a Royal Commission on Agriculture in 1926 headed by Lord Linlithgow (who later on became the Viceroy of India and served 1936 to 1943) to examine the conditions of agriculture and rural economy in India. The Commission recognised the significance of agricultural education and research and stated that the foundation of all agricultural progress is only practical and experimental. Therefore, the Commission proposed that the Imperial Council of Agricultural Research should be constituted, the primary function of which would be to promote, guide, and coordinate agriculture research and education throughout India. Subsequently, the Royal Commission on Agriculture decided to setup the Imperial Council of Agricultural Research by their resolution, Simla dated, 23 May 1929 at Delhi¹⁰. The Government of India considered the recommendations of the Royal Commission and decided to set up the Imperial Council of Agricultural Research as a Society registered under the Societies

Table 3. State-wise distribution of the ICAR agricultural research & education system

S. No.	Name of the state				Number and type of the institutes					Total
		SAUs	DUs	CAU	NRC	ICAR Institute	NB	PD	ICRP	
1.	Anadaman and Nicobar	-	-	-	-	1	-	-	-	01
2.	Andra Pradesh	3	-	-	1	3	-	5	8	20
3.	Arunachal Pradesh	-	-	-	1	-	-	-	-	01
4.	Assam	1	-	-	1	-	-	-	1	03
5.	Bihar	1	-	-	1	1	-	-	1	04
6.	Chattishgarh	1	-	-	-	-	-	-	-	01
7.	Delhi	-	1	-	3	1	1	3	5	14
8.	Goa	-	-	-	-	1	-	-	-	01
9.	Gujarat	4	-	-	-	-	-	2	2	08
10.	Haryana	1	1	-	1	3	1	1	6	14
11.	Himachal Pradesh	2	-	-	-	1	-	1	2	06
12.	Jammu and Kashmir	2	-	-	-	1	-	-	-	03
13.	Jharkhand	1	-	-	-	1	-	-	1	03
14.	Karnataka	5	-	-	-	2	1	2	7	17
15.	Kerala	1	-	-	-	5	-	-	3	09
16.	Madhya Pradesh	2	-	-	-	2	-	2	11	17
17.	Maharashtra	5	1	-	3	5	1	1-	-	17
18.	Meghalaya	-	-	-	-	1	-	-	-	01
19.	Mizoram	-	-	1	-	-	-	-	-	01
20.	Nagaland	-	-	-	1	-	-	-	-	01
21.	Orrissa	1	-	-	-	2	-	2	5	10
22.	Punjab	2	-	-	-	1	-	-	2	05
23.	Rajashthan	2	-	-	2	3	-	1	7	15
24.	Sikkim	-	-	-	1	-	-	-	-	01
25.	Tamilnadu	2	-	-	1	2	-	-	1	06
26.	Uttarakhand	1	-	-	-	2	-	2	-	05
27.	Utter Pradesh	4	2	-	1	8	2	3	15	35
28.	West Bengal	3	-	-	-	3	-	-	1	07
Total		44	05	01	17	49	06	25	78	227

Registration Act 1860. Therefore, the Council came into existence as a registered society on 16 July 1929. It was renamed as Indian Council of Agricultural Research (ICAR) after Independence¹⁰.

3.2.1 Structural Organisation of ICAR

The Union Minister of Agriculture is the President of the ICAR. Its principal officer is the Director-General (DG). He is also the Secretary to the Government of India in the DARE. The General Body, the supreme authority of the ICAR, is headed by the Minister of Agriculture, Government of India. Its members include the Minister of Agriculture, Animal Husbandry and Fisheries and senior officers of the various state governments, representatives of the parliament, the agro-industries, scientific organisations and farmers⁹. The Governing Body is the chief executive and decision-making authority of ICAR. It is headed by the DG, comprising of eminent agricultural scientists, educators, legislators, and representative of farmers. It is supported by the Standing Finance Committee, Accreditation Board, Regional Committees

and several Scientific Panels. The Secretary, DARE and DG of the ICAR function as the Principal Advisor to the Government of India in all matters concerning research and education in agriculture, and allied fields⁹. The structure and organisation of present ICAR system is shown in the Fig. 1.

The DG is assisted by eight Deputy Director General (DDG) - one each In-charge of Crop Sciences, Natural Resource Management, Animal Sciences, Agricultural Education, Agricultural Extension, Fisheries, Horticulture and Agricultural Engineering. On the administrative side, the DG is assisted by the Secretary, ICAR, who is also the Additional Secretary to the DARE. In all financial matters, the DG is assisted by the Financial Advisor (FA). The Agricultural Scientists' Recruitment Board (ASRB) is an independent recruiting agency of the ICAR for its Agricultural Research Services (ARS) and equivalent technical posts as well as also for research management positions. The Council also has a National Academy of Agricultural Research Management (NAARM), at Hyderabad (AP) to provide the requisite training to the

new entrants to the Agricultural Research Services (Agriculturists)⁸.

3.2.2 Responsibility and Mandate

Agriculture is a state subject and the prime responsibility for agricultural research, education, extension education and its development lies with the States. However, as the apex organisation in the country, ICAR coordinates the research and extension education. ICAR has the following mandate as governed by the ICAR society:

- To plan, undertake, aid, promote and co-ordinate education, research and its application in agriculture, agro-forestry, animal husbandry, fisheries, home science and allied sciences
- To act as a clearing-house of research and general information relating to agriculture, animal husbandry, home science and allied sciences and fisheries matters through its publications and information systems, as well as instituting and propagating transfer of technology programme
- To provide, undertake and promote consultancy services in the field of education, research, training and dissemination of information in agriculture, agro-forestry, animal husbandry, fisheries, home science and allied sciences
- To look into the problems pertaining to the broad spectrum of rural development concerning agriculture

including post-harvest technology by developing co-operative programmes with other organisations, such as the Indian Council of Social Science Research (ICSSR), Council of Scientific and Industrial Research (CSIR), Bhabha Atomic Research Centre (BARC), Universities, etc¹¹.

3.2.3 Agricultural Education

The imparting of agriculture education and research in India at the central level is the sole responsibility of the ICAR. Under the ICAR, the Education Division which is headed by the Deputy Director General (Education) and five Assistant Directors General namely, ADG (HRD-I), ADG (HRD-II), ADG (Education Planning and Development), ADG (Accreditation), and ADG (Home Science)¹². The Education Division of the ICAR since 1995 onwards conducts the All India Entrance Examination (AIEEA) for admission to 15 per cent of the seats reserved in SAUs, CUs (i.e., AMU, BHU, Biswa Bharti, Nagaland University, and CAU, Imphal) for UG degree (BSc, B.Tech., B.F. Sc, etc.) in agricultural sciences, namely, horticulture, agriculture engineering, dairy technology, forestry, food sciences, fishery sciences, home sciences, sericulture, and agriculture marketing and cooperation¹².

In addition to above activities, the Education Division of the ICAR also looks into the various important activities for the agriculture education in the country such as accreditation for quality assurance, global competitiveness in human resource development, distance education for reaching to the un-reached people,

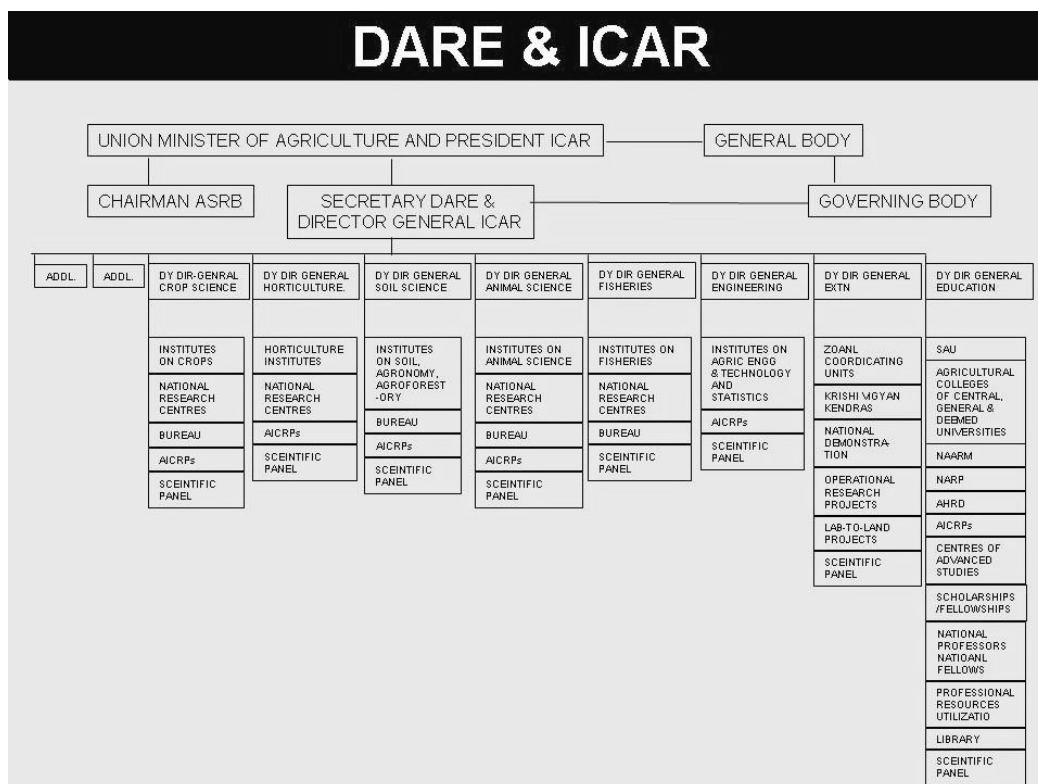


Figure 1. Structure and organisation of ICAR¹¹.

fellowship and scholarships as a tool for human resource development, women technological empowerment, faculty competence improvement, and networking for access to information¹³. Further, the admission for the five-year Bachelor of Veterinary Science and Animal Husbandry degree is the responsibility of the Veterinary Council of India. The Veterinary Council of India is a statutory body of the Government of India framed under an Act of Parliament, i.e., Indian Veterinary Council Act, 1984 (52 of 1984) with its Headquarters in New Delhi. The Veterinary Council of India regulates veterinary practices and veterinary education. Only those who possess recognised veterinary qualification and registered with the Council can practice in the country in veterinary¹³. The Veterinary Council of India conducts an annual examination, i.e., All India Common Entrance Examination (AICEE) for filling up of 15 per cent of the total undergraduate (i.e., Bachelor of Veterinary Science and Animal Husbandry) seats of each veterinary college and university, i.e., Veterinary, Animal and Fishery Sciences University, Bidar (Karnataka); Tamil Nadu Veterinary and Animal Sciences University, Chennai, (Tamilnadu); West Bengal University of Animal and Fishery Sciences, Belgachia, Kolkata (West Bengal); Maharashtra Animal and Fishery Sciences University, Nagpur (Maharashtra); Indian Veterinary Research Institute, Izatnagar, Bareilly (Uttar Pradesh); National Dairy Research Institute, Karnal (Haryana); and Central Institute for Fisheries Education, Versova, Mumbai (Maharashtra)¹⁰.

The Education Division, has three sections: (i) Human Resource Development; (ii) Education Planning and Development and (iii) Educational Quality Assurance and Reforms and headed by the Deputy Director General (Education) responsible for planning, development, coordination and quality assurance in higher agricultural education in the country and keep control in maintaining and upgrading quality and higher agricultural education through partnership and efforts SAUs, DUs, CAU and CUs with agriculture faculty. In addition to, the Division also has a NAARM for facilitating capacity building of the National Agricultural Research System (NARS) in research and education policy, planning and management and a National Centre for Agricultural Economics and Policy Research. The Division has many credits in its name and a few noteworthy are as¹⁴:

- Established Accreditation Board and accredited 22 agricultural universities for quality assurance in agricultural education
- Regular financial and professional support provided to SAUs, CUs and DUs for modernisation and strengthening of academic facilities, infrastructure and faculty development
- Revised course curricula and syllabi approved for AUs for UG education

- Conducted regularly the examination for admission of students to the tune of 15 per cent of total seats in UG programmes and 25 per cent seats in PG programmes for quality up-gradation and reduction of inbreeding in education. Every year about 1350 meritorious candidates are admitted in UG programmes and 1600 in PG programme
- About 2400 scientists trained in emerging areas through 90 summer/winter schools organised in cutting edge areas every year
- Awards annually about 1000 National Talent Scholarships for undergraduate studies, 475 junior research fellowships (JRF) for post-graduate studies and 200 senior research fellowships (SRF) for PhD
- Modernisation of agricultural libraries through creating networking and consortia for online access to literature to agriculture literature, and
- Promoting excellence at national level through ICAR National Professor and National Fellow Schemes for agricultural academicians and scientists

3.2.4 *Agricultural Research*

The institutes and centres belonging to the ICAR assumed responsibility for agricultural research and other related fields both at the national and regional levels. The scenario has changed after the establishment of SAUs. The ICAR has made efforts to reinforce the research capabilities of the agricultural universities through their AICRP, the National Agricultural Research Project (NARP), National Agricultural Technology Project (NATP) and National Agricultural Innovation Project (NAIP). As a result, a large number of the SAU have developed a remarkably good research infrastructure and scientific manpower¹⁴.

3.2.5 *Agricultural Extension and Technology Transfer*

To make available the latest tools and technology and awareness and extension in the country to ultimate users (i.e., farmers), the Agricultural Extension Division of ICAR is responsible for the assessment, refinement and demonstration of technology/products through a network of Krishi Vigyan Kendras (KVK). Under this endeavor, about 44 Agricultural Technology Information Centres (ATIC) have been established under the ICAR institutes and SAUs. There is one National Research Centre for Women in Agriculture (NRCWA) located in Bhubaneswar (Orissa). The Division is headed by DDG (Agricultural Extension) supported by 2 ADG and had many credits such as⁹:

- Established a VSAT-based national network of over 589 KVKs

- Conducted 4189 on-farm trials on 537 technologies to identify their location specificity under different farming systems
- Organised 53,974 frontline demonstrations to demonstrate the production potential of newly released production technologies on the farmers' fields
- Trained more than 1.0 million farmers and extension personnel in agriculture and allied fields;
- Conducted large number of extension activities benefiting about 4.19 million farmers and other end users
- Trained more than 1.0 million farmers and extension personnel in agriculture and allied fields, and
- Continued functioning of 44 ATICs in ICAR institutes and SAUs

3.2.6 Collaborations with Other R&D Organisations

In its endeavor to implement its research policies and programmes, the ICAR developed a large network in discharging its role as a national co-coordinating agency (NCA) in the field of agriculture education and research. The ICAR has also established linkages with the Planning Commission, Department of Science and Technology (DST), Council of Scientific Industrial Research (CSIR), Indian Council of Medical Research (ICMR), Indian Council of Social Sciences Research (ICSSR), Department of Atomic Energy (DAE), and other relevant agencies on the one hand and International Research Organisations and Institutes such as Food and Agricultural Organisation (FAO), United Nations Development Programme (UNDP), World Bank (WB), International Development Agency (IDA), Asian Development Bank (ADB), etc., on the other. The ICAR also maintains a regular link with the SAUs and their research network in the country through the AICRP through senior scientists as ICAR nominees on the Management Boards of the SAUs and through the representatives of the SAU on various ICAR bodies. The ICAR also maintains a close working relationship with the UGC and discharges the functions of the UGC with regard to agricultural universities. The ICAR is also represented on the boards of numerous related departments such as the Department of Ocean Development (DOD), Indian Meteorological Department (IMD), Department of Biotechnology (DBT), Department of Non-Conventional Energy Sources (DNES), etc. It is through these linkages that the ICAR has acquired the possibility of providing support not only to organisations involved directly in agricultural research but also to those working in allied fields, providing superlative means of an integrated

functioning of agricultural research, education, and extension education¹⁰.

3.2.7 Agricultural Libraries

Libraries, being a part and parcel of the education and research system, are playing a vital role. They provide information support and function as a nerve centre for research affairs around which the progress of the country is spiraling high. Their development has been parallel along with the growth and development of institutions in particular and the country as a whole in general. Libraries have served the nation and borne many constraints during the span of 64 years of independence. Special emphasis was laid to the development of an agricultural research infrastructure immediately after Independence. The ICAR acts as a repository of information and provides consultancy on agriculture, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension, agricultural education, home science, and agricultural communication. Presently, 44 SAUs libraries and One CAU library, 5 DU libraries, 17 NRC libraries, 50 CRI libraries, 6 NB libraries, 25 PD libraries and many field stations libraries/KVS libraries are functioning under the aegis of ICAR.

3.2.8 Committees and Commissions of Agricultural Libraries

Since the inception of the ICAR system, many Committees and Commissions have been appointed for the assessment/improvement of agricultural education and libraries. The most specific committee which advocate the various recommendations for the betterment agricultural libraries in India are¹⁵:

- 1956—Dr Ralph R Shaw and Dr Krishna Rao Committee
- 1957—Dr M.S. Randhawa Committee, which states “Libraries are a necessary part of the researcher’s tool. Every possible step should be taken to improve library facilities which are often inadequate. The recommendations of this Committee created deep awareness among librarians and administrators for better agricultural libraries”
- 1968—Dr Dorothy Parket Committee, resulted a survey, i.e, The Indo American Agricultural Library Survey and Study Team. The committee gave 69 recommendations for the overhauling the entire system of agricultural libraries in India. Some significant were: (i) improvement in the physical facilities of ICAR institute libraries (ii) strengthening the collection of books and journals (iii) appointment of trained librarians in the institutes libraries (iv) status of library equal to that of a Department of the institute (v) status of librarian at par with Head of the department and (vi) making of a National Agricultural Library in India headed by a Director

- (d) 1969–Dr Ramaiah Committee, under the chairmanship of Dr K. Ramaiah, Honorable member of Parliament, consisting of scientists like Dr M.S. Swaminathan, Dr C.M. Singh, Dr N.N. Singh, etc., to review the recommendations of Dr Dorothy Parket Committee, which accepted a few of out of them
- (e) 1973–Regional Agricultural Library Study Team
- (f) 1980-2010—several recommendations which came out from the deliberations and discussions of various national agricultural conferences/seminars/workshop being organised at national level by the ICAR, AALDI, CeRA, and other bodies from time to time

3.2.9 Initiatives in Capacity Building of Agricultural Resources

Access to digital resources is of paramount importance to the researchers, academicians, students and other stockholders. Under the aegis of ICAR, mega efforts are being made to strengthen digital library, create open access institutional repositories, providing access to digital resources, enhancing web presence, e-courses development and hosting, crop specific knowledge portals and web services through world bank funded project known as National Agricultural Innovation Project (NAIP) such as:

- (a) **CeRA (Consortium of Resources in Agriculture):** an online agricultural resources initiative commissioned in November 2007. IARI library acts as nodal agency to subscribe e-resources for the NARS libraries of ICAR.
- (b) **e-Granth Consortium:** NARS has a very large collection of repositories in agriculture and allied sciences, spread all over the country in different libraries, academic institutions, museums, and in authors' collections. This invaluable heritage has to be documented, preserved and made easily accessible to end users. Therefore, with the financial assistance of NAIP, this responsibility was assigned to IARI as the lead centre and other institutes such as Acharya NG Ranga Agricultural University (ANGRAU), Hyderabad; Central Institute of Fisheries Education (CIFE), Mumbai; Ch. Charan Singh Haryana Agricultural University (CCSHAU), Hisar; CSK Himachal Pradesh Krishi Vishwavidyalaya (CSKHPKV), Palampur; GB Pant University of Agriculture & Technology (GBPUAT), Pantnagar; ICAR Library, New Delhi; Indian Veterinary Research Institute (IVRI), Izatnagar; Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri; National Dairy Research Institute (NDRI), Karnal; Tamilnadu Veterinary and Animal Sciences University, Chennai; and University of Agricultural Sciences (UAS), Bangalore as co-partner for creation of digital repositories of agricultural education, training and research.

- (c) **KrishiPrabha:** *KrishiPrabha* is Indian Agricultural Doctoral Dissertations Repository of 45 SAUs/DAUs of NARS which award doctoral degrees in agriculture and allied disciplines. *KrishiPrabha* is the first of its kind in agricultural sciences in India. The Nehru Library of CCS HAU is the nodal and coordination agency. It is responsible for data capturing, editing, indexing, organising, aggregating and other operations related to the development and maintenance of the digital repository. ICAR and all SAUs/DAUs are the stakeholders and can access the content of doctoral dissertations.

8. CONCLUSIONS

The human resource developed by the national agricultural research system (NARS) has undoubtedly has been instrumental in agricultural transformation of the country. In future, the need for new knowledge and skills becoming more challenging than ever, it would however; be hard pressed to keep pace with the rapid technological, economic and social developments taking place nationally and internationally. Henceforth, agricultural education is seen to be required to:

- (i) Respond to the need of employment, food security, poverty, economic growth and sustenance of the natural resource quality, and
- (ii) Measure up to handling of internal (poverty) and external pressures of such international organisations such as FAO, WTA, GATT, GMO, etc.

The re-orientation of agricultural education and its linkage with trends of employment and needs of various sectors of economy (public, private, service, import and export) on one hand and its responsiveness to maintain environmental integration on the other hand will have to be the front ranking strategy of the national agricultural education system. While futuristic quality of agricultural education and research will depend upon employment, economic growth and environmental health, it will be necessary to make sector-wise projections on manpower demand and plan supply accordingly at the regional and national levels. Apparently, forging and forcing a match between the kind and number of graduates and post-graduates churned out by the education system and their employability vis-à-vis changing market demand will be a necessity. Placing maximum emphasis on employability is justified because unemployment is a major cause of wasted human resource, persistent frustration giving birth to destructive activities, deceleration of economic growth and hurt to national pride and international standing.

For the improvement of the status of agricultural libraries and librarians in the country, the ICAR sincerely takes serious initiatives to implement the recommendations of the various committees and commissions. As libraries and labs are tools in the

application of agricultural research, education, and training in order to innovation and new research, it is the need of hour that ICAR should recruit the LIS professionals at par with the computer professionals (scientists). Further, ICAR should also make concerted efforts to create the higher promotional avenues for LIS professionals in the NARS from the existing (T-9, which is equal to Deputy Librarian/Senior Scientist) to University Librarians/Principal Scientist so that the LIS professionals should not move to other organisations.

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About the Author

Dr K.P. Singh is working as Senior Assistant Professor at the Department of Library and Information Science, University of Delhi, Delhi. He obtained his MSc (Agricultural Sciences) from Meerut University, while MLIS, MPhil, both in Library & Information Science, from University of Delhi in 1997 and 2004, respectively. He obtained PhD (Library & Information Science) from GNDU, Amritsar (Punjab) in 2007. He has received fellowships and awards such as UGC-JRF/NET, ICAR-JRF, and DRDO-JRF for higher studies in agricultural sciences and LIS. His areas of interest include: ICT in libraries, knowledge management, design and development of online directories, e-content management, e-learning, e-portals, e-S&T information sources, and information seeking behaviour.