National Symposium
on
University Autonomy and Quality Improvement of Higher Education

November 13-14, 2003

Administrative Block of MPUAT, Udaipur

Organised By

MAHARANA PRATAP UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, UDAIPUR

Sponsored By

INDIAN AGRICULTURAL UNIVERSITIES ASSOCIATION, NEW DELHI

"जो दृढ़ राखे धर्म को तिहि राखे करतार।"

The University is named after Maharana Pratap, the Great Worrier, Freedom Loving Ruler of the country

Proceedings of National Symposium on University Autonomy and Quality Improvement of Higher Education

November 13-14, 2003

Edited By

Prof. L. L. Dhakar **Prof. A. N. Mathur**

Organised By

MAHARANA PRATAP UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, UDAIPUR

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INDIAN AGRICULTURAL UNIVERSITIES ASSOCIATION, NEW DELHI

FOREWORD

It gives me immense pleasure to learn that the proceedings of the IAUA National Symposium on **"University Autonomy and Quality Improvement in Higher Education"** held on 13-14, Nov. 2003 at Maharana Pratap University of Agriculture and Technology, Udaipur are being brought out in the form of a publication.

During last few decades, the extent and scope of agricultural education has enormously expanded. Shrinking resources on one hand and added challenges on the other made the task of bringing excellence in education a stupendous one. The thrust of education has been shifted. We want our graduates to be "job providers" rather than "job seekers". Job oriented professional courses are the need of the day. Besides, the process of economic liberalization initiated in early nineties by GOI, the General Agreement on Trade in Services (GATS) as a part of WTO agreements, revolutionary changes taking place in information and communication technology and shift in economic policies, have posed huge challenges on the existing agricultural education system in our country. It is rightly warranted to ponder on these issues so as to setright the path to impart world class education to meet the ensuing challenges of new millennium.

The national symposium proved to be an apt occasion to enlist our accomplishments, to locate the grey areas and more importantly to look into the required reforms in agricultural education in terms of its quality and concern for employment prospects including self employment. The deliberations of the symposium proved to be fruitful in spotlighting the vital issues in higher education and also to evolve suitable strategies for effectively resolving the same.

I appreciate and congratulate Dr. R.P. Singh, Vice-Chancellor, Dr. A.N. Mathur, Nodal Officer and their whole team for meticulously organizing this historic event at Maharana Pratap University of Agriculture and Technology, Udaipur. All the participants enjoyed the stay, deliberations and other arrangements made by the organizers.

I hope and wish that the recommendations enlisted in this proceeding will be implemented in the right perspective by the stakeholders of agricultural higher education in our country.

(S.S. Baghel)
President,
Indian Agricultural Universities Association (IAUA)
New Delhi

PREFACE

It has indeed been our pleasure and privilege to organize the National Symposium on **"University Autonomy and Quality Improvement in Higher Education"** at Maharana Pratap University of Agriculture and Technology, Udaipur on 13-14th Nov., 2003. Reforms in educational system is the need of the time due to the emerging new areas of learning, revolution in information and communication technology and also due to implications of changing global economic and trade policies, including liberalization, privatization and globalization. Agricultural education and research system in our country has made spectacular progress during the last few decades. A country which struggled for meeting the bare minimum needs of foodgrains at the time of independence is now confronting the problem of effectively managing the surpluses. It is a matter of great proud for all of us that the progress made in the field of agriculture is often referred as revolutions - Green Revolution for foodgrains, White Revolution for milk, Blue Revolution for fisheries and Yellow Revolution for oilseeds. Now our country is set for an Ever-Green Revolution.

The deliberations of the symposium encompassed sub-themes like (i) Status of Agricultural Education in India (ii) University Autonomy – Concepts and Issues (iii) Challenges and Opportunities of Higher Education vis-à-vis Teaching, Research and Extension Education (iv) Excellence and Quality Assurance in Higher Education, and (v) Agricultural Education in the Context of Globalization. On the last day, a panel discussion was also arranged as part of valedictory function.

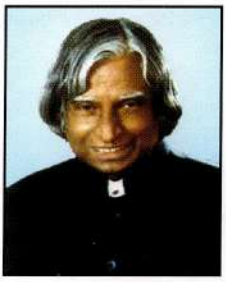
At this occasion we were fortunate enough to have with us most reverend Shreeji Arvind Singhji Mewar as the Chairman of the inaugural function of this great event. The gracious presence of a visionary leader of agricultural research and education, Dr. Mangala Rai, Hon'ble Director General, ICAR and Secretary, Department of Agricultural Research and Education Govt. of India, New Delhi made the occasion a glamorous one. The Vice-Chancellors of various Agricultural Universities, the senior officials of the ICAR and other dignitaries participated in the symposium whole heartedly placed their views and opinion either by presenting the papers or by participating in the discussion. In fact 4 papers each in the first and second sessions, five papers in the third combined session were presented by learned authorities on the respective subjects. The presentations of papers followed by discussion in each session and the panel discussion conducted as part of valedictory function paved way to streamline specific recommendations which are enlisted as part of the proceedings.

I express my gratitude to the Indian Agricultural Universities Association, New Delhi for sponsoring the National Symposium on a topic of very vital importance. I gratefully acknowledge the contributions made by the esteemed Vice-Chancellors, ICAR Officials and other dignitaries who participated in the symposium. Dr. A.N. Mathur, Dean, CTAE & Nodal Officer and the entire team of host University did a marvelous job to make the programme a grand success. I sincerely acknowledge their services. The proceedings of the symposium covering the papers presented with relevant details will prove to be a useful reference material for all these who are associated with the task of improving agricultural higher education in our country. I am sure that the recommendations emanated from deliberations will be followed up for implementation by the concerned organizations and agencies in the right perspectives.

(R.P. Singh)
Vice-Chancellor
Maharana Pratap University of Agriculture and Technology, Udaipur

राष्ट्रपति के प्रेस सचिव
Press Secretary to the President

राष्ट्रपति सचिवालय
राष्ट्रपति भवन
नई दिल्ली–110004
President's Secretariat
Rashtrapati Bhawan
New Delhi - 110 004



MESSAGE

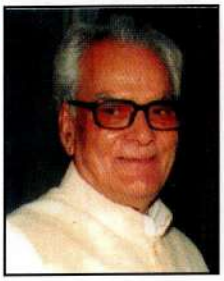
The President of India, Dr. A.P.J. Kalam, is happy to know that the Maharana Pratap University of Agriculture and Technology, Udaipur and the Indian Agricultural Universities Association, New Delhi are jointly organising a National Symposium on "University Autonomy and Quality Improvement of Higher Education" on 13th and 14th November, 2003 at Udaipur.

The President hopes that the focus of higher education should be towards promotion of excellence in frontier areas of Science, Information Technology, Agriculture and other job-oriented courses.

The President extends his warm greetings and felicitations to the organisers and the participants and wishes the Symposium all success.

PRESS SECRETARY TO THE PRESIDENT

Bhairon Singh Shekhawat
Vice-President of India



भारत के उप-राष्ट्रपति
VICE-PRESIDENT OF INDIA

MESSAGE

I am happy to know that National Symposium 2003-2004 of Indian Agricultural Universities Association (IAUA), New Delhi on "University Autonomy and Quality Improvement of Higher Education" is being organised from 13-14th November, 2003 at Maharana Pratap University of Agriculture and Technology, Udaipur and a souvenir is also being brought out to mark this occasion.

The Symposium will provide an excellent opportunity to the participants to address the core concerns of the higher education in the field of agriculture and allied areas. I am confident that the collective deliberations in the Symposium will go a long way in formulating national strategies to meet the emerging challenges of globalization through ensuring autonomy of educational institutions and quality improvement of education.

I wish the Symposium all success.

(BHAIRON SINGH SHEKHAWAT)

New Delhi
12th November 2003

Kailashpati Mishra
Governor Rajasthan

RAJBHAWAN
Jaipur - 302 006

MESSAGE

I am glad to know that Maharana Pratap University of Agriculture and Technology, Udaipur and Indian Agricultural University Association (IAUA), New Delhi are jointly organising a National Symposium on "University Autonomy and Quality Improvement of Higher Education" at Udaipur from 13th-14th Nov. 2003.

I am sure, the academic deliberations in the above symposium on crucial topics like status of Agricultural Education in India in the context of globalization, challenges currently faced and strategies for its improvement would help to bring out suitable recommendations that would be of immense use in setting new direction to the national agricultural education system and policy.

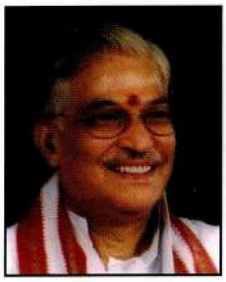
I wish this endeavor a great success.

Kailash Pati Mishra

(KAILASHPATI MISHRA)

Dr. Murli Mahohar Joshi

Minister of Human Resource Development Indian
New Delhi - 110 001



MESSAGE

I am glad that Maharana Pratap University of Agriculture and Technology, Udaipur is organizing a "National Symposium on University Autonomy and Quality Improvement of Higher Education" in collaboration with Indian Agricultural Universities Association, New Delhi.

The subject chosen for the National Symposium is much relevant in the present scenario and therefore, I complement the organizers. The challenging task of higher education in the applied field like agriculture is to generate greater confidence and real competence to attract our scholars towards self-employment ventures, as it would create substantial job-opportunities for absorbing our Nation's well-trained surplus youth available for gainful production activities.

I convey my best wishes for the success of National Symposium.

(MURLI MANOHAR JOSHI)

Ashok Gehlot

Chief Minister
Rajasthan

MESSAGE

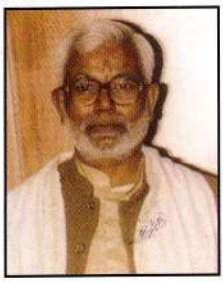
I am glad to know that Maharana Pratap University of Agriculture and Technology, Udaipur and Indian Agricultural Universities Association (IAUA), New Delhi are jointly organising a National Symposium on "University Autonomy and Quality Improvement of Higher Education" at Udaipur from November 13 to 14, 2003. A souvenir is also being published to commemorate the occasion. In view of our future needs, rapid technological developments and the upcoming opportunities and challenges under WTO regime, it will be appropriate to assess the strengths and weaknesses of our agricultural education system so as to re-orient the same as warranted by the time. I am hopeful that the deliberations will help to set directions for building competence and desired skills in our agricultural graduates and post-graduates to shoulder the responsibilities with confidence and strength and will come out with new vistas for the autonomy of higher educational institutions in general and quality improvement of higher education in particular.

I convey my best wishes for the success of the symposium and the publication.

(ASHOK GEHLOT)

Hukumdeo Narayan Yadav

Minister of State for Agriculture
Government of India
Krishi Bhawan
New Delhi - 110 001



MESSAGE

The National Symposium on "University Autonomy and Quality Improvement of Higher Education" being organized by the Maharana Pratap University of Agriculture and Technology, Udaipur in collaboration with Indian Agricultural Universities Association, New Delhi on 13-14th November, 2003 is an important event in the context of reforms being thought for agricultural higher education in India.

I am glad to note that the vital topics like Status of Agricultural Education in India, University Autonomy-Concepts and Issues, Challenges and Opportunities of Higher Education vis-a-vis Teaching, Research and Extension Education, Excellence and Quality Assurance in Higher Education and Agricultural Education in the Context of Globalization will form the focus of deliberations. I hope suitable recommendations will emerge so as to give the required momentum for the reform process for higher education in agriculture which is under active consideration of the ICAR.

I send all my good wishes for the success of the event.

11/11

(HUKUMDEO NARAYAN YADAV)

Dr. Mangala Rai
Secretary & Director General

Government of India
Department of Agricultural Research & Education
and
Indian Council of Agricultural Research
Ministry of Agricultural, Krishi Bhawan
New Delhi - 110 001

MESSAGE

I am happy to know that a National Symposium on "University Autonomy and Quality Improvement of Higher Education" is being hosted by MPUAT, Udaipur under the aegis of Indian Agricultural Universities Association (IAUA), New Delhi at Udaipur on 13th November, 2003.

The new economic policy initiatives and the process of globalization have thrown a series of challenges for agriculture in the developing countries like India. The institutional network for agricultural education and research in India is one of the largest in the world. Ensuing issues for agricultural education include integrating agricultural education with job creation, increased pressure on natural resources, demand for specific human resources from client groups, sustainability perspective to agriculture, value addition to agricultural produce, shrinking resources with educational institutions, the emerging global economic order and so on. The WTO also warrants the need for quality improvement in higher education to make it globally competitive.

The agricultural higher education reforms project is under active consideration of the ICAR and the Council is also contemplating to have a series of seminar/symposium to device strategies for the envisaged reform process which may include action leading to improvements in course curricula change in delivery system from teaching to learning, utilitarian approach by revitalizing educational programmes developing competence and capacity building of faculty and Infrastructural development to meet the emerging challenges in agricultural education.

I am hopeful that the recommendations of this symposium will set direction to formulate national strategies for higher education.

I wish the Symposium a grand success.

(MANGALA RAI)

Dated the 11th November, 2003
New Delhi

Prof. Ram Pratap Singh

Vice-Chancellor

Maharana Pratap University of
Agriculture & Technology,
Udaipur - 313 001

Message

I am indeed delighted to have with us a galaxy of visiting dignitaries attending the IAUA sponsored **National Symposium on "University Autonomy and Quality Improvement of Higher Education"** Rajasthan is a land of hospitality and welcome. The visiting Vice Chancellors and Senior Officers from various organizations will have an appropriate environment for healthy and fruitful discussions which will give new directions to the Agriculture education in the country. The decision of IUAU to assign the symposium to Maharana Pratap University of Agriculture and Technology is most appropriate and timely one.

The agriculture education in India has got tremendous boost during past five decades. The agriculture research in the country has been internationally recognized. It has helped to meet the challenge of feeding 1000 million people and keep our warehouses full of food grain for emergency needs. The emerging technologies need to be transformed in the books for the education of our young and talented Scientists, so that the pace of progress and growth in the area is maintained. The symposium will give an opportunity to the eminent educationist sitting at the helm of affair in the country, to make suitable recommendations for upgrading the course curriculum and introduce new and emerging areas of education.

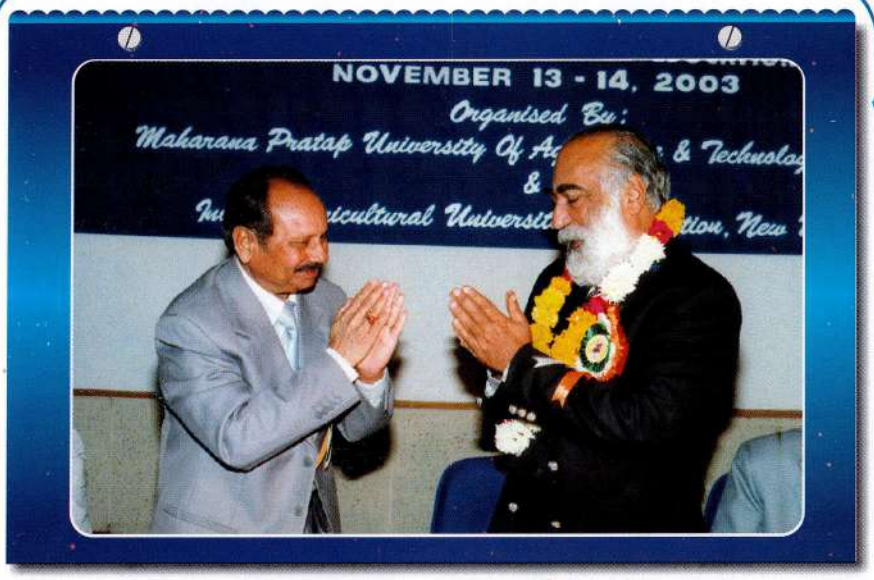
I am sure the deliberations during the two days conference will be fruitful and lead the agriculture education in right direction.

I am happy to welcome on behalf of Host University the DG ICAR, visiting Vice Chancellor and other Officers from ICAR and deemed universities.

(RAM PRATAP SINGH)

Prof. Ram Pratap Singh, Vice Chancellor
welcomes Hon'ble Dr. Mangla Rai, DG ICAR & Secretary DARE

Dignatories of the Inaugural Function lighting the lamp



Dr. Ram Pratap Singh, Vice-Chancellor
Garlanding Shreeji Shri Arvind Singhji Mewar

Dignitaries on the dias in the inauguration of the symposium

Dr. S.S. Baghal, President IAUA

Dignitaries in the Inaugural Function

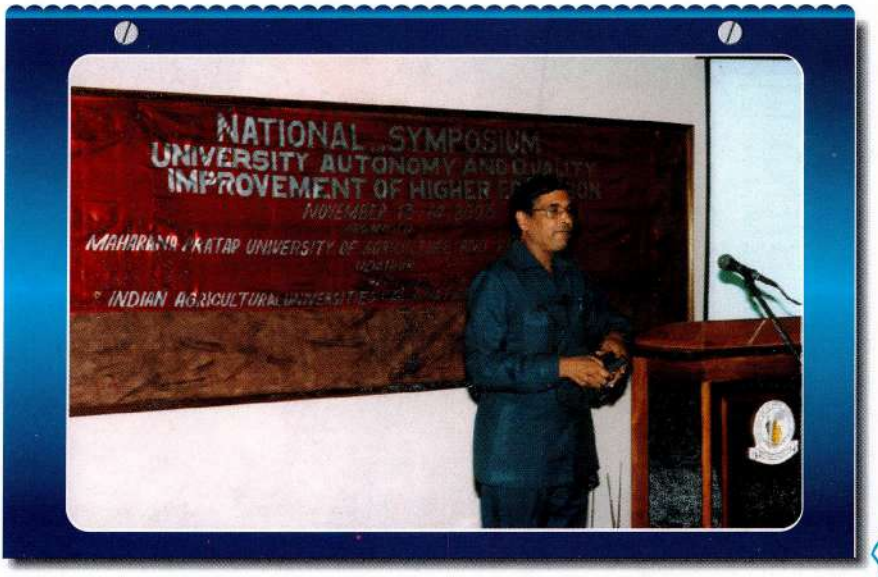
Hon'ble Dr. Mangh Rai addressing

Padmshri J.S.P. Yadav and Dr. Kirti Singh chairing Technical Session

Dr. A.S. Faroda, Chairman ASRB chairing Group Discussion
& Valedictory Function

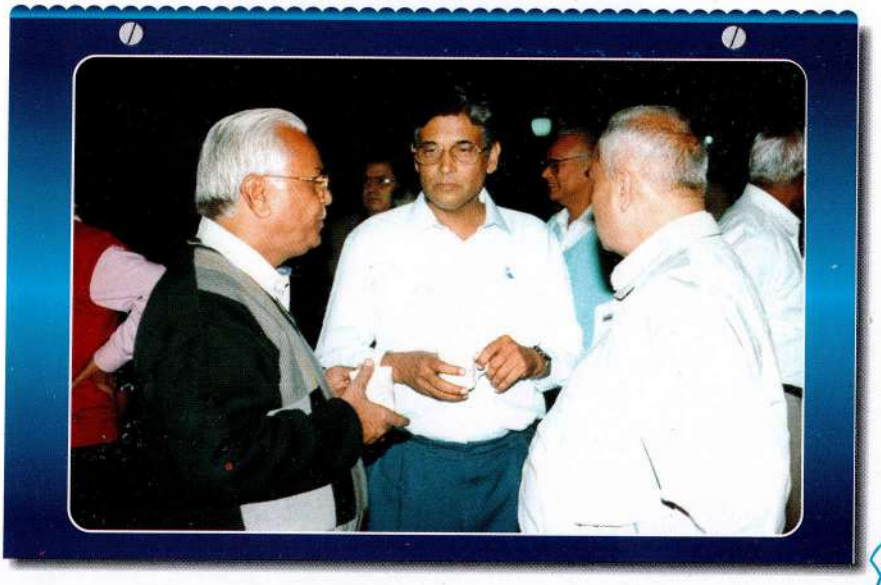
Prof. A.N. Mathur, Dean, MPUAT, Udaipur & Nodal Officer of symposium
presenting his paper in Technical Session

Hon'ble Dr. Mangla Rai, releasing book on
Digital Logic Design by Sh. Dharam Singh, CTAE

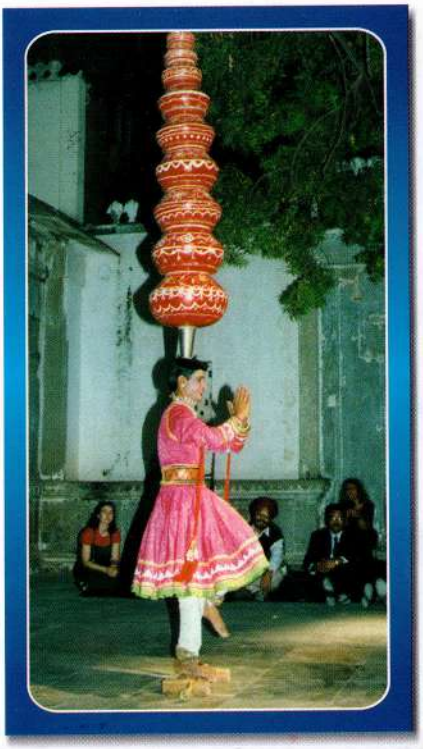


Dr. S.L. Mehta, National Director T&A NATP ICAR,
presenting his paper in Technical Session.

Dr. S.S. Puri, Vice-Chancellor. MPKVV Rahuri presenting his views in Group Discussion



Dignitaries discussing during the symposium



Glimpses of cultural programme organised in honour of dignitaries

Recommendations of the National Symposium on "University Autonomy and Quality Improvement of Higher Education" at Maharana Pratap University of Agriculture and Technology, Udaipur on Nov. 13-14, 2003

(A) University Autonomy:

1. The concept of autonomy should be crystallized and its implications should be specified with respect to academic, financial, administrative and legal perspective.
2. There is a great need for complete autonomy at all levels, which include the freedom to start new courses, create new posts and re-deployment of staff.
3. The ICAR should take up the matter with concerned State Governments for ensuring autonomy of the universities including financial autonomy for effective participation of the university in agricultural development activities in respective states.
4. The SAUs should set up tribunals to redress the grievances of the staff and students in view of large number of court cases.
5. Immediate steps and procedures are to be drawn to mobilize internal and external resources and to make the SAUs financially strong.
6. The revenue generated by the university should be kept apart for the development of the university and should not form part of university budget.
7. The IAUA as an apex body should make efforts to get financial support from Planning Commission, Government of India to overcome the financial crises so as to implement regular programmes and also to take up new programmes of contemporary relevance.
8. The State Government should be informed to provide atleast one per cent of the agricultural *Krishi Upaj Mandi* tax earned from selling of agricultural produce in KUMs to SAUs for taking

up problem oriented researches and effective transfer of technology programmes.

9. The state governments may be impressed upon to act promptly on matters related to nominations on various committees as provided under university act and statutes to ensure smooth functioning and prompt actions at university level.
10. The Model Act of the ICAR must be reviewed and after necessary amendments it must be implemented in letter and spirit by all State Agricultural Universities in the country.

(B) Quality Improvement of Higher Education:

1. The intake for higher education must be restricted strictly on the basis of merit and the remaining sub-standard out-turned students are diverted/encouraged for vocational education/ training.
2. The recruitment of faculty must be on merit basis with adequate provision for updating the knowledge through refresher trainings, participation in seminar, conferences, etc.
3. The resources for infrastructure and HRD development to evolve teaching programmes in frontier areas of sciences applicable to agriculture and allied sciences are to be developed in various SAUs and ICAR institutes.
4. Job-oriented certificate and diploma programmes in addition to the regular degree programmes, for upgrading skill and developing confidence of agricultural graduates are to be launched to overcome the problem of increasing unemployment of agricultural graduates.
5. The four year B.Sc. (Ag.) degree programme needs to be re-oriented with two years study of basic courses, one year professional learning and the last year for long interactive sessions including Rural Awareness Work Experience (RAWE)/in plant training, etc.
6. In order to fully exploit the status and strength of the institutional network of NARS imparting agricultural education, research and extension, the government of India should consider the visit by the team of experts comprising Vice-Chancellors, Deans, Directors to client countries for marketing our expertise and capability and also exploring the possibility of giving

assistance to such countries in developing their human resources, institutional set up and educational system including opening of campuses in such countries.

7. A necessity has been felt to adequately strengthen the National Agricultural Education System by providing support like 'earn while you learn', placement, entrepreneurship development, vocational education, etc. The State Governments should participate equally for the development of the institutions in SAUs.

8. The degree programmes should include super-specialization in some of the emerging areas such as Natural Resource Management, Integrated Pest Management, Hi-Tech Horticulture, Precision Farming, Forestry, Food Processing, Organic Farming, Crop Production and Crop Diversification, Mechanization Practices, Fashion Designing, Rural Home Management, Agro-Processing, Value Addition, Agri-Business Management, Agricultural Export, etc. to develop competence and confidence in students for entrepreneurship and self-employment. There is a need to introduce need-based courses and their regular revision with change in socio-economic condition of stakeholders and policies on macro development strategies at government level.

9. The Master's Degree in Agriculture Engineering should be awarded with specialization in major areas of Irrigation Water Management, Renewable Energy Technology and Post Harvest Technology and Engineering. Further, to meet the quality of higher education in Agriculture Engineering the accreditation should be sought from NAB, AICTE, NAAC besides ICAR.

10. A meeting of Deans of all Home Science Colleges and Senior Home Scientists of SAUs and traditional universities be convened to discuss various issues related to higher education in Home Science in SAUs and to make the programme viable, professional and carrier oriented. Other issues related to nomenclature, duration of degree programme and specialization, etc. can also be discussed there.

(C) Administrative/General:

1. All Agricultural Universities while implementing the Model Act of the Indian Council of Agricultural Research, some of the

provisions made in the Act need to be reviewed and necessary amendments for effective functioning of SAUs be made.

It was unanimously resolved that the tenure of Vice-Chancellors in SAU must be five years instead of 3 years (in some universities) and the age of retirement of Vice-Chancellors should be 67 years instead of 65 years prevalent in some of the universities so as to effectively make use of their expertise, insight and perception and also to provide a reasonable span of time to plan and perform in accordance to the set vision of developing the universities by the Vice-Chancellors, specially in the context of new challenges arising from economic reforms and globalization including GATS under WTO. It is also more logical in view of the decision of the Indian Council Agricultural Research for enhancing the superannuation age of agricultural university teachers/scientists from 60 to 62. There is an urgent need to initiate the process of recruitment of the faculty in SAUs/ NAES to prevent the sliding down of progress made so far in the system. There is an urgent need to recruit the faculty in the several newly emerging areas covering Biotechnology, Space Technology, Environmental Sciences, Food Technology and Information Technology, etc.

The tenure of Vice-Chancellor should be made 5 years in all SAUs in place of present 3 years. As such, these modifications will enable the Vice-Chancellors of SAUs to play more effective role for longer duration to meet the challenges of emerging scenario in advancement of agriculture as a whole. In some Universities, however, there is no upper age limit for the Vice-Chancellors.

Proceedings of the National Symposium on "University Autonomy and Quality Improvement of Higher Education" at Maharana Pratap University of Agriculture and Technology, Udaipur on Nov. 13-14, 2003

1. THE INAUGURAL SESSION

The inaugural session of the National Symposium was held in the auditorium of Rajasthan College of Agriculture on 13th November, 2003 at 11.00 a.m. Dr. Mangala Rai, Secretary Department of Agriculture Research and Education and Director General ICAR was the chief guest and the programme was presided by Hon'ble Shreeji Arvind Singhji Mewar.

Professor Ram Pratap Singh, Hon'ble Vice-Chancellor, Maharana Pratap University of Agriculture and Technology welcomed all the delegates. While welcoming Prof. Singh said in the history of agricultural education in India, this event will be inscribed in golden words as the shining stars of the galaxy of agricultural scientists are joining today to illuminate the universe of agricultural education by their well synthesised rays of glittering light of knowledge and wisdom.

He expressed his deep appreciation to the Indian Agricultural Universities Association (IAUA) for entrusting the task of organising this important symposium to Maharana Pratap University of Agriculture and Technology, Udaipur, fully knowing that this university is still in its infancy. It is, therefore, certainly a testimony to the trust in capacities, capabilities and devotion of MPUAT scientists, which might have made them to take this decision

In his address Prof. Singh emphatically mentioned that during last few decades, the extent and scope of agricultural education has enormously expanded. Shrinking resources on one hand and added challenges on the other made the job of bringing excellence in education a stupendous task. The thrust of education has been shifted. We want our graduates to be "job providers" rather than "job seekers". Job oriented professional courses are the need of the day. Besides, the process of economic liberalization initiated in early nineties by GOI, the General Agreement on Trade in Services (GATS) as a part of WTO agreements, revolutionary changes taking place in information and communication technology and shift in

economic policies, have posed huge challenges on the existing agricultural education system in our country. It is rightly warranted to ponder on these issues and to set right the path to impart world class education to meet the ensuing challenges of new millennium. I firmly believe that it is the apt time for IAUA to organise the national symposium on "University Autonomy and Quality Improvement of Higher Education". We are delighted to avail the privilege of shouldering the responsibility of hosting this historic event.

This national symposium is certainly an occasion to have an overview of our accomplishments, to locate the grey areas and more importantly to look into the required reforms in agricultural education in terms of its quality and concern for employment prospects including self employment. Our deliberations will prove meaningful and fruitful in spotlighting the vital issues in higher education and also to evolve suitable strategies to effectively resolve the same.

Inaugurating the symposium, Dr. Rai said India is moving and agriculture development is the only way through which it can be projected as a global leader. The future of agriculture depends upon improving the quality of agricultural education and strengthening the research system in order to meet out the emerging challenges of economic liberalization and globalization. Presenting the data on scientific manpower in India in relation to developed countries, he pinpointed the need for increased manpower input in accelerating the process of development of Indian agriculture. He emphasized the need of judicious utilization of human and non human resources. In the present scenario, the mandate of education should not only to provide degrees but also to make them professionally sound and competent enough for self-employment. He also mentioned that it is a matter of great satisfaction that India achieved remarkable increase in per capita income last year but as far as GDP is concerned the effort should be made to achieve 6 per cent growth rate. The Director General, ICAR also discussed the cutting edge and frontier technologies in agriculture and emphasized the need for improving the agricultural education system, that not only will provide world class education to the students but will make them internationally recognized.

Shreeji Arvind Singhji Mewar, in his presidential address advocated the need based education system, which develops

professional competency in the youth to make the education system of the century more rewarding. Pointing out on University Autonomy, he stated that autonomy should be linked with a sense of responsibility, which should infuse from the core of the heart of the people.

Dr. S.S. Baghel, President, IAUA, and Vice-Chancellor, CAU, Imphal gave detailed account of objectives and activities of IAUA. Dr. Baghel strongly expressed that ban on new recruitment of scientists in Universities has stopped the pace of agricultural development in the country. Agriculture being the most important sector should be looked with the same angles to give the priority to the recruitments of the scientists in order to meet the challenges of globalization and liberalization.

Dr. A.N. Mathur, Dean College of Technology and Engineering, Udaipur and the University Nodal Officer of the symposium extended vote of thanks.

2. TECHNICAL SESSION-I ON STATUS OF AGRICULTURAL EDUCATION IN INDIA

Chairman	:	**Dr. Mangala Rai**, Secretary, DARE and DG, ICAR
Co-Chairman	:	**Dr. A. Alam**, Vice-Chancellor, SKUAST, Srinagar
Speakers	:	**Dr. J.C. Katyal,** DDG (Edn.), ICAR, New Delhi
		Dr. S.L. Mehta, N D (NATP), ICAR, New Delhi
		Dr. Tej Pratap, VC, CSKKV, Palampur
		Dr. A. Alam, VC, SKUAST, Srinagar
Rapporteur	:	**Dr. Ritu Singhvi**, Assoc. Prof. & Head, MPUAT, Udaipur

The Chairman in his opening remarks emphasized the importance of this session and stated that the agricultural universities have made significant contribution in the improvement of teaching, research and extension. However, there exists vast scope for further improvement in upgrading the quality of our graduates. The following four speakers presented their papers.

Dr. J.C. Katyal in his paper on "**Employment oriented agricultural education**", discussed the status of human resources and the strength and weaknesses of the system. He emphasized the need to stress the States Government to reset their Act on those lines for uniform governing of the SAUs. Analysing the job opportunity pattern, he suggested that there is possibility of higher job opportunities in private sector in agriculture for which required strategies are to be formulated.

Dr.Tej Pratap presenting paper on "**Emerging requirement and modeling of higher education for self-employment**" stressed need to have market responsive curricula for producing knowledgeable and skillful professionals. There is necessity to prepare the universities in the era of WTO and GAT regime and the lot of things has to be done to achieve it. This will also require the changes in university governance and management.

Dr. S.L. Mehta presenting his paper on "**Future opportunities of National Agricultural Education System**" described our success in the agriculture due to NAES and highlighted the future opportunities. The present curriculum is not

in tune with the time. All the institutions will have to be connected through network for achieving excellence. There is need to generate the resources and increase the private sector participation as done by MPUAT, Udaipur by involving the R.R. Morarka Foundation for running a job oriented PGDOAM.

Dr. A. Alam presenting a paper on **"Relevance of information technology in quality improvement in higher education"** informed that the use of information technology in this sector would help in internationalizing our NAES. There is necessity to have an interactive web site with range of data base. The stress must be given on computer education in our UG and PG programmes.

These presentations were followed by discussion. The following recommendations emerged from the deliberation in this session:

1. In view of rising unemployment the agricultural education needs reorientation by introducing courses in new upcoming areas of employment and making it professional.
2. The four year B.Sc.(Ag.) programme needs to be redistributed with two years study of basic courses, one year for professional learning and one year for long interactive sessions.
3. Looking to the status of the institutions imparting education in the country, the Government of India should depute the teams of experts comprising Vice-Chancellors, Deans and Directors to visit potential countries, specially African countries, for marketing our expertise and capabilities. The team must also explore the possibility of giving assistance in developing their human resources and also developing their institutions. Besides the visiting team should convenience our competence in assisting their countries for improvement in education system in those countries and opening of campuses in some countries.
4. All Agricultural Universities while implementing the Model Act of the Indian Council of Agricultural Research, some of the provisions made in the act need to be reviewed and necessary amendments for effective functioning of SAUs be made.

It was unanimously resolved that the tenure of Vice-Chancellors in SAU must be 5 years instead of 3 years (in some universities) and the age of retirement of Vice-Chancellors

should be 67 years instead of 65 years prevalent in some of the universities so as to effectively make use of their expertise, insight and perception and also to provide a reasonable span of time to plan and perform in accordance to the set vision of developing the universities by the Vice-Chancellors, specially in the context of new challenges arising from economic reforms and globalization including GATS under WTO. It is also more logical in view of the decision of the Indian Council Agricultural Research for enhancing the superannuation age of agricultural university teachers/scientists from 60 to 62. There is an urgent need to initiate the process of recruitment of the faculty in SAUs/ NAES to prevent the sliding down of progress made so far in the system. There is an urgent need to recruit the faculty in the several newly emerging areas covering Biotechnology, Space Technology, Environmental Sciences, Food Technology and Information Technology, etc.

5. The tenure of Vice-Chancellor should be made 5 years in all SAUs in place of present 3 years. As such, these modifications will enable the Vice-Chancellors of SAUs to play more effective role for longer duration to meet the challenges of emerging scenario in advancement of agriculture as a whole. In some Universities, however, there is no upper age limit for the Vice-Chancellors.

3. TECHNICAL SESSION-II ON UNIVERSITY AUTONOMY – CONCEPTS AND ISSUES

Chairman	:	**Dr. A.G. Sawant**, Member, ASRB, New Delhi
Co-Chairman	:	**Dr. Parmatma Singh,** Vice-Chancellor, RAU, Bikaner
Speakers	:	**Dr.K.N. Nag,** Ex-VC, RAU, Bikaner **Dr. S.N. Puri,** VC, MPKV, Rahuri **Dr. V.B. Singh,** Ex-VC, MPUAT, Udaipur **Dr. G.S. Sharma,** Dean, RCA, MPUAT, Udaipur
Rapporteur	:	**Dr. Suman Singh**, Assoc. Prof. & Former Head, MPUAT, Udaipur

Dr. K.N. Nag, Ex. Vice-Chancellor of Rajasthan Agricultural University, Bikaner (Raj.) in his paper **"University autonomy-A need"** stressed the importance of Autonomy in University at all the levels. He expressed grave concern over the recent discouraging trend of compulsion of University to prove their transparency, thus resulting in loss of autonomy. He further specified that this transparency has to be proven at Government, public and politician level. Dr. Nag suggested that statutory powers should rest with the ICAR to convince the State Governments for the maintenance of autonomy of the university.

Dr. S.N. Puri, Vice-Chancellor of MKPU, Rahuri delivered paper on **"Accountability in autonomy - A real perspective".** He emphasized and added perspective of accountability to autonomy. His deliberations reflected accountability in terms of freedom to start new courses, create new posts and also to re-deploy the staff. Further he stressed that constitution of BOM should be reviewed and larger number of members from academics should be included. Dr. Puri brought this important point home that autonomy brings power and combined power and responsibility should be correlated.

Dr. V.B. Singh, Ex Vice-Chancellor, Maharana Pratap University of Agriculture & Technology, Udaipur presented his paper on **"Significance of autonomy-issues for sustainable quality in higher education".** He advocated the restrictions of intake in higher education on the basis of merit and channelized the remaining

sub-standard out turned students in vocation education. He felt the need to recruit faculty on merit basis and update them through refresher trainings.

Dr. G.S. Sharma, Dean, Rajasthan College of Agriculture, Udaipur expressed his views on the topic "**Organization and management of agricultural educational system in India**". He opined that the fate of agriculture development in India rests on corner stone of education. Therefore, the academics in university *vis-a-vis* teaching should be re-strengthened primarily so as to set a stage for the chain like manifestation in research and extension.

The representations were followed by intense and in depth discussions and following recommendations were emerged:

1. There is a need for complete autonomy in university at all levels, which includes the freedom to start new courses, create new post and re-appropriate staff.
2. The ICAR should convince the state Government for the maintenance of autonomy of the universities including financial autonomy.
3. The restrictions be imposed on the intake in higher education on the basis of merit and channelized the remaining sub-standard out turned students in vocational education.
4. Ensure recruitment of faculty on merit with adequate scope for updating them through refresher training on regular basis.

4. COMBINED SESSION-III & IV ON "CHALLENGES AND OPPORTUNITIES OF HIGHER EDUCATION VIS-À-VIS TEACHING, RESEARCH AND EXTENSION EDUCATION" AND "EXCELLENCE AND QUALITY ASSURANCE IN HIGHER AGRICULTURAL EDUCATION IN THE CONTEXT OF GLOBALIZATION"

Chairman	:	**Padmashri J.S.P. Yadav**, Ex-Chairman, ASRB, New Delhi
Co-Chairman	:	**Dr. Kirti Singh**, Ex Vice-Chancellor & Ex-member and Chairman, ASRB, New Delhi
Speakers	:	**Dr. D.P. Singh**, Vice-Chancellor, JNKVV, Jabalpur, **Dr. A.N. Mathur**, Dean, CTAE, MPUAT, Udaipur, **Dr. (Mrs.) P. Gupta**, Dean, CHS, MPUAT, Udaipur, **Dr. J.S. Chauhan**, Dean, Ag., Nauni, Solan, **Dr. S.S. Baghel**, Vice-Chancellor, CAU, Imphal **Dr . R. P. Singh,** Vice-Chancellor, MPUAT, Udaipur **Dr. P.K. Jain**, Director, CMS, MLSU, Udaipur **Dr P. K. Dashora,** Assoc. Prof. MPUAT Udaipur
Rapporteur	:	**Dr. Asha Singhal**, Associate Professor, CHS, MPUAT, Udaipur.

At the outset, Padmashri Yadav ji introduced the speakers of this session and stressed the crucial need of curriculum revision in the wake of changing scenario and globalization in order to improve the quality of higher education.

Dr. D.P. Singh, in his paper "**Curricula relevance of higher education in agricultural sciences in the new millennium**" introduced the topic and stressed the need of reorienting the Agricultural Education System to improve the quality of higher education with respect to curricula relevance, strengthening of infrastructure facilities with modern equipment and need based meaningful HRD. While discussing on unemployment problem among graduates, food sustainability in addition to nutrition security and management of resources, there is a need for very strong globally competitive education, cost effective remunerative agricultural technology and development of course curriculum with

much wider social obligations.

Dr. A.N. Mathur, presenting his thoughts on "**Curricula relevance of higher education in agricultural engineering in the realm of higher education**" advocated the need of restructuring of curriculum and syllabi, adoption of accreditation systems from many agencies such as NBA, AICTE, NAAC besides ICAR so as to make the agricultural engineering education globally competitive. He emphasized the need for identifying the PG programmes in the areas of Irrigation Water Management, Renewable Energy Technology and Post Harvest Technology and Engineering as major disciplines besides three areas already notified by the ICAR to produce the engineers who can be jobs providers rather than job seekers.

Dr. (Mrs.) P. Gupta presenting paper on " **Curricula relevance of higher education in home science in the New Millennium**" intensively reviewed the Home Science curriculum from dual dimensions i.e. from family/home based skill development orientation to career oriented community based experiences, which leads to developing professional skills and competence. While giving the dimensions, she highlighted the pros and cons of 3 and 4 year systems of under-graduate studies in Home Science.

Dr. J.S. Chauhan presenting paper on "**Curricula relevance of higher education in horticulture and forestry sciences in new millennium**" touched the historical aspects of horticulture and forestry sciences and gave the paradigm shift of agricultural education from that of public sector to private sector, quantity to quality produce local market focus to global market, etc. He also proposed modification in the UG and PG curriculum.

Dr. Baghel presented a detailed scenario of agricultural education in context of globalization and WTO and its effect on different facets of life while presenting the paper on "**Demand driven avenues of higher education in the context of globalization**". It was emphasized that agricultural education should meet the national needs in terms of production sustainability and international needs in the context of training in specialized areas.

Dr. P.K. Jain presented his views on "**Higher education under WTO regime**".

The education system as a whole and agriculture education in

particular will have to look into the various aspects in great detail. The ICAR should give top priority to support the SAUs to meet the emerging challenges. He highlighted the various clauses of WTO.

Dr R. P. Singh, presented his paper **"Threats and opportunities of higher education in agriculture in the context of GATS".** He summerised the challenges of agriculture education and opportunities under GATS.

Dr P. K. Dashora, presented paper on "**Employment oriented agricultural education**". He stressed the needs of maintaining quality of education and pleaded a case for introduction of moral education in the syllabus.

The following recommendations emerged from the deliberations in this combined session:

1. A necessity has been felt to strengthen the NAES and providing support for student's education, earn while you learn, placement, entrepreneurship development and vocational education. The state governments should participate equally for the development of the institutions in SAUs.
2. The degree programmes should include the specialization in some of the emerging areas such as Crop Improvement, Natural Resource Management, Pest Management, Precision Farming, Horticulture and Forestry, Crop Production and Crop Diversification, Mechanization Practices, Fashion Designing, Rural Home Management, Rural and Social Sciences, etc. so that these can lead to self employment. Further, there is a need to introduce need-based courses and their regular revision with change in socio-economic condition of stakeholders.
3. There is an emergent need to recruit against large number of existing vacancies in NAES otherwise the progress made so far will start sliding down. Besides, there is an urgent necessity to recruit the faculty in the several newly emerging areas covering Biotechnology, Space Technology, Environmental Sciences, Food Technology and Information Technology, etc.
4. The Master's Degree in Agriculture Engineering should be awarded with specialization in major areas of Irrigation Water Management, Renewable Energy Technology and Post Harvest Technology and Engineering also. Further, to meet the quality of higher education in Agriculture Engineering the accreditation should be sought from NAB, AICTE, and NAAC besides ICAR.

5. It is necessary to hold a meeting of Deans of Home Science Colleges, Senior Home Scientists of SAUs. The Deans/Heads in traditional university be invited to discuss various issues related to higher education in Home Science in SAUs to make the programme viable, professional and carrier oriented. Other issues related to nomenclature, duration of degree programme and specialization, etc. can also be discussed there.

5. VALEDICTORY CUM PANEL DISCUSSION

Dr. A.S. Faroda	:	Chairman, ASRB, New Delhi
Dr. S.N. Puri	:	Vice-Chancellor, MPKV, Rauhri
Dr. S.S. Magar	:	Vice-Chancellor, BSKKV, Dapoli
Dr. S.L. Mehta	:	ND, ICAR, New Delhi
Dr. R.C. Maheshwari	:	ADG (TC), ICAR, New Delhi
Dr. R.P. Singh	:	Vice-Chancellor, MPUAT, Udaipur

The reports of the various Technical Sessions were presented by the Rapporteurs of the sessions and adopted.

The following additional recommendations emerged from the discussion:

1. The concept of autonomy should be crystallized and its implication should be specified viz., legal, financial and administrative.
2. The SAUs should set-up Tribunals to redress the grievances of the employees in view of large number of court cases.
3. Immediate steps should be taken to make SAUs financially strong. The IAUA as an apex body should also make efforts to get support for NAES from Planning Commission, etc.
4. The resources generated by the university should not form part of university recurring budget.
5. The State Governments should be stressed to provide one per cent of the sales tax generating from agricultural produce to Agricultural Universities for research and education.
6. The government should not delay the nominations on various committees as per provision under the University Act.

Dr. R.P. Singh, Executive Secretary, IAUA presented a brief overview of progress achieved and various programmes in hand in the IAUA.

Dr. A.S. Faroda expressed his gratitude to the organizers for the meticulous conduct of the symposium.

Dr. R.P. Singh, Vice-Chancellor, Maharana Pratap University of Agriculture and Technology, Udaipur humbly expressed his gratitude to the Director General, ICAR officials and Vice-Chancellors and Other officials of SAUs for their whole-hearted support.

LEAD PAPERS

CONTENTS

1

Employment – Oriented Agricultural Education

*J.C. Katyal**

AGRICULTURAL EDUCATION

History

The history of agricultural education could be traced back to ancient time when agriculture was included in the curricula of Nalnda and Takshila Universities as one of the 18 arts. However, organized courses in agricultural education started in the beginning of 20th century when six agricultural colleges were established at Layalpur, Kanpur, Nagpur and Coimbtore in 1905 and Pune in 1907 and at Sabhour in 1908. In the year 1905 IARI was setup at PUSA. The ICAR was launched in 1929. At the time of independence, we had 17 colleges for agriculture and allied sciences. During that period, teaching was done at colleges, whereas research and extension were the responsibilities of state government staff. No linkages were existing between teaching staff and research and extension staff.

Soon after independence the urgency of bringing and rapid increase in food grain production necessitated re-examination of existing pattern of agricultural education. Need was also felt for establishing closer inter-relationship between research, extension and teaching programme, which was not possible under general university education system. The several committees and commissions made to review agricultural education system and as an outcome a special status is given to agricultural education in our country and recommended five steps to effect it:

- As a first step, education programmes are reoriented and reorganized, to include practical skill improvement and location specific problems to serve farmers.
- The second step was setting up of ICAE.

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- As a part of third step, first SAU at Pantnagar was established in 1960 at Pantnagar on Land Grand University pattern of USA. Prior that IARI in 1958 got deemed to be university status.
- Fourth step : to establish one SAU in each state.
- Fifth step : reorganization of ICAR in 1966 into 4 divisions, Agricultural Education was one of the four divisions.

At present ICAR through education division coordinates, supports and guides the SAU's. The ICAR also provides developmental and strengthening grant to SAU's. At present ICAR relationship with SAU's lacks statutory authority as is available to UGC/VCI. Therefore, SAU's have no binding say to reform in agricultural education:

Agricultural Education

Set up :

At present, there are 34 State Agricultural Universities, which includes University on Animal, Veterinary and fisheries and one on Horticulture and Forestry. There are four deemed universities under direct control ICAR and one outside the purview of ICAR i.e. Allahabad Agricultural Institute. Also, one Central Agricultural University (CAU) in Imphal (Manipur), and three Central Universities (CU) are having faculty of Agriculture. Besides, there are about 50 private colleges imparting agriculture education and are mostly affiliated to general universities.

Table : The distribution of universities and college in our country

University	No. of Universities	No. of colleges
SAU	34	200
CAU	01	06
DU	05	10
CU	03	03
IIT	01	01
General Universities	16	41
Total:	60	251

Programme:

In the state of Rajasthan and Uttar Pradesh, there exists distinct stream on agriculture at school level. The Swaminathan committee

on education in 1997 has recommended not to launch separate stream at pre-high school level but suggested to introduce some components of agriculture subject in the existing curricula. The committee came up with recommendation to introduce agriculture as an optional subject in curricula at 10+2 (Sr. high secondary) level.

Undergraduate Programme:

At under graduate level, there are 11 faculties offering 11-degree programmes in agriculture. The present intake capacity at undergraduate level is 13500 students per annum, which includes about 3000 students in private colleges. The faculty-wise distribution includes 8600 in agriculture, 2000 in veterinary, 750 each in Agricultural Engineering and Home Science streams. In Maharastra 5 SAU's admit 2200 students for undergraduate programme.

Postgraduate Programme:

The postgraduate programme includes M.Sc. and Ph.D. degrees. At present 52 universities (including 19 general) offers M.Sc. programme and 41 universities (including 9 general) offers Ph.D. programme in 95 and 80 disciplines at postgraduate and Ph.D. level respectively. The intake capacity at masters and Ph.D. levels in 6000 and 1550 respectively. The majority of admissions are in agriculture, food science and technology disciplines, whereas sericulture admits a few number of students.

All the universities and colleges have a uniform duration for M.Sc. and Ph.D. programmes and in 2 years for M.Sc. and 3 years for Ph.D. But, there exists variation in total credit hours, distribution among major and minor fields, grading for research and evaluation procedure. The ICAR in association with SAU's has developed a model academic regulations, curricula and syllabi, which is likely to be implemented from the coming session all over the country.

Faculty Status:

About 19000 faculty positions are filled-in out of sanctioned strength 23000. This includes all positions, whether borne exclusively on teaching or not. The present state of filled-in positions includes 87 per cent Assistant Professor, 76 per cent Associate Professor and 79 per cent at Professor level respectively. The relative proportion of females is 20 per cent of all filled-in positions and 10 per cent at Assistant Professor, 6 per cent Associate

Professor and 4 per cent Professor level respectively.

University Governance:

To ensure a certain minimum uniformity in the structure, organization and governance of SAU's as well as to provide a sound base for their development, the ICAR developed its model act for Agricultural Universities in 1966 after which the acts of most of earlier SAU's were patterned.

The model Act (1966), had envisaged the SAU's as mono campus (one SAU/ state) institutions in each state, having integration of teaching, research and extension functions with jurisdiction over entire state. However, in course of time most of the SAU's have become multi-campus institutions with campus scattered throughout the jurisdiction area, and in many states university number also multiplied going up to even four in Maharastra. The model Act was revised twice in 1984 and 1994. The model act 1994 has detailed guidelines on various aspects of university functioning related to teaching, research and extension education programmes.

Employment Scenario :

So far SAU's and other institutions have produced allied subjects, among it are 1,66,200 at undergraduate level, 78200 at M.Sc. and 11400 at doctorate levels respectively. The discipline-wise distribution of total stock of graduates includes 1,24,745 graduates, 77760 M.Sc. and 6905 Ph.D. in agriculture and allied subjects and 292995 graduates, 11885 M.Sc. and 4470 Ph.D. in Veterinary and allied subjects.

The employment pattern of graduates indicated public sector as main employer. The private sector employment is high for agriculture and allied subjects as compared to that of veterinary subjects. The entrepreneurship development is very low among both agricultural and veterinary graduates. Many opportunities are likely to be exploded by agriculture graduates. Also reorientation in education system may offer vast employment potential untapped so far.

The present employment pattern of agriculture and veterinary graduates in various sectors is given in table 2:

Table : Employment pattern(%) among Agriculture and Veterinary graduates

Employment Sector	Agriculture Graduates	Veterinary Graduates
Public	50	65
Private	20	03
Research & Academics	12	11
Financial Institutions & NGO	06	01
Self-employed	02	10
Inactive/migrated	10	10

Evaluation of Employment Pattern:

The Agricultural Universities were set up with the purpose to develop agriculture graduates capable of assisting in modernization of agriculture through knowledge of improved agriculture practices. The post graduate education was developed to prepare human resources to carry out research in order to enhance productivity of field crops in local environment.

The early job opportunities came mostly from the public sector and problem of unemployment was hardly an issue in early days in the beginning of 1990s. With opening up of economy, greater emphasis was laid on private sector and therefore employment opportunities in public sector started declining. During this period accelerated growth of industries and services has initiated large scale migration of rural communities to urban areas and thus have reduced the importance of agriculture for employment.

Further, the studies forecasted that it pretend continue by 2020 the contribution of agriculture to GDP will come down to merely 7 per cent as compared to 25 per cent now. The rise in service sector and industrial growth, to some extent, will fill the GDP gap created due to fall in relative contribution of agriculture sector. In the present context, the graduates loaded with knowledge in traditional subjects lack creativity and business management skills to be relevant to demand of manufacturing and service industry.

The other factors for present employment scenes are:

- General complacency towards investments in agriculture on account of comfortable food situation.

- Warning attention to and investment in agriculture not specific to India – it is a global phenomena.
- Falling investment areas on causing drying up of employment avenues in the government/public sector.

The Globalization of Commerce in Agriculture, guided by WTA has its own influence on the quality of manpower to service agriculture sectors. There is a specific demand for agricultural graduates who are well versed with various clause of WTA. But present education system lacks adoption of these lines, in the curricula makes the available graduates less suitable for the market needs.

As globalization of trade roots deep into agriculture, farm produce will become competitive price-wise and acceptable quality-wise. The trade in value added processed foods would occupy a prime place, when the WTA is in full operation. Currently, there is only 7% value addition to the raw produce in India, as compared 23% in China, 45% in the Philippines and 188% in United Kingdom. The surge in value addition through primary and secondary processing of agricultural produce will come in the forefront. There will be increased role of S&T to build industrial aspects of agriculture and develop agriculture as an industry this infusion to take place agri-advisory services are required to be strengthened. There is need for individuals having relevant knowledge in modem subjects and experience in real life situations. The currently available graduates are found not well versed in subject knowledge suiting emerging market demand and also lack confidence in providing solutions to common field problems. The consequence of this mismatch is also responsible for this rising state of unemployment of agricultural graduates.

Rising Unemployment - A dilemma of Agricultural Education :

The study conducted by Applied Manpower Research Institute (AMRI) in 2000 to study employment status of agricultural graduates revealed that about 43% agricultural graduates are unemployed. The unemployment figure for postgraduates is around 23%.

The study also predicated that annual national demand for agricultural and veterinary graduates is about 700 and 1550 respectively. By year 2010, the cumulative gap (i.e. excess supply of graduates over demand at current rate employment) will be 34000 for agricultural graduates and 6000 for veterinary graduates.

The symptoms of unemployment can be seen through rising number of RAs and continuation of temporary employment for even more than 6 years. There are few takes for agri-business and agri-clinic scheme. Out of 18,885 applicants, only 3762 turned out for training and merely 676 set up agri-business ventures. Thus, a success rate of only 18 per cent (MANAGE) is observed for this self employment programme. The reason for this poor state is enormous, but it is felt that training is good but not adequate. There is urgent need to develop flare of agri-business at College/University level and that can be achieved through building enterprise courses and make specialized practical training essential at graduate level.

The rising unemployment scenario also reflected persistent inflexibility and impassivity to redesign and re-engineer existing course curricula suiting to contemporary and emerging market needs. Therefore, the graduates coming out are neither confident nor competent to create self-employment. They, generally, lack creativity and enterpreneurship spirit. They find themselves ill equipped to be accepted for positions in industry, agri-business houses and emerging areas of science, technology and trade. There is a need, to have watch on merging job market trends, identifying their requirements and develop a course package as part of reorienting education and make it more employment oriented.

A study by NAARM to know willingness and mindset of graduates on setting up service centres in villages confirmed the aforesaid deficiencies. Only two out of 60 graduates accepted the agri-business/agri-clinics scheme of self-employment. The state government jobs are still first choice of graduates. The choice for private jobs and self-employment was observed fifth and eight. The main reasons to this poor stake are lack of confidence and business knowledge. Therefore, it is suggested to include subjects on project and agri-business management with opportunities for practical trainings.

Employment Oriented Agricultural Education Issues:

The important issues of present state of employment and agricultural education are:

- Decline in the share of employment in public sector
- Lack of update knowledge on needs of employment opportunities with other sectors of economy and no dialogue

with perspective stakeholders of education.

- Lack of enterpreneurship competence among agricultural graduates less than 2% currently self employed.
- Mismatch in manpower availability and the areas of need.
- Inflexible course curricula faculty competence concentrated in traditional subjects, old and outdated infrastructure.
- Sharp surge in female students.
- Education under GATS (General Agreement on Trade in Services) becomes business. Quality and competitiveness in sustaining it becomes the hallmark of futuristic agricultural education system and set-up.
- Duration of graduate programme and its distribution among teaching in basic subjects and practice sessions.
- Agricultural education a professional course requires support services of para-professionals.
- Expansion of lower level of education is as much an issue as is the higher level of agricultural education.

Strategies and Activities:

The strategies and activities to make agricultural education more employment oriented are:

- Manpower need assessment – tapping future employment avenues requires re-engineering agricultural education in consonance with needs of stakeholders.
- Course curriculum revision – Introduction of subjects in upcoming areas of employment, needs of perspective employers and charging scene in agricultural trade and environmental management.
- Education Methodology – produce professionals suiting market needs, move from teaching to learning with increased emphasis on hands on practice in real life situations.
- Linkages – intensive tie-ups between SAU's/Institutions and development departments/industry/NGOs is a must to increase field of exposure for practical training.
- Facilities and Faculty up-gradation – In order to reduce formal academic load and to expand room for practice and innovativeness through hands on training it will be necessary

to build infrastructures (like model plants and Instructional Farms etc.).

- Building faculty competence and capability in emerging areas of science and technology and developing skills in vocational courses.

ACTIVITY ROAD MAP – CRITICAL REQUIREMENTS AND ACTIONS:

Manpower need assessment and requirements:

The assessment is built through a comprehensive review of the various sectors of economy by identifying the number and kind of manpower needed sector and region-wise. In order to give re-orientation to agricultural education to support forecasted manpower requirements, it is essential to know the present skill composition *vis-à-vis* the futuristic job profiles. The manpower need assessment should be treated as priority activity to be undertaken by each SAU for its domain area. In order to make a countrywide need assessment, ICAR education division may coordinate or support a project on above lines for manpower assessment.

Curriculum Planning and Reorientation:

In order to capture the stakeholder perspective and changing market demand, curriculum review is a major lamppost of activity roadmap. No doubt curriculum revision is and development is a dynamic process and should respond to changing national compulsions and market vibes. In that pursuit, it is necessary to infuse right perspective in curriculum changes, which are aligned with competencies required in the futuristic agricultural graduates.

Course curricula review at school, graduate and postgraduate level:

At the school level, village environment should influence and enrich the course curricula. The teaching learning process should centre on local resources, management options and crop growing environment. In this natural setting, a student is encouraged to observe, learn, experience and even collect live specimens of soil, water, fauna and flora.

The life sciences can be taught and learnt in an integrated manner studying the field crops, ecological principles and how farmers handle diverse natural resources by selecting crops and

their varieties to meet the feed requirements of their livestock and food and other needs of their families.

At the undergraduate level, the course curricula review should address employability of future graduates by developing professional excellence through teaching in real life subjects. The new syllabus should be relevant, responsive and sensitive to changing needs of farming community, industry and external pressures generated by WTA and related issues like IPR. The introduction of courses in food processing, business management including market and trade, international treaties and agreements and information technology should be part of new look graduate programme.

Distribution of four year graduate programme:

Under the proposed new modified system, the first two years will be allocated for teaching – learning in basic courses of agriculture including crop ad animal husbandry. The teaching of soils as an important natural resource will also be taken up during this period. In addition, ecological principles, operation of agricultural equipment and information technology subject will be given due consideration. In order to strengthen work experience, the passive classroom teaching shall be reduced and more emphasis be given to practical sessions, thereby increasing learning opportunities.

The third year of programme will be devoted for hands on training in any one subject of professional learning in the field, factory, business enterprises, engineering workshop or a model plant. Since the final objective is to infuse creativity, confidence, competitiveness and enterpreneurship spirit among graduating students, the training must be most comprehensive covering each aspect of trade from beginning (say cultivation) to end (say consumption).

The fourth year will cover learning in multidisciplinary subjects through long interactive sessions involving students and faculty. This is the period when teaching in subjects of business management, marketing and international treaties and conventions should be introduced. Since the learning sessions are for the development of ideas and plans for working out solutions of a problem, the format used shall be brain storming and based on case studies.

The post graduate level agricultural education should look for development of professionals by building academic brilliance and professional excellence for sustainable development. While endeavoring that it will be necessary to enrich the course curricula by balancing employment generation and country's economic growth against biodiversity conservation, value addition, moderating global warming and preserving quality of soil, water and vegetation.

The over exploitation of natural resources, changing land use and management patterns forced by rising demand for food and other goods, globalization of trade, increasing use of bio-technology and policy issues emerging out from opening policy of economics will call for inclusion of topics relating to the internal and external pressures while planning teaching and research activities. The goal oriented research shall be put on prime place and merry-go-round research a back seat.

2

Emerging Requirements and Modeling of Higher Education For Self-Employment

Tej Partap*, Pritam K. Sharma** and H. R. Sharma***

This paper documents the objectivity and need for change in agricultural education system and modeling of higher education for meeting the current challenges posed by the ongoing process of economic change and to promote self-employment. Different aspects covered include need for change in agri-education system, emerging requirements, the current status of Agri. education in mountain perspective, existing problems besetting agri. education, priority areas for future and, some suggestions for improving the quality of agricultural teaching and research to promote avenues for self employment.

The Need for Change in Agricultural Educational System

There are number of factors that call for change the agricultural education system to cater to the emerging needs and requirements. The most important change in recent years has been the ongoing process of liberalisation and privatization that has led to gradual withdrawal of government grants and patronage in many economic activities and services including agricultural education. Further the process of globalisation through international agreements like WTO which has thrown up both challenges and opportunities that can be harnessed by bringing about required changes in the agricultural education and research in the country. Yet another important factor that requires change in agricultural research agenda is the climate Change, especially for hill and mountain eco-systems, which are much more vulnerable to these changes compared to other eco-systems. The above-mentioned changes have serious implications

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for higher education, especially in agriculture. For example, the R & D institutions have now to compete with resource rich transnational and multinational corporations to justify their existence.

Emerging Requirements: The Need for Change

As mentioned above, in today's context, when the multinational and private sector posing challenge to the public funded R & D institutions, there is a dire need for ensuring exacting standards in education, research and extension. This could be done through a number of ways. First, ensuring continuous revision and updating of course curricula incorporating latest developments in different fields. Second, continuous training and updating of faculty's know-how through short term refresher courses. Third, there needs to be given more emphasis on the development of entrepreneurial development and management capabilities. Fourth, providing infrastructures and other facilities like computers, latest literature, etc

The Current Status of Agricultural Education in Mountains

The current agricultural education and research system suffers from some limitations, especially of those institutions that are located in the hills and mountains that have unique features and are expected to cater to their needs and requirements. For example, it is insensitive and unsuitable to the ecological and socio-economic conditions in the mountains. Second, it is based on the monoculture of individual crops whereas agriculture in the mountains is largely based on integrated crop-livestock-agro-forestry farming systems. Third, inadequate emphasis on sustainable use of natural resources, most of which are exploited beyond their carrying capacity. Fourth, weak linkages of educational institutions with research institutes, extension organizations, and the public sector development organization. Fifth, little inter-linkages of teaching institutions with farmer and therefore, resulting into mismatch between the farmers' needs and requirements and the education being imparted.

Current Problem Besetting Agricultural Education

In terms of resource allocation to agricultural research and education which less than 1 per cent of GDP, it has not got the priority it deserves despite the fact that two-thirds of population continue to depend on agriculture for their livelihood. The agricultural

education is least preferred, particularly in the current circumstances when the gap between available jobs and the number of agricultural graduates being produced tend to widen every day. Further, there is a preference for supporting urban based agriculture rather than working in the rural areas The most important problem, however, is that the course curricula tend to be uniform without inadequate focus on regional specificities and that there is too much compartmentalization in basic and applied education and research

The yet another important problem in agricultural education is that the course curricula continues to be designed mainly for irrigated areas and most favoured crops. There is very little scope for incorporating regional/ mountain specificities. There is also an inadequate emphasis on livestock, forestry, and range management and these are important activities in the mountains. There is a lack of expertise in agriculture at the senior management level. Further, there is inadequate linkages with state agricultural departments, which have the responsibility of agricultural development. Many of the agricultural education institutions have no outreach programme and the scientists-farmers' interaction is very low.

Priority Areas for Future

In our wisdom, the above-mentioned weaknesses can be overcome by undertaking suitable measures. Some of these are listed below. First, overcoming past neglect of mountain agricultural education and research. Second, redesigning agricultural education and research for sustainable mountain agriculture. Third, ensuring close cooperation between national and international agricultural research centres. Fourth, integrating education-research and extension programme. Fifth, more emphasis on entrepreneurship development and market intelligence and management, especially in today's economic context, need to be given. Sixth, introduction of courses that have high employment potential and are demand driven like agri-business management, biotechnology, post-harvest technology, marketing should be introduced. Seventh, in the changed context, the private sector participation in agricultural education and research should be allowed to generate adequate resources. Eighth, promoting better linkages with the industries to make the education more relevant to needs of the industrial sector. Ninth, instituting a suitable system of rewards and punishments for encouraging excellence Tenth, incorporating management concerns

and entrepreneurial education into the course curricula. Eleventh, giving more emphasis on consolidation rather than proliferation of agricultural educational institution

Improving the Quality of Teaching: Some Suggestions

The following are some the suggestions to improve the quality of agricultural education to meet the current challenges.

- To impart pedagogical training of teachers
- Discouraging inbreeding
- Active involvement of faculty members in the development/ changing education system
- Effective tutorials and advisory system
- Judicious mix of external and internal system of evaluation
- Proper balance between basic and applied knowledge
- Using modern multi-media and other modern teaching aides for imparting effective education.
- Instituting short term training courses on different enterprises like bee-keeping, dairy, mushroom, sericulture, rabbitary, and so on
- Encouraging the agricultural graduates to enter into the business of seed production, seed and agro-chemical supplies and providing extension services, know-how about post harvest technology, etc.
- Taking up marketing and export of agricultural produce especially in the areas growing high value cash crops.
- Taking up small-scale agro-processing activities
- Fruit nurseries and vegetable growing.

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3

Future Opportunities of National Agricultural Education System

S. L. Mehta*

The spectacular agricultural growth since early sixties has mainly been due to the development of skilled agricultural human resource that were instrumental in generation- assessment and refinement of technologies and their dissemination to the farming community. High receptivity of the farming communities and helpful government policies propelled the agricultural transformation. In a span of five decades, food grain production increased from a mere 57 MT in 1951 to 211.3 MT in 2001-2002. This is a record which is envied by many nations of the world. India also has become the second largest producer of wheat and rice and third largest producer of sugarcane. In fruits & vegetables production, India shares first position with China. Similarly, in animal husbandry & dairy sector the progress has been impressive & we are today largest producer of milk (85 MT).

Today, country is not only self-sufficient in meeting the food needs of vastly increased population but also has built a buffer stock of over 60 million tonnes of food grains to tide-over any shortages which may arise because of bad weather conditions. In fact, despite worst drought last year, food prices have remained more or less constant because of resilience and huge buffer stocks. The success in agricultural production has been mainly on account of development of skilled human resources through institutions built over time. Establishment of Post-Graduate School in 1958 at IARI and first agricultural university at Pantnagar heralded the growth of agricultural education in the country with at least one SAU in each of the major states.

Present Status

Today the SAU system comprises 34 SAUs including 5 specialized universities (4 in Veterinary and Animal Sciences and one in Horticulture). One Central Agricultural University (CAU) for

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north-eastern-region and 5 Deemed-to-be-universities including four ICAR national institutes. In addition three General Universities (BHU, AMU, VB) have agriculture faculties and involved in teaching, research & extension.

Today, the education is imparted through 217 colleges of SAUs and 48 colleges of General Universities. The annual intake is about 14000 students at under graduate level, 6000 at M.Sc. level and 1800 at Ph.D level.

Emerging Concerns

Most of the SAUs at the beginning of their establishment recruited faculty largely on the basis of national merit. This coupled with extensive opportunities for overseas training because of support from USAID and tie up with land-grant universities of USA, helped development of faculty competence, this was the main reason that SAUs performed well and developed human resources which were instrumental in ushering green revolution. Over the years, we have developed the strongest NARS System ever.

We are proud of establishment and growth of state agricultural universities which have been instrumental in developing skilled human resource. The human resource developed by SAUs have so far delivered and have been instrumental in agricultural transformation in the country. However, in view of rapid technological development taking place globally, our SAU system needs to keep pace with changing development. While we could be proud of the past achievements, there are concerns which if not addressed, future opportunities will be lost and would leave us in the back seat.

i) Financial un-sustainability of the System: During early phase of SAUs establishment, both State Government and ICAR provided adequate funds for academic excellence. That led to the development of excellent infrastructure including laboratory facilities, equipments, library etc. However, with passage of time the support for SAUs declined by the State Government & ICAR. During IV, V &VI Plan ICAR's 25-30 % budget used to be allocated to SAUs for education. This declined to a mere 9% during VIII plan. At present, most of the SAUs are facing financial crisis. This is seriously impending the quality of instructions. The financial crisis is further compounded by

opening of new universities without consideration of merit or availability of financial resources. The sectoral division of SAUs is a new trend, which is hardly conducive to holistic education.

ii) Extensive Inbreeding: Most of the Universities as of now have inbreeding up to the extent of more than 85%. This is inversely proportional to the growth and academic improvement of the universities. It has also led to parochialism, and seriously affected quality of education.

iii) Poor Infrastructure: With the passage of time due to severe financial crunch the infrastructure development has been a casualty. Most universities have poor infrastructure, out-dated equipments, poor lecture halls, poor libraries etc. To remain in the forefront for developing new technologies taking advantages of advances in science and technology, it is imperative to develop state-of the-art facilities.

iv) Lack of career development plan for faculty : This is one area which has been more or less neglected in State Agricultural Universities for over a decade and a half. Most of the Institutions have no career development plans. The opportunities for training of faculty which existed during early part of their establishment, declined due to lack of donor support. Faculty competence is critical since faculty is the key resource for academic excellence. Unless the faculty keeps abreast with the new developments, it is hardly possible to impart the necessary skills to the graduates for developing competence. The role of teachers, in fact, is undergoing transformation. They instead of being only informer of knowledge are going to be knowledge navigators in the present century and this would necessitate training on a continued basis.

v) Proliferation of SAUs: In the absence of statutory control by ICAR for higher agricultural education many new sectoral State Agricultural Universities have opened agricultural universities disproportionate to the financial allocation. Although Model Act provided for single campus mutli-faculty universities, over the years many of the States have established more than one SAU with Maharashtra topping the list with 5 SAUs. Another retrograde tendency is the sectoral bifurcation of the SAUs. Despite the existing universities facing serious financial crunch, in total disregard, new institutions are being opened. There is

need to put moratorium on the opening of the new universities or colleges unless adequate financial support is forthcoming. A major policy decision needs to be taken in this regard.

Decline in Faculty

One of the fallout of financial crunch has also been the decline in faculty strength. Ex-Cadre promotions in most universities have led to inverted pyramid. Institutions like IARI face serious crisis with respect to faculty. Being a deemed university IARI played a vital role in developing human resource for the country. Also being a national institute it attracted bright faculty. This coupled with the cream of the country joining as students ensured leadership in agricultural science in almost all disciplines. Sadly this cannot be said now. In next 3-4 years many divisions in IARI will become non-descript with policy of 1 recruitment against 3 vacancies. With the present trend we are going to destroy the fabric of quality education with devastating effect on agricultural growth. The decay in academic institutions needs to be arrested immediately if country has to acquire the status of developed nation in next 15-20 years.

Need for Reorientation

While we are proud of developing one of the most sound Human Resource Development system which has delivered in the past, yet in view of the future challenges, a revision and reorientation of the present system of agricultural education is timely so that graduates coming out are job providers rather than job seekers. This necessitates the concept of higher education of practical nature which addresses the problems of the farming sector. The institutions have to develop modern and precision farming technology suited to small and marginal farmers and which lead to improvement in the quality of inputs and managerial practices. It is well recognized that growth in agriculture propels higher industrial growth and brings economic up-liftment for vast segments of our population. The developments in science and technology which are revolutionary need to be harnessed to bring economic benefits to our people. This is possible if necessary structural changes are introduced which reflect modern realities, challenges and opportunities. The institutional system must be relevant towards issues and concerns, reinvigorate its commitment to the linkages among teaching, research and public service, organize its programmes keeping with national requirements in agriculture.

During the early part of the establishment, the academic programmes were structured to produce graduates who became primarily technology agents. In the present era of specialization and developments in modern sciences, it is necessary that we restructure our agricultural education in a manner that the graduates coming out are not only able to meet the challenges of the present day but also propel Indian Agriculture with determination, zeal and commitment so that India becomes a developed nation in the next 20 years time frame. For this to happen, universities will have to develop and strengthen both formal and non-formal degree programmes, bring academic excellence and education relevant to future needs.

Agricultural education system in India has to take note of vast changes taking place rapidly in national and international environment of agriculture and prepare its graduates to face this new environment with confidence and faith in their ability to benefit from new opportunities arising from these changes. The first and foremost requirement for the agriculture education system is to foster a mindset among students which is analytical, technology oriented, sensitive to the social and economic issues of farming in India and sees problems of Indian agriculture in the wider context of global developments. Agriculture education has so far focused on crops, dairy and livestock production in the context of food self-sufficiency. A time has come to give it a broader orientation of international competitiveness, trade and industry. The industrial growth is largely dependent on agricultural growth. In order to accelerate agricultural growth, we have to remain in the forefront in developing advanced technologies in areas of molecular biology and biotechnology. We also need to market our University Education System overseas so as to assist other developing countries and in the process, bring credit to the system that we have developed.

International leadership

While there may be some weaknesses in HRD programmes of SAUs, there are strengths also which need to be harnessed for providing training to scientists and students from many developing countries specially Africa and the SAARC countries. India must extend support in this endeavour to demonstrate its leadership position. This would not only bring visibility but also would lead to resource generation in long term. DARE would need to provide

guidance and support for establishing campuses of IARI & other reputed SAUs overseas based on need assessment. We need to be partner in establishing institutions overseas for human resource development.

Exchange of faculty and institution of adjunct professorship

At present there is no exchange of faculty from one university to another. In X Plan support need to be built in for exchange of faculty not only from one SAU to another but also from R&D institutions to SAUs and vice-versa. This will promote inter-disciplinary and inter-institutional teamwork, complementation of expertise in NARS and also optimization of limited resources. Universities also need to be encouraged to have scheme of Adjunct Professorship by identifying persons with academic excellence from outside the SAU system to be invited as Adjunct Professor. This will considerably improve the quality of teaching with little investment.

Linkages among institutions

Partnerships need to be developed between SAUs and ICAR institutes and also the possibilities of linkages with international organizations, CGIAR institutes and universities overseas should be explored with IT coming to our aid, we should have inter-connectivity with other institutions through modern technologies such as videos, telecommunications and internet to allow broader exposure to students and faculty to diverse ideas, perspectives, values and cultures. Additionally there is a need to foster partnership among faculty from different disciplines to build the knowledge for sustainability of the farming systems. Discoveries in different disciplines (Genetics, Plant Physiology, Crop Breeding, Biotechnology, Animal Science etc.) realize their potential value when related to one another and applied to real world needs through integrative research. It is therefore necessary that major support is provided only to programmes that are multi-disciplinary in nature.

Reorientation of academic programmes

Reorienting instruction

There is need to broaden the curricula being followed so as to reflect a more comprehensively national and global vision of the food and agricultural farming systems. Teaching programmes must

remain relevant to production issues facing the farm producers. There is a scope to enhance the efficiency of instructional delivery systems by reducing unnecessary replication and allowing universities to develop more depth in specialized fields. This calls for right-sizing, down sizing or restructuring educational programmes in SAUs. It is not necessary that all SAUs should have post-graduate programmes in all fields or for that matter all colleges need not duplicate the efforts. The restructuring would allow sharing and optimisation of limited financial resources. The SAU need to focus on highest priority research and information needs of the region. The advances in science are leading to restructuring of agricultural research, redefining educational needs and technological opportunities and realigning roles for public and private research.

Curriculum

The curriculum needs to undergo major reforms to meet the expectations of the stakeholders. The rigid water tight compartment system needs to be done away with. We need to support integrated courses, which give specialization in a subject of choice to enhance his/her job opportunities. After the Kothari Commission report, agriculture education underwent a change from 10+2 to 10+2+4 programme. However, with addition of 2 years, the duration of the courses was brought at par with technical education. However, it did not give the advantage to agricultural graduates. In general, the courses offered earlier were spread to 4 years without much value addition. The re-structuring initiated during AHRD Phase-I need to be taken to logical conclusion. The degree programmes must have 10+2+2+2 in which first 2 years programme consist of general course work followed by 2 years of intensive training in the area of choice. This will allow skill and entrepreneurship development and confidence in the skills acquired. In fact, Dr. M.S. Swaminathan Committee recommended that at under graduate level there should be two streams which could bifurcate after 2 years programme at under graduate level. First stream to be academic stream which is for career in research and education and other stream could be for career in self-employment. Simultaneous to this change in curriculum we need to train faculties in new areas as also develop strong infrastructure. Academic excellence holds key for development. Therefore, the support needs to be built in a

manner which ensures academic excellence. This would require supporting concept of autonomous colleges, performance link support and reforms in university governance.

i) Entrepreneurial orientation: Employment opportunities over the years have changed considerably. Previously, Government sector, public system of agricultural research, universities & banks provided jobs to most agriculture graduates and post-graduates. With the governments and SAUs facing resource crunch, and Banks also reaching saturation level in employment, this segment of the job-market has shrunk significantly. This has led to a high degree of unemployment among agricultural graduates. Lacking entrepreneurial skills and practical orientation, graduates now are unable to start any enterprise of their own. There is a need to give them orientation for starting and running an enterprise. With proper training they could easily take up enterprises like soil testing, crop clinics, warehousing, agro-service centres, farm-equipment service renders, livestock rearing, dairying, agro-processing and other vocations. This would require skill and confidence building through practical knowledge and hands-on experience. The new breed of graduates must be willing to fight on intellectual battle for self-confidence and self-assertion as equal players in the emerging globalized world.

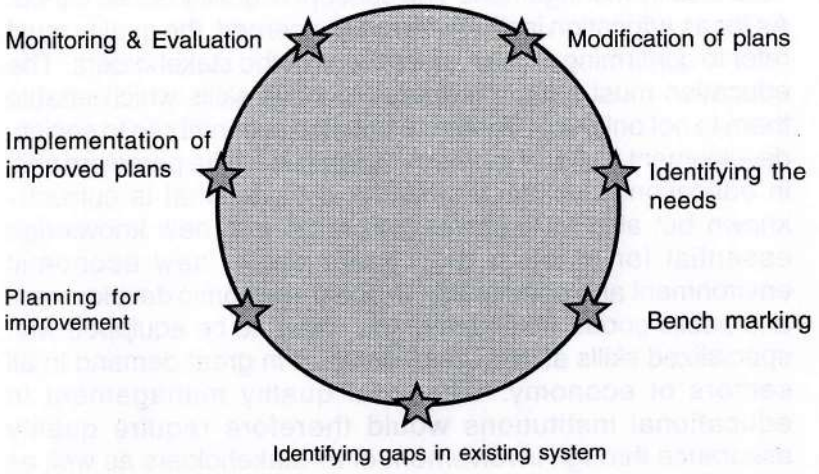
ii) Broad-basing agriculture education: Course curricula need to be extensively revised so as to be in tune with the fast changing requirement of contemporary agriculture and client requirements. Greater emphasis need to be given to the internship at the graduate level so as to provide graduates with hands-on experience in agriculture. Exposure of students to various national programmes and opportunities in the agriculture sector would equip them with knowledge and perspective of national efforts & support. Similarly inclusion of a management module at both the graduate and post-graduate level would build the confidence & develop analytical skills for venturing for new enterprise. New & emerging areas such as environment protection, sustainability of farming systems, IPM, INM, biotechnology, biodiversity, IPR, International agriculture marketing, value addition, etc. should have adequate integrated coverage.

iii) Total Quality Management: The concept of quality is also varied. As far as education institutions are concerned, the quality must refer to confirming to the expectations of the stakeholders. The education must equip graduates to have skills which enable them to not only earn livelihood but also to contribute to society development and environmental protection. The paradigm shift in education is to teach students not just what is currently known but also to keep them abreast with new knowledge essential for meeting the challenges of new economic environment and contributing to socio-economic development and public good. Additionally, they need to be equipped with specialized skills as the specialists are in great demand in all sectors of economy. The total quality management in educational institutions would therefore require quality assurance through involvement of all stakeholders as well as commitment of faculty and putting in place modern and efficient university governance. The world economy is changing as a result of technology revolutions including information technology, biotechnology, space technology etc. Technology is driving much of the economic transformation with IT, BT and other innovations impacting the way people live and work. We could take advantage of the liberalized economy and specially the provisions of WTO provided. Our education should lead to development of analytical skills, exposure to international marketing, international quality standards, comparative advantage, opportunities for exports, confidence in ensuring sustainability with high productivity and quality of the produce meeting international standards. Post Harvest Technology and value addition also hold key for maximum benefits from exports.

The Total Quality Management in agriculture education therefore need to focus on improving quality of courses, instructional processes, establishing continuous resources, human centred development, students support services, building strong work culture and electronic communication system. Ultimately, the quality and skills being imparted must meet expectations of different stakeholders.

Non formal education

Since 70 per cent of the population depends directly or indirectly on agriculture, it is essential for continued agriculture growth that agriculture education is imparted to all practitioners of farming system. The revolution in information technology offers opportunity



of technological empowerment of practitioners of agriculture including farmwomen.

Future education would demand innovative approaches towards technology dissemination. In fact, there is need to have total quality movement and educational empowerment. This will ensure agriculture growth envisioned and will also be a major contributing factor for making India a developed nation, as it will ensure contribution from each and every one. The Universities need to support/offer need based training programmes meeting different stakeholders' needs including NGOs, agri-business establishments, farmwomen and rural youth. The programme could be short-term training from a month to 6 months and certificate courses of one year duration. However, these programmes will be on need-assessed basis and be partially financed by the participants. The Universities over time could build on-line education programmes.

Joint programmes with agri-business and Self Supporting Programmes

In order to meet new challenges and also find avenues of agriculture employment, Universities could consider supporting joint formal or informal programmes with agri- business establishments or other stakeholders. The main purport of such programme is to develop human resources which meet the requirements of agri-business. These courses need to be self-supporting and in-built employment opportunities in agri-business establishments. We

need to compliment Maharana Pratap University of Agriculture and Technology for starting such programme with Morarka Foundation.

The Universities would also have to offer self-supporting courses in different disciplines. This will not only ensure quality but also development of human resources based on market needs. Some of the Universities have already started ventures of this kind. ICAR should encourage development of such programmes with one time infrastructure and training grant after which these institutions need to be self-supporting. This is going to bring visibility for the strength that SAUs possesses.

iv) Agri-business and marketing: Agriculture is acquiring an interface with industry. Home-made products are now being replaced with factory produced goods. Requirement of farm sector is impacting in a big way on industry and vice-versa. There is a need to develop specialized courses on agri-business by SAUs. These would be job-oriented courses. Such courses could be both short -term and long- term and self-supporting.

v) Distance education: Agricultural education has to get out of its mould of a rigid framework and has to take on the role of continuing education where the education process is adjusted to the needs of illiterate, unskilled farmers and farm-households. This would imply that the individual farmer should have access to agricultural education facilities at different stages of his/her life. It would also mean that the educational process has to be more directly related to local conditions and should be made more socially relevant.

Epilogue

In view of globalization tremendous opportunity lay for agricultural education in not only ensuring higher agricultural growth, sustainability of farming system, reduction of poverty, ensuring food & nutritional security, but also contributing its share for making India a developed nation by 2020. We need to seize the opportunities provided and take steps to meet new challenges through reorientation of our agricultural education. India occupied pre-eminent position in education from time immemorial. In between this leadership was lost. There is need for reengineering education for global leadership and banishing poverty and ensuring food & nutritional security for all.

4

University Autonomy- A Need

*Dr. K.N. NAG**

According to the Webster Dictionary the world "Autonomy" means self rule or self discipline. Autonomy also refers of independent working of an organization.

The University system in India inherited the British system and accordingly the autonomy of the Universities was in-built. Autonomy was synonymous with the university system. There was no pondering, at any stage about the university autonomy. As a matter of fact universities were considered sacred institution of societies and derived faith of people.

In the recent years, autonomy of universities has become a matter of great concern and the image of universities has been questioned from the situation of pride of university autonomy, now for some reasons, a picture of exploitation is painted. Certainly, autonomy of the university is being questioned because of some obvious reasons for which the administrators' academician and supporting staff are responsible along with politicians and governmental departments and their officials.

University Conventional Autonomy

The conventional autonomy of a university or teaching, research and extension institution can be grouped in the following categories:

1. Academic
2. Administrative
3. Financial, and
4. Others

Academic Autonomy

It deals with mainly the various aspects academic programmes of teaching, research and extension. The following activities are covered under:

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a. Introduction or adoption of teaching programmes of UG, PG and Ph.D. degrees, diplomas and certificates

b. Design of courses and time to time revision of courses to keep abreast and ensure relevance

c. Preparation of teaching and examination schemes

d. Planning of Research and Extension Programmes

e. Arranging examinations and preparation of session papers for teaching system external/internal and practicals; and emphasize on the secrecy and integrity of examination system.

f. Conferring degrees, diplomas and certificates.

To maintain academic autonomy under the Act and Statues of the university, statutory committees are provided.

Academic autonomy is threatened by restrictions and imposition of bans internally by the university administration on the instigation of government and its working policies and most by the government directives. Accordingly, adoption of new programmes intake and design and development of syllabi are adversely affected.

The Central/State Governments and agencies in recent years are making financial cuts and obstructions in budgets of the university resulting in day to day difficulties for conduction of practicals, procurement of laboratory supplies and library reading material, and other supplies and services.

Interference from the governments and other agencies in recruitment of teachers and supporting and technical staff is putting lot of stress on the academic heads and chief executives (VC's/ Deans, Directors). The ban imposed is now responsible not only for stunted growth but causing a permanent check on future programmes and lowering down the quality of the university graduates. The system of guest faculty or contract teachers should not be allowed to continue any more as it affects the quality of teaching and there is no stake. The overall growth and development of pupil is neglected. Similarly, the co-curriculum activities are either neglected or if carried out then the job is done halfhearted and its impact is not felt.

Administrative Autonomy

The administrative autonomy is equally important to ensure protection of the institutional system and carry out the different

aspects of the system religiously. It requires commitment to academic excellence, integrity, vision, dedication, professionalism and non-political or non-sectarian approach.

Transparency is required in appointments, promotions and removals. Undue interference from the members of decision-making bodies of the university institution, politicians and governments should not be allowed. Similarly, pressures from associations/ unions of students, teachers and non-teachers affect the administrative autonomy. Apathy and indifference among administrators and others in the university system is highly undesirable.

Financial Autonomy

The financial autonomy has more relevance in present day situation because of shrinking state resources and public funding. At every level of financial transaction transparency and integrity is expected rules and regulations should adhered to sincerely and emphasize on quality.

Decentralization of financial powers helps in many ways. Through decentralization timely utilization of budgetary provisions is ensured. It also permits right choice of materials, supplies, equipment and accessories. However, it calls for alertness at every level of decision making. Today there is tendency of centralization of financial powers. It is not a healthy trend.

The state government and other grant making bodies/agencies also impose cuts and bans. As a result of these cuts and bans day to day working is adversely affected and quality of academic performance and research is affected. Once for all the state governments should review the requirements of the universities and commit for a minimum budgetary support under non plan. This will relieve the vice-chancellors and in turn his administrative heads of the financial stress and allow them to put their energies for academic programmes. Similarly, the state government should provide adequate financial support for plan activities according to the needs of the state. The University should not be put to financial stress continuously. Similarly, once committed, the state grants be released timely and regularly to avoid unnecessary stress.

In the university system at each level of decision-making Directors, Deans, Heads of the Departments, Project Leaders etc

should be well versed with financial rules and their interpretations. A regular interval training in financial rules be organized, rules of purchase be reviewed from time to time. Purchase committees be functional and reviewed regularly.

The Controller of Finance/Comptroller should help and advice at all levels rather than become a bottleneck. It is his duty to get the grants released from state government and other agencies in time regularly. In other words he should be Financial Advisor and Manager.

5

Autonomy Issues for Sustainable Quality In Higher Education

*V.B. Singh**

Education : To prepare human individuals Capable for putting things in right perspective,Make people sensible to the nation, and Lead society to new values and achievements.

Table : Dimensions of the System -

Year	Universities	Colleges	Teachers	Enrolment
1947	20	500	24000	2 lakhs
Current (In Agriculture)	300	12000	4 lakhs	90 lakhs
Current	40 (11 faculties)	200		UG PG Ph.D 10000 5000 1600
	50 (Non SAU)			5400 950 -

Adjectives Often Used:

Adjectives often used for Indian Higher Education as "Wooden, Obsolete, Static, Lifeless, Mechanical etc. may be true for some in isolated cases and hence can not be generalized. The reason is at no point of time, the educationists and the government remained idle in the matter of improvement of education be it general, professional or technical.

Features (General Education):

- The system is vibrant and is the second largest higher education system after USA.
- Periodic initiatives at Govt. level to improve different facets of higher education (appointment of commissions, councils, committees, recruitment boards etc.)

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- Enrolment of students hardly touches 6% of the relevant age group (18-23 years) as against 47% in developed and 7% in developing countries.
- Government spending is far below 6% of GNP (recommendation of Education commission 1964)
- Establishment of NAAC (1996), for quality assurance in higher education.

(Agricultural Education)

- National Agricultural Research System of ICAR is now one of the largest systems in the world.
- The system has vast institutional and human resource base available.
- The ICAR, Agril. Scientists and planners have always remain alert and dedicated in tackling problems of Agril. Education timely.
- There have been continuous improvements and development ever since the recommendations of Dr. Radhakrishnan Commission (1964-65).

  Joint Indo American Team (1958); Dr. Cummings commission (1966),

  NCA (1976); ICAR review team (1978);

  Dr. Lamba Committee (1991); III Dean's Committee (1995);

  Establishment of Accreditation Board (1996); Dr. Swaminathan Committee (1997), Dr. Kirti Singh's Report (2000); NATP and AHRD Project I and II etc.

all have contributed and aim to improve the quality and effectiveness of agricultural education in India and producing scientists with latest knowledge and farmers with adequate enlightenment.

Autonomy (Conceptual Understanding) :

Meaning-right to self Government/Governance

Autonomy of a university is meaningful only when the university stands for the propagation of virtues which sustain the society. Autonomy intents to create an atmosphere in which professionals are able to contribute their best. Any obstacle in the

creation of such atmosphere is termed as interference with autonomy. The danger to autonomy can be as great from within as from outside. In Indian Universities often autonomy has been used as a shield by non-performance to flourish anti-education activities. The vast majority of teachers have little or no voice in educational institutions in matters of creating a conducive academic environment.

Autonomy or educational freedom creates dissimilarities and create variations and these are signs of life and evidence of dynamic force. While functioning freely (enjoying autonomy) and effecting changes without respect to needs, future, environment and people bring mistakes but then one learns and refine own *modus operandi* to yield fault free and fruitful process. Hence, freedom to functioning (autonomy) is a pivot and perquisite for reforms and development.

Autonomy in Education – rights and privileges to function/exercise in :

(a) Academic affairs: Own syllabi; own examination; set own standards, award degree/diplomas in its own right. (Courses will be according to the needs of the society in which an institution is located).

(b) Financial affairs : Generate own resources, allocate funds at own level, set own financial regulations for managing funds and its spending.

(c) Administrative affairs: Recruitments, promotions, creation of cadres/posts, administrative rules, awards/rewards, penalty for indiscipline, insubordination, omissions/commissions and delinquency.

Foreign universities which have a dent internationally in higher education and established their edge have enjoyed full autonomy in letter and spirit. In India also initially autonomy existed to a large extent in institutions of higher learning and was being honoured. Over the years, due to introduction of various kinds of abuses and their perpetuation and proliferation, the autonomy shrinked due to periodic riders and imposition of restrictions and what is left is "limited autonomy in academic affairs". The leverage in "academic sphere has also been exploited negatively resulting into ever falling standards and numerous kinds of vices gaining grounds into it.

Presently what is left in the name of the autonomy in higher education is microscopic. The erosion impact is severest in financial sphere followed by in academic and administrative/management spheres. To quote Dr. Venkatasubramanian (planning commission) the financial situation in higher education is grave and is becoming a crises.

Lately, there have been several paradigm shifts in higher education from national to Global, from state controlled to open market economy, from general education to education driven by market force, from one time education to lifelong education, from teacher-centered to learner-centered education and so on. These changes have created new demands and fresh challenges to our established system and practices. Therefore, introspection and reappraisal to our functioning in administrative academic, financial and management spheres have become inevitable. At this juncture the definition (understanding) of autonomy of higher education need to be recast. Infect with globalization and market driven forces higher education has to be got liberated from all sorts of impositions, bondages/restrictions enabling it to play freely and compete globally in kind and quality and meet the diversified needs of the productive sector. Given this leverage sincere ones will glitter and rest will collapse at their own.

Issues Confronted:

(i) Rapid rise in enrolment vis-à-vis pace of infra-structural development.

(ii) Quality of the faculty.

(iii) Quality of University curricula/offerings vis-à-vis market needs.

(iv) Quality of student, their aim and will

(v) Financial resource shrinkages- Donations, endowments, investments, fee, grants from governments, diminishing returns from farms of SAU's and cost escalations.

(vi) Rising indiscipline and absence of accountability

(vii) Ills in management – Constitution, purposeful, service oriented and visionary.

(viii) Govt. (Political) indulgences and interferences in university life.

(ix) Disproportionate teaching and non-teaching staff.

Suggestions for Betterment:

(i) Restrict higher education: Allow only the meritorious and enthusiastic youth, Filter out non-performers at subsequent intervals. Channelize the remaining and dropouts in vocational education.

(ii) Provide adequate funds for optimum infrastructure (classroom, Labs, library and farms etc.)

(iii) Recruit faculty on merit and merit alone and keep them update and attune by periodic refresher trainings at centres of advanced studies.

(iv) Review and recast university curricula periodically to give room for future needs and market demands.

(v) Lay emphasis on quality of student entering higher education – Parameters of will, sensibility, logical thinking and positive approach must be looked into and encouraged for further improvement.

(vi) Set strict rules for indiscipline and keep transparency in awarding penalties.

(vii) Set rules for administration and accountability – willful delinquents must be dealt severely.

(viii) Provide purposeful management – Revise constitution, induct service – oriented and visionaries.

(ix) Harmonize dis-proportionate cadre strength

(x) Introduce periodic assessment of each programme/activity to know the progress and pitfalls and take remedial steps in between if necessary.

(xi) Introduce an element of review and revision of University ACT and statutes; to drop irrelevant provisions and introduce progressive ones. Keep political provisions away from the ACT and other university bodies/committees.

(xii) Encourage institutions to generate resources internally and set them free to utilize funds according to their priority but in a transparent manner.

(a) Realization of cost as fee from the students according to the usefulness and market demand of the programme. More fee for high employment potential programmes.

(b) Establish linkages with industry/business houses and provide consultancy, charge fee for conducting surveys and impact studies, and accept donations and endowment.

(c) Fix 10-20% supernumerary seats for admission on full cost basis/NRI

(d) Generate funds from lending spaces and buildings for social and commercial purposes during vacations or when not in use.

(e) Develop a contractual system for maintenance of buildings, premises, gardens, play grounds, sanitation, power, transport etc. rather than employing own staff for them.

(f) Amalgamate small departments/units/offices/hostels into larger ones to reduce managerial cost.

(g) Develop centralize office with computerization, central store and central purchasing.

(h) Encourage sharing physical facilities, resources and faculty at inter and intra-institutional level.

(i) Services of hostel, messes water, electricity, sanitation should be self supporting and the cost be recovered in full form the students. Introduce "learn while earn" schemes for deserving students to meet a part of the study cost.

(xiii) Prevent rampant commercialization of Higher Education and encourage privatization cautiously by enacting suitable legislation to inhibit exploitation and ensure quality education at reasonable cost.

(xiv) The society need to recognize that efficient educational system is the work of qualified and dedicated man and women who in conditions of utmost freedom can aim to train young intellectuals, develop and refine their sensibilities, imparting to them productive skills and make them truly nationalists.

It is heartening that quality agricultural education has always been in the active consideration of ICAR as evinced by various periodic interventions in the form of recommendations and in giving financial support for infrastructure development and updating the old/obsolete ones, providing forum and support for faculty improvement and various other measures through introduction of AHRD-I and II projects.

My all appreciations to the ICAR and its officials past and present for their righteous commitments.

6

Organization and Management of Agricultural Education System in India

G.S. Sharma[*]

Genesis of Agricultural Education in India

Enough evidences are available to prove that Agricultural education existed in India during Medieval period. However, the development of Agricultural Education in India. was initially targeted to fulfill the interest of the imperial Government. The demand for establishing department of agriculture in India initially came from the British Industrialists since the textile industry of Manchester was facing acute crisis due to stoppage of supply of raw cotton from the USA on account of the civil war during 1863-64. In 1905 the Imperial Agricultural Research Institute was established in Pusa. At the beginning of 20th century, six agricultural colleges were established at Kanpur, Loyalpur, Coimbatore and Nagpur in 1906, Pune in 1907 and Sabour in 1908. At the time of independence there were 17 Agricultural and Veterinary Colleges in the country, which were part of the concerned state Department of Agriculture and Animal Husbandry. In 1929 the Imperial Council of Agricultural Research was set up.

In 1958, an education programme was started in IARI and a two years later in 1960 the first state Agricultural University was established at Pantnagar. The full fledged Department of Agricultural Research and Education was created under the central Ministry of Agriculture in 1973. Sixties, seventies and eighties witnessed establishment of a number of State Agricultural Universities including deemed universities under ICAR set up.

Institutional Set up for Agricultural Education

The Agricultural Education and Research system in India is one of the largest in the world consisting of 34 State Agricultural

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Universities (SAUs), 5 Deemed to be Universities (Including four ICAR institutes and Allahabad Agricutlural Institute). Besides four central universities having faculty of Agriculture, more than 50 private and public colleges also offer degree programmes in Agriculture. Out of these 10 colleges are affiliated to Agricultural Universities and one Central Agricultural University. The created facilities are adequate to produce annually more then 10,000 graduates and 4000 post graduates in different disciplines of agriculture.

Our past strategies for development of human resources and appropriate technologies for enhanced production of agricultural commodities have paid rewarding dividends. However, ensuing challenges, on account of globalization and liberalization. Our agricultural education system needs regular review and reorientation for addressing the future challenge.

Faculty of Studies

Currently there are 11 separate faculty of studies catering to the needs of agricultural education in agriculture and related fields. These are:

(1) Agriculture
(2) Veterinary Science
(3) Agricultural Engineering
(4) Home Science
(5) Forestry
(6) Horticulture
(7) Dairy Technology
(8) Fisheries
(9) Sericulture
(10) Food Science & Technology
(11) Agricultural Marketing, Banking & Cooperation

Intake Capacity

The details of annual intake capacity in the SAUs, ICAR system of education and affiliated agricultural colleges outside SAU's at various levels are as under:

Degree Programme	Annual intake	
	SAU's & ICAR	Colleges outside SAU's
UG	9100	3500
Masters Degree	4900	500
Ph.D.	1550	-

Resetting the Goal

The tremendous progress made in the agricultural education and research through the network of the ICAR institutes and SAU's during the planned era, particularly during the post-green revolution period, is a matter of great satisfaction. However the emerging challenges in the field of agri. education. are a matter of grave concern for all those who are engaged in the stupendous task of setting direction for our agricultural education system. We have a glorious history of building up strong and sound networks for agricultural education and research in this country. Unless we respond to the ensuing challenges with vigour and wisdom, we may find ourselves out of the league of the best in the near future. Though we inherited an agricultural system oriented to fulfill the vested interest of the west, it took us no time to realign our goal to make our agricultural education and research system vibrant and vital to resolve the problems arising out of deficiency in food production. Today, our National Agricultural Research System is not only one of the strongest in the world, but also has the potential to respond instantaneously to the challenges thrown on it from any corner. However, it is to be kept in mind that the network of agricultural research and education institutions that we developed was to focus on the goal of self-reliance in agricultural production at a time when despite the vast; natural resources and human work force available with us; we were importing large quantities of food grains. As soon as we resolved the crucial task of achieving self-sufficiency, the new challenge of imparting global competitiveness to the system of agriculture education has been thrown on us which makes it necessary to again realign our goal and tune our systems to face these challenges with full strength and confidence.

Reforms in Agricultural Education in India

The Education Commission appointed by Govt. of India in 1948 under Chairmanship of Dr. S. Radhakrishnan recommended establishment of rural universities to cater to the educational needs

of the country. The subsequent Indo-American study team headed by K.R. Damale (1955) and M.S. Randhawa (1959) recommended the establishment of Agricultural Universities on the Land-Grant pattern of USA. The Agricultural University at Pantnagar was the first to be established in the country on the land grant pattern. The Govt. of India subsequently appointed the Agricultural University Committee in 1960 to prepare the blueprint and guideline for establishment of Agricultural Universities in various states.

The efforts to improve curriculum started with the first major exercise on improvement of curriculum and courses of agricultural education' in late 50's undertaken by the erstwhile 'Indian Council of Agricultural Education'. As an output of this exercise a model curriculum was formulated. Subsequently, efforts were made periodically by the ICAR through Dean's committees to improve quality in agricultural education viz.,

i. First Dean's Committee (1965)

ii. Second Dean's Committee (1981)

iii. Third Dean's Committee (1995)

The Agricultural Universities Review Committee (1977) headed by Dr. M.S. Randhawa was yet another milestone in this direction.

The First Dean's Committee gave detailed guideline for undergraduate education in Agriculture, Veterinary Science, Animal Husbandry, Agricultural Engineering and Home Science. General guidelines for postgraduate education were also given by this committee. The Second Dean's Committee under the Chairmanship of Dr. N.K. Anant Rao was the follow up of Randhawa, Committee recommendations after the review of progress of Agricultural Universities including relevance of course curriculum in various disciplines of Agricultural Education. The terms of reference of the Third Deans Committee (1995) under the Chairmanship of Dr. Kirti Singh were quite comprehensive. These were:

(i) To redefine the objectives of undergraduate and post-graduate programmes.

(ii) To examine the course contents of the basic sciences at plus two level to account for restructuring the UG curriculum.

(iii) To examine the existing curriculum and courses of various degree programmes of agriculture and allied sciences and

suggest a standard curriculum taking into account (i) subjects already covered at the plus two stage (ii) ensure adequate emphasis on practical content so as to develop adequate confidence in the minds of the graduates for extension activities and self-employment.

(iv) To suggest guidelines for formulation of course contents of postgraduate programmes (core, supplementary, research etc.)

(v) To suggest norms of workload for the teachers.

(vi) To suggest norms for contingencies for UG and PG studies and

(vii) To recommend laboratory space, equipment facilities and contingency requirements per student according to course curriculum.

The committee did a marvelous job and a comprehensive report was submitted.

Swaminathan Committee Report on Education for Agriculture

The Swaminathan Committee Report (1999) is yet another important document leading to guidelines to structure agricultural education as per needs of the time. In this report some of the pertinent aspects considered include:

- Farm graduate for the New Millennium
- Women's Technological Empowerment
- End-to-End Technology Mission Approach
- Global Competitiveness
- Harnessing Frontier Science and Technology
- Strengthening Partnership with other Institutions
- Human Resource Development
- User Orientation to Agricultural Education
- Non-degree Training Programmes
- Computer-aided Extension and Instruction
- Manpower Planning
- Education for sustainable agriculture
- Improving Education in Private Agriculture Colleges
- Distance Education and Harnessing the Tools of Information Technology

- Enhancing Social Relevance of Ag. Education
- Uniformity in Educational Standards
- Centres of Advanced Studies
- Achieving a Learning Revolution.

Some Limitations of Agricultural University System

Some of the emerging limitations of our agricultural education system are as given below :

(i) Decline in the state resource allocation for education

(ii) Large dependence on state exchequer and limited policy backup.

(iii) Still dominated by the traditional set up of rules, regulations and statutes that offer little scope for quick improvement in its present work-system, the required level of autonomy and flexibility.

(iv) The academic structure is rigid and the teaching and evaluation methodologies are outdated. There is need of academic reforms which will make the system flexible.

(v) The work culture of universities is static and rigid mode of functioning leading to bureaucratic set ups.

(vi) The universities have little internal urge to accept a change and evolve dynamic mechanism that is susceptible to changes.

(vii) The level and quality of innovation and research has low social and educational relevance.

(viii) The growing number of institutions, unrestricted growth of students, faculty and courses do not match with the required qualitative improvement and knowledge advancement.

(ix) The absence of innovation and lack of willingness to overcome rigidity.

Higher Education Under Gatts (WTO)

During the Uruguay Round of the General Agreement on Trade and Tariffs (GATT), in 1994, there was a consensus that trade in services be also covered under a multilateral agreement in view of the substantial growth of services and the shift in the composition of GNP of most countries in favour of the service sector. Under WTO two areas were clearly identified for multilateral agreement

trade in goods and merchandise (as in GATT) and trade in services (covered by GATS).

It is a multilateral agreement based upon the premise that progressive liberalization of trade in commercial services will promote economic growth in trade in WTO member – countries. It provides legally enforceable right in all services and covers all services except those provided entirely by government. The agreement presently covers 12 specific services, including educational services. The approach adopted is a progressive one and covers all services through negotiated commitments and progressive liberalization.

Trade in Educational Services

In the GATS guidelines Education Services are classified into five categories and trade in these may be carried out under four modes. The categories of education services may include : primary education services; secondary education services; higher education services; adult and continuing education services and other education services.

WTO has recognized four modes of trade in education that receive legal protection through GATS. These are :

- *Cross – border supply :* This is the supply of services across national borders, from the territory of one country into the territory of another. Distance education using print media or any other kind of educational material that is sent across national boarders, or online education via the internet, falls in this category.
- *Consumption abroad :* This involves the movement of the consumer of service to another country to get the required service.
- *Commercial presence :* This requires the actual presence of a (foreign) service provider in another (host) country. In the case of education this involves the setting up of programmes, course or institutions, by a member country in another country.
- *Movement of natural persons:* This means the presence of an individual from one country in another to provide service. In education it means the presence of a foreign teacher in a host country.

Model Act

Government of India in 1960 appointed a committee under Dr. Ralph Cummings to work out a legal base for establishment and functioning of an Agricultural University. The committee submitted its report in the form of Model Act in 1962. Subsequently ICAR developed Model Act for a State Agricultural University to assist in bringing uniformity in broad governance principles. The Act was first revised in 1984 and again in view of the changing trend in organizational structures from mono campus to multi campus and from one SAUs for each State to more than one in some of the States, vital amendments to the Model Act were made in 1994.

The revised Model Act was thought to be a modern Governance tool for better and effective management of the universities. Ever since the Model Act came into being, the ICAR has been striving hard to get the same adopted in SAU system by bringing need-based amendments to the SAU Act. However, necessary changes could not be brought about. Today not even a single SAU has adopted Model Act in toto. Even the universities created recently do not adhere to the broad principles of Model Act.

The ICAR has been keeping the Governance of Agricultural Universities on the top of its agenda and is continuously attempting to ensure uniformity in the structure, organization and governance of SAUs as well as provide sound base for development. The issue of implementation of Model Act in SAUs is being deliberated every year in Vice-Chancellors Conference and every time need for bringing desired changes in the University Act is repatriated, but since SAUs come under the jurisdiction of State legislation, the States are not in favour of amending those clauses of the Act by which either the representation of legislators on management bodies is affected or the role of State Government in managing the affairs of the university is diminished.

Emerging Issues for Management of Agricultural Education

UNESCO has adopted a declaration on higher education for the Twenty-first Century at the World Conference on Higher Education held in Paris during 9-10 October 1998. This declaration recognizes that everywhere higher education is faced with great challenges and difficulties related to financing, equity of conditions

at access to and during the course of studies, improved staff development, skill-based training, enhancement and preservation of quality in teaching, research and services, relevance of programmes, employability of graduates, establishment of efficient cooperation agreements and equitable access to the benefits of international cooperation.

Educational management is the most challenging area these days. The following dimensions of educational management are very relevant in this present context.

- Sources of power and authority
- From reactive managers to creative-proactive managers
- Decision making through democratic and participatory approach
- System design considerations for educational management
- From classical process theory to behavioural theory to systems theory
- Management through information system series
- Increased efficiency of iterations in the management
- From inequality to equity and equality
- Partial quality to total quality management
- From local perspective to global perspective.

Sources of Power and Authority:

Educational merit and educational management go together and there is no place for extra academic considerations as far as educational management is concerned. So there is a need to identify valid authority and source for educational management. Educational managers by virtue of their positions have to be reasonably versatile & free from all prejudices and biases.

From Reactive to Creative Managers:

One of the identified weaknesses of our education system is the absence of professionalism in the management of institutions. We need to have proactive managers with appropriate skills and mindset to lead the institutions forward. We need to have educational leaders who have a vision of the future, project a mission for the institute and develop strategies, goals, action plans, and monitoring and evaluation systems for fulfilling the mission of the institute.

When individuals working in an organization have permission, protection and processes, they flourish, they can create and can solve problems formerly believed to be insurmountable. Following are the qualities of creative leaders.

- Has no ego-driven need to have all answers.
- Is listen-oriented rather than tell-oriented.
- Empowers the people to make decisions rather than making all decisions personally.
- Pulls the organization towards a vision rather than pushes the organization for result.
- Listens to intuition rather than analyzes recursively.
- Generates lasting commitment rather than create sporadic motivation.
- Is open-minded rather than being opinionated
- Teaches importance of self-responsibility rather than teach the subordinates to expect direction.
- Models self-responsibility rather than is in a self-protect mode.
- Knows that relaxing control yields results and is not afraid of losing control.
- Focuses on building on strengths rather than finding faults & weakness
- Sees mistakes as opportunities to learn rather than instances to punish.

Decision-making through a Democratic and Participatory Approach:

Now-a-days the decision-making in most of the educational organizations is through a democratic and participatory approach. Policies and theories of educational management should emerge out of thorough debates and discussions involving various stakeholders.

System Design Considerations:

Every educational manager faces system design considerations such as whether to run the system manually or through machines or a combination there of what degree of decentralization to be built in to the system to institute a centralized

system or decentralized system? Whether to build a system or buy a system? Whether to start with prototypes or a fully functional system. The emerging trends are from man to machine, from centralized management to decentralized management, buying a ready made system rather than building a system. We are trying to fit into the ready-made systems at the cost of our philosophy and culture. Aspiring for fully functional systems is a figment of imagination.

From Classical Process Theory to Systems Theory and Beyond Systems:

Traditionally education was managed more through classical approach wherein there was formally centralized and compartmentalized distribution of work. Progressively it was realized that education is a human endeavour. The focus should be on the quality of the output rather than the rigidity of the organization. Neither the Classical Process Approach nor the Behaviorist Approach worked comprehensively for educational management. The educational managers finally coursed through the Systematic Approach wherein the presumption is that the problem of any system is found in a multivariate setting, wherein the variable of the problems in education have been found to be rooted in education and the other systems, such as, political, social and economic systems. Actual role of the educational managers is operational when the act, ordinance and the rule of the educational organization are silent. There come the challenges of governing or managing the organization through self-evolved rules, which are error free.

Management through Information System Series:

Gone are the days of merely manual educational management. Progressively the educational management is through information system series, such as, follows:

- Admission supported through automation
- Computer aided instruction
- Computer based time-space-personnel management system
- Computer based learning resources management system
- Computer based laboratory management
- Computer based question banks and question papers
- Computer based secretarial practices

- Computer based payroll system
- Networking of educational institution
- Networking of libraries
- Electronic conferencing.

Increased Efficiency of Iterations in Management:

With the availability of the Management Information Systems the efficiency of iterations and changes in planning, organizing, staffing, directing, coordinating, reporting and budgeting has increased tremendously. There is public assessment and accreditation for due appreciation. In the work culture administrators, managers and co-workers cannot be discriminated. The educational institutions are full of co-operation and teamwork rather than competition. Even the criteria for placement and promotion are being revised.

From Inequality to Equity and Equality:

The concept of boss and sub-ordinates do not exist in education. Education system by its nature is different from other systems.

From Partial to Total Quality Management:

Each element of education needs to be fully attended to for realization of total quality. Quality management strives to strike a balance among the input, process, output and the environment.

The standard of our education system can be raised through the following principles of TQM:

(i) To create an organization whereby everyone is working towards making their organization the best (Quality of operation).

(ii) Continuous and relentless cost reduction on one hand and quality improvement on the other hand (Quality management)

(iii) Continuous improvement of the system which must meet needs and expectations of the society (Quality output).

From Local to Global Perspective:

Science and technology have facilitated globalization. Our educational management should be aligned with the global perspective. We have not yet been in a position to cater to the educational needs of all in India inspite of all the efforts. Our education should cater to the global needs, cultures and values

while sustaining our own identities. For that there is a need to involve all in education – public sector, private sector, NGOs, inside agencies and outside agencies. There is a need to move from local classroom to global classroom, from local curricula to global curricula, from LAN to WAN and internet to internet. There is a need to have educational and cultural exchange programmes.

Globalization and modernization should go hand in hand. Our educational management should be such so as to promote physical mobility, logical mobility, spatial mobility, economic mobility, social mobility and mobility in all the desirable areas.

There are many challenges for the educational managers.

- How to realize the objective of compatible education for all.
- Education by virtue of its nature is public good. How to save it from the monopoly of the private.
- How to establish a global knowledge base and global outlook
- Knowledge economy and knowledge power are greater value than the material power. How to realize it.

7

University Autonomy and Quality Improvement of Higher Education

S.S. Baghel*

Mr Jackquees Delors, Chairman of the International Commission for the Twenty first Century in 1996 UNESCO report, "Learning the treasure within" had observed, "the Commission does not see education as a miracle cure or a magic formula opening the door to a world in which all ideals will be attained, but as one of the principal means available to foster a deeper and more hormonius form of human development and thereby, reduce poverty, exclusion, ignorance, oppression and war".

Effective dissemination of adequate and technology information through education plays a positive, interventionist role in accelerating the process of technology transfer. In a world of technology, it is education that determines the levels of well being & prosperity of the people.

The formal agricultural education in India began in the first decade of 20th Century, when first agriculture college was established in 1905. Subsequently, based on the recommendation of 1st Education Commission and several Committees, the need was felt to establish agricultural universities based on the Land Grant Pattern of USA integrating the teaching, research and extension education functions. The first Agricultural University, U.P. Agricultural University (now known as G.B. Pant University of Agriculture and Technology), at Pantnagar came into existence in 1960. Today there are 30 State Agricultural Universities, 4 State Veterinary and Fisheries Universities, 5 Deemed to be Universities (including 4 ICAR institutes and one Allahabad Agricultural Institute) and one Central Agricultural University. Thus, there are 40 University level institutions imparting education in agricultural and allied disciplines. Besides, there are 3 Central Universities under UGC/ HRD having a reasonably strong Agricultural faculties. These

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are B.H.U., A.M.U. and Vishwa Bharati. In addition, there are a large number of private agricultural colleges affiliated to traditional Universities imparting agricultural education, leading to the award of B.Sc, M.Sc and in some cases even Ph.D.

These institutions played a pivotal role in transforming the food deficit India not only into a self sufficiency, but also into a vibrant agricultural economy. This year riding on a healthy growth in agriculture, the National economy is expected to achieve a growth rate of 8%. Most of the increases in agricultural production came through the improvement in productivity resulting from adoption and usage of appropriate technology developed by agricultural institutions, use of agro-inputs backed up with appropriate Government policies, market support and above all, the hard work of our millions of farmers.

While we may derive the legitimate pride from our achievements of the past, there are serious concerns afflicting the national agricultural scene today. In the beginning agricultural Universities enjoyed full, financial, academic and administrative autonomy. The Universities grew and contributed to the growth in agriculture and national economy, since they were adequately funded and were free to recruit faculty purely on merit without any considerations to region, caste or sex.

However, inspite of the fact that although the Model Act formulated by ICAR in sixties and subsequently amended in 80's provided for full autonomy of SAU's, the adoption of this act is still not complete. It varies from state to state, resulting into serious erosion in the autonomy of functioning of agricultural universities. In the absence of clear cut outlays for SAU's, the Vice-Chancellors are required to run around, in many cases; on monthly basis to get release of funds for payment of even salaries. This has greatly eroded the autonomous functioning and creativity in universities. Sooner this malady is removed, better it will be for the smooth functioning and maintenance of discipline.

There is a growing tendency to proliferate the number of institutions. Agriculture is a composite profession involving crop husbandry, dairy and other professions. The establishment of Agricultural Universities in the Country was based on the premise that the problems of the farming will be addressed in a holistic

manner, integrating various disciplines. The emergence of discipline based Universities is fraught with the risk of negating the very objective of setting up of these Universities. Similarly, there are a very large number of private agricultural colleges, outside the SAU (now in some states even within SAU) system; having sufficient to grossly insufficient infrastructure facilities producing large number of ill-equipped agricultural graduates and post-graduates. The improvement in agricultural education cannot be achieved by ignoring these institutions. The ICAR had constituted a committee to look into functioning of these colleges under the chairmanship of Dr. Kirti Singh, (ex) Chairman, ASRB. The Committee had submitted its report. It observed that there are a few colleges, which if properly supported, could come up to the minimum standards, while majority of these are not suitable to be recognized as Agricultural Colleges, and recommended their conversion into KVK's, polyclinics etc. However, due to agriculture being a state subject, these colleges continue to function and their product is flooding the job market. I think the time has come, when some hard decisions have to be taken; since the recommendations of successive Vice-Chancellor conferences/ IAUA conventions/ seminars etc. could not stop the proliferation of institutions. Based on the findings of the ICAR sponsored study under NATP on manpower need assessment, the ICAR may consider to advise the Central Government either to bring out a suitable Central legislation to ban the further proliferation or to arrive at a political consensus on this subject.

The quality of education even in Agricultural Universities is also a cause of concern. There is a general feeling that there is a general decline in the quality of agricultural educations. Among the Universities there are broadly two categories viz.:

1. Those established in sixties and seventies and
2. Those established thereafter.

The first category of Universities received adequate funding support and created adequate infrastructure in terms of buildings, equipments and other physical infrastructure. Most of the faculty also got good exposure under USAID arrangement on bilateral basis between an Indian Agricultural University and with an American University. However, due to inadequate financial support

from State Governments, this infrastructure is in poor condition and equipments & machinery are obsolete. Most of the earlier staff is either retired or is going to retire soon. To some extent, the catch up grant by the ICAR has helped to improve the situation, however, it is still far from satisfactory.

The second Category of Universities are most unfortunate. These had been established not out of genuine developmental requirements but on extra academic considerations. Also their establishment coincided with acute financial crisis and therefore, lack even in basic facilities.

Faculty is the backbone of any academic institution. Unfortunately, in most of the Universities there is a blanket ban on recruitment. This is creating a serious distortion. The Career Advancement and other Personal Promotion Schemes have resulted in *in-situ* up-gradation of faculty members and in most of the Universities the pyramid is reversed. There are mostly Professors, a few Associate Professors and hardly an Assistant Professor, setting in an ageing syndrome.

One of the fall out of these schemes has been the lack of motivation to excel and move from one institution to another, resulting into inbreeding, even in the institution, where there are open selections. Many of us feel that Personal Promotion Schemes require re-look at least in Agriculture sector.

While there are many more factors, responsible for decline in academic standards, and these will be discussed during next two days in the seminar, let me conclude by stating that we have an advantage of having well defined agril education system under the guidance and support of ICAR, second largest trained manpower in the world and relatively cheap education, the Country will not be able to derive the full advantage of opening of higher education under W.T.O. regime, if immediate corrective measurers are not taken to address some of these concerns. The Universities will also have to realize that abrupt increase in the Government funding support is unlikely, and therefore, the available resources and manpower will have to be redeployed in-emerging frontier areas, by right sizing and appropriate training/ exposure of redeployed staff in these areas where there is an increasing demand of graduates.

8

Curricula Relevance of Higher Education in Agricultural Sciences in the New Millennium

*D.P. Singh**

Preamble

Indian agriculture has been able to march towards self-sufficiency in food production by approaching grain revolution and also it is second to none in fruits, vegetables, milk and egg production. The country supports 18 per cent of human and 15 per cent of global population of livestock with 2.4 per cent world's agricultural area. Ecologically country is extremely heterogeneous with enormous potentials of natural resources. To ensure food/feed and nutritional security to growing human and cattle population, the agricultural education for human resource development in new millennium must be ensured. Keeping in view the changing scenario and globalization. All this, however, requires qualitative improvement in teaching skills, curricula relevance, strengthening of infrastructure facilities with modem equipments and training on new emerging areas to produce agricultural graduates who can take the country into the 21th Century with an eco-friendly, cost effective and remunerative agricultural production technology.

It is high time to develop a very strong globally competitive education system to face the challenges with a mission to achieve environmentally sustainable agriculture. The system of agricultural education and the process of teaching learning need reorientation. Traditional methods of teaching has to be replaced with advance education technologies embedded with modern and innovative more practical skill based methods, such as group discussion, project work, faculty seminar, video conferencing and modem electronic instructional aids.

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Major Issues

Present day agriculture is a very complex activity in which agricultural education; research and extension are complementary to each other. By the turn of this decade, India will need about 240 million tonnes of food, 17.2 million tonnes of vegetable oil and 64.4 million cubic meter industrial woods for 1000 million people. Towards the middle of the 21S' century, the human population is expected to stabilize around 1500 million in the country. The food and feed requirements will be doubled of the estimate of 2000 AD. Considering increasing demand for food, fibre, fuel, fodder and other agricultural enterprises for biotic population on one hand and deterioration in the environment due to indiscriminate use of available resources on the other hand, concern is often expressed about our sustained, cost effective and eco-friendly progress in agriculture.

We have the responsibility not only to provide nutritional food security economically to the living population of the country, but also export surplus to earn more foreign exchange, generate more job opportunity as well as self employment in this sector to gain higher income on long term basis for the farming community. In future, the new approaches of alternate farming, bio fertilizers, pressure irrigation, integrated water management, integrated nutrient management, integrated pest management, crop modeling, resource optimization, post harvest technology and value added - products should get increased emphasis to achieve desired results from agriculture sector. Now, the farmers are looking at Agricultural scientists very eagerly to suggest cost effective, employment generating and eco-friendly packages to adopt these technologies for global competition. The global warming phenomenon and environmental pollution are now recognized world over. The science of biotechnology is sure to create much bigger revolution in 21st Century. These and some other pertinent issues relating to world trade organization should thoroughly be answered and reflected in the subject matter of our revised course curricula of agriculture so as to serve the society and the nation in a better way in 21st Century.

Need of the Hour

Agricultural education has been constantly in the lime light ever since independence and it has grownup gradually and helped the man to enjoy the settled life from nomadic life. In order to achieve

self sufficiency for food, clothing and shelter, there is a need to critically examine and evaluate certain issues related to agricultural productivity based HRD. In the planning and implementation of agricultural course curriculum it is needed to consider the problems of farmers views of research organizations and industries so as to make HRD programmes more need based, meaningful and effective. Therefore, in view of the rapidly changing scenario and latest development in Agriculture and allied field in India, it is suggested to make the HRD programme more need based, meaningful and effective.

There is a need for expansion of higher education in following frontier areas:

- Agribusiness
- Hybrid technology - for still higher yields
- Agro ecology and environmental sciences
- Biotechnology and genetic engineering
- Integrated water and nutrient management
- Integrated pest management (IPM) and organic farming
- Farm mechanization Technologies
- Animal Disease Forecasting, Diagnostic and Disease Control Technologies
- Poultry - High Productivity Backyard and Commercial Strains of Layers and Broilers
- Dairy Technology - Value addition and product diversification
- Post Harvest technologies including Value Addition - Manufacture of various agri-products
- Biodiversity and I PR
- WTO and its related issues

Need of Competitive Agricultural Graduates

Agricultural education, research and extension played an important' role in ushering green, blue, white, yellow and now the "rainbow" revolution to provide food, nutrition and environmental security to our ever increasing population. In culmination of 20th century our achievements in agricultural sector have been splendid. This necessitates development of new breed of agriculture

scientists and educated agriculturist fully equipped to meet the challenges of the 21st Century. We have developed one of the best and largest National Agriculture Research System, therefore, we are uniquely placed in reaping the benefits of technology revolution. Indian agriculture is on the move and in future, specialized knowledge will make us globally competitive. Good quality of graduates of today are good teachers, researchers, scientists and extension workers of tomorrow. Higher education should effectively be a market of "Seller and Buyer". Hence, the characteristics desired agriculture graduates to compete in 21st century must posses following qualities:

- Self motivation
- Excellent communication skills
- Good professional qualities, attitude, technical & business skills
- Computer literacy
- Quantitative and management skills

Weakness of SAUs

During past one decade, the general deterioration in agricultural graduates has been observed. This is primarily due to following reasons:

- Academic inbreeding in admissions of students, which leads to perpetuate parochialism
- Poorly equipped university libraries
- Poor physical/infrastructure teaching facilities in class room
- Deteriorating hostel, recreational and medical facilities in college premises, inadequate financial support both from central and state level
- Heavy course load mostly confined to four walls
- Missing of links between theory course work and practical, mainly tied down to the text books and examination systems which cuts them off from national and social environments.
- Little incentives to encourage meritorious and talented students by award of scholarships.
- Lack of computer telecommunication facilities resulting into access to global information networks.

- Imbalance between intake and human resource needs.
- Lack of strong placement cell/counseling /effective advisory system.
- Lack of adequate staff in new emerging areas and desired expertise in teaching.
- Lack of strong monitoring and evaluation cell

Most of the SAUs are facing financial crunch and not receiving sufficient financial support for operational costs, new requirements and developing required infrastructure facilities from their State Governments especially for agricultural education component, hence it is in crippled position. However, the rusty wheels of agriculture education machinery in SAUs are being oiled to some extent by ICAR catch up grant and also partly fuelled by enhancing reasonable amount in fee structure. Yet, there is a long uphill climb to face the challenges in 21st century.

Meeting the Challenges

The 21st Century will be technology driven and there will be a profuse information explosion, only the specialized knowledge will make us powerful. Therefore, reorientation of agricultural education is of paramount importance. We shall have to be in the forefront of developing new technology to den benefits under post GATT scenario, IPR regime, NRM/bio-diversity conservation and many more key emerging areas. Our education should be need based, generate employment and be directly beneficial to the common man.

- In the process of reorientation and planning following steps are important :
- Integration of work and knowledge
- Addressing local, regional, national and global problems and needs
- Application of latest scientific and technological ideas
- Inculcation of scientific attitudes and appropriate skills, and
- Periodical revision of course curriculum which influences the overall agricultural development

In order to improve skills and relevance of education, there is an urgent need to restructure curricula at U G/PG levels. The

revised curricula should include new courses in areas like bio-diversity, sustainability, IPM, INM, Environmental Science, Agri-business management, Bio-technology, agri-meteorology, agro-ecology, trade and export, GIS application, Computer Science, Precision Farming, Post Harvest Technologies, Value Addition and core subjects of electives covering the alternate farming issues for self employment/employment, etc.

Significance of Curriculum Development

Curriculum is a detailed programme of study leading to a degree. The quality of education in a particular discipline depends on the development and implementation of comprehensive curriculum. Curricula therefore, needs to be continuously or periodically examined to eliminate outdated or irrelevant material and to make room for newer development. The curriculum development involves proper planning, implementation and modifications at regular intervals to cater to multifarious needs of the society/state/nation. The studies of Manpower Need Assessment by A. F. Ferguson indicated that Government departments (50%) have been the largest employers of agriculture professionals. Now there is a drop in the number of additional positions in the government sector. Every year, around 7000 agriculture and 1200 veterinary professionals are passing out of the agriculture universities and ICAR institutions. Significant proportion of non-agriculture manpower is now competing for agricultural jobs. The course curriculum therefore, needs to be job oriented specially with respect to private sector requirement, ideological shift towards free markets and sustained productivity in farming system based agriculture warrants up-gradation of course curriculum from time to time to fulfill such requirements.

The course curricula development till now has in general served the required purpose of building up trained manpower to cater to the needs of agricultural education, research and extension in our country. It, however, now requires more integration of knowledge and technology not only from its sub-disciplines, but also from several other diverse fields of basic and social sciences to deliver cost-effective and eco-friendly technological packages and to meet the growing need of international trade and high tech agriculture.

Proposed Scheme at UG level

In majority of the agricultural universities, the students are

admitted after 10+2, who complete their 4-year degree programme following a semester system of education taking a load of 20-24 credits per semester. There has been a feeling that these students do not possess the required practical knowledge and skills for performing the job as professionals in agricultural departments, and other organizations effectively and efficiently. The existing course curricula also do not provide them the desired opportunities for self employment in agro-based industries and on their own farms. Thus, there is a need to strengthen and modernize the U.G programme by incorporating sufficient number of practical and agro-industry based programmes as well as a compulsory course in Computer Science. Apart from a general degree in agriculture, reorientation is needed to provide specialized degrees with emphasis on Plant Protection, Horticulture, Seed Technology, Environmental/Pollution Science, Natural Resource Management, Retailing and Consumer Services, Agri-business Management, High tech-water Management, Agricultural Economics and Rural Development, etc.

In view of the unemployment problem a self sustained two way agricultural education stream is suggested to develop the HRD in agriculture. The four years B.Sc (Agri.) degree programme can be restructured in two tier system. In first two years, common courses of agriculture and basic sciences can be taught, after that, for remaining two years, following two divergent lines can be followed based on the liking and need of the graduate:

1. B.Sc (Ag) with specialized degree in any one discipline like Natural Resource Management, Crop Improvement, Crop Diversification, Integrated Pest Management, Economics and Social Sciences, etc. In remaining two years, suppose, the student opt for B.Sc (Ag NRM), then he/she should be taught only the courses related to NRM like Agronomy, Soil Science, Agro-forestry, Water Management etc.
2. B.Sc (Ag- General) as prevalent today. This degree programme also needs fine tuning by incorporating courses by developing viable units of alternate enterprises of integrated farming system, project formulation skill, development, exposure to agro-based industries and industrial parks and more Intensive RAWE program.

These degree programmes should include following location specific need based packages for confidence building and inculcating professionalism among the graduates:

(a) Elective subjects

Keeping in view the modernization of agriculture and open market economy in future, there is an urgent need to introduce/ strengthen various groups of elective subjects consisting of 15-16 credits each during the first semester of third year of U.G program. These electives should cover a wide spectrum of agricultural activities such as food processing technologies, agricultural business management, seed technology, high tech-water management, agro-forestry, sericulture, flower gardening, turf grass management, animal sciences, bio-science, tissue culture, biotechnology, bio-energy, agro-horticulture and vegetables, plant protection, diversification in crop production, rural development and communication, WTO/IPR issues, agribusiness management, environmental sciences, farm power machinery and alternate sources of energy, clothing, textile design and production etc. Through these electives, it is envisaged to meet out the specific requirements of two streams of graduates - one for those who will be pursuing higher studies in a particular discipline, and the other for self- employment/employment.

(b) Earn while learn

This practical crop production program has been introduced in several SAUs by allocating about one acre of land to a batch of 4-6 students of pre-final year of UG program. The students own this land for one academic year in which all operations starting from field preparations through harvesting and marketing are performed by the students themselves, but under the expert guidance of the teachers. The net profit earned at the end of the year after following particular sequence of crop rotation is distributed among students. It may provide them an opportunity to put scientific principles into practice and conduct farming as a business as well as to understand and find the solution of problems faced during actual farming conditions. In this program, so far major emphasis has been given only to crop production. However, in future, it is necessary to include the components of floriculture, seed technology, fisheries, bee keeping, mushroom culture and other components of farming

systems. Therefore, in this program it is envisaged to build up confidence and increase the profit while adopting the alternate farming approaches in agriculture. This programme should be introduced during 6th and 7th semester of degree programme.

(c) Internship / RAWE programme

All the SAUs have introduced RAWE to provide adequate exposure of rural experience to the U.G students under actual farming situations during the last semester of their degree program. However, it needs fine tuning and should consist of three components, i.e. short term orientation of interns in important areas of agricultural activities, exposure to agro-based industries and rural institutions, and village experience. For village experience, a batch of 4-5 students should be allocated to a village under the guidance of KGK/KVK/Regional Research Station.

Each intern should be attached to a progressive farmer for 3-4 months duration. The programme should be coordinated by at least one sincere teacher from each discipline through regular visits. It may help the interns to gain knowledge and experience on the operational aspects of agricultural technology, particularly about the constraints in the adoption of latest farm technology. It will also acquaint the interns with the functioning of various organizations involved in agricultural development, marketing and extension in rural areas.

(d) Plant Clinic/Agri. Clinic

Over the years, it has been experienced that for scientific crop production and management, it is absolutely necessary that agricultural graduates be trained to diagnose most plant disorders which are caused by various biotic (diseases, pests, nematodes, weeds) and abiotic stresses (nutritional deficiencies, soil water and other environmental toxicities, phytoxicities due to pesticides and fertilizers). The ICAR has already introduced a course on Plant Clinic with the primary objective of imparting thorough training to all the students admitted to U.G programme covering these aspects of plant ailments. This inter-disciplinary course should draw resources from Department of Plant Pathology, Entomology, Nematology, Soil Science, Agronomy and Plant Physiology. However, there is still need to strengthen the infrastructure facilities for this practical oriented programme to cover all the aspects

adequately for better exposure and confidence building among the agricultural graduates.

Need of Vocational Education

India's population has already crossed 100 crore mark at the beginning of the 21st century. To achieve the target of full employment during the next 10-12 years, additional employment opportunities have to be created every year for at east 2 crore new job seekers as well as for the existing backlog of unemployed or under-employed populations, particularly in rural areas. The significance of self-employment in rural areas, where about 70% of Indian population lives, may be seen in the context of steady migration of rural population to the cities in search of jobs. This trend of migration has created multifarious problems in mega-cities of the country. This means a large number of appropriate job or self-employment opportunities through vocational education need to be created in the rural areas. Students unable to pursue higher education, college drop outs, women in agriculture who have no facilities of higher education and unemployed youths, etc. can easily be oriented towards agricultural vocations as per their traditional occupations. There is a good scope for vocations in crop diversification, watershed management, integrated farming, animal husbandry and dairying, fisheries, horticulture, floriculture, medicinal and aromatic plants, food preservation and processing, sericulture, agri-business, farm machines, home science, etc.

The vocational education should also focus on development of skills like project formulation, record keeping, procurement, marketing, finance, etc. in addition to imparting knowledge and skills in particular area. The duration these programs can vary from one week to few months depending upon the objective and requirements of the proposed programme. For this purpose, the faculty has to be carefully chosen both from practitioners (successful entrepreneurs, executives, bankers, etc.) and academicians from different disciplines.

Small-scale rural entrepreneurs have contributed significantly to economic growth of developed as well as developing nations. Traditional agriculture in India is gradually evolving into well-developed agri-business with strong linkages among agri-inputs, processing and agro-based industries which results in the

wholesale and retail trade. There is an urgent need to develop adequate infrastructural facilities at various focal points (SAUs, KVKs, Research Centres, etc.) to impart knowledge and training on these important subjects to rural folk so as to enable them in setting up and successfully running their own ventures. The Government, both at the State and National level should encourage the entrepreneurs for setting up marketing associations at their level and provide the necessary support by way of procurement, processing and marketing of their products. Mass media may be used to promote the products of these new entrepreneurs. Each SAU should also establish separate Vocational Education Cell and develop Agro-industrial Parks to facilitate development, testing and popularisation of future viable commercial products.

EDUCATION AT PG LEVEL

Emphasis on quality

Structured around a core curriculum of post-graduate students, the programmes should train students with optional courses from related disciplines. There should be series of problem oriented seminars focussed on the most pressing policy issues of the day. In addition, the universities should undertake exchange agreements with other universities world wide. New developments in science and technology, having significance in higher agricultural education, relate to the fields of biotechnology including tissue culture, micro-propagation technology and cloning technology, genetic engineering, bioctimatology, agro-meteorology, remote sensing, information technology and computerization and new agricultural management systems with increased stress on complex inter-related areas (e.g. sustainable development and natural resources management, post harvest technology, farming systems development and integrated pest management) demand completely different approaches to curriculum design, teaching/learning and resource use. Teaching programme have to be geared to the need of agricultural and rural development by adopting system research approach. Although a series of different disciplines are involved, these must be seen as elements which compliment each other and form a sound holistic base using systems approach. The inter-disciplinary characteristics of agriculture and systems approach need to be fully reflected in agricultural curricula development. Every

agricultural graduate should be able to comprehend agriculture as an organic system comprising of technical, economic, social and cultural elements.

Further improve and sustain the quality of agricultural education, the Indian Council of Agricultural Research has set up an Accreditation Board. One of the important aims of this board is to periodically assess curricula of various programmes and suggest the required modifications.

Relevance to changing needs

The PG programme both at M.Sc and Ph.D level, besides teaching, also includes the research component in most of the SAUs. After admission of the student in a particular discipline, he is required to offer some core courses from his own discipline and minor and supporting courses from other disciplines keeping in view his research project as suggested by the advisory committee. The PG students should be encouraged to offer their major, minor and supporting courses in those areas which require a greater attention for reshaping our futuristic requirements of trained manpower covering different aspects of sustainable agriculture. The issues which need special attention while framing the new course curricula at PG level keeping in view the challenges of tomorrow are briefly discussed here. It is needless to mention that most of these issues are complex in nature and would require a multi-disciplinary (cross listed courses between disciplines) core group of courses in key areas of agricultural activities for reshaping tomorrow's agriculture.

(i) Soil health

The maintenance of good soil health is dependent on the socio-economic aspects and awareness about other alternatives in developing a sound economic base. Shrinking land area, decreasing efficiency of various inputs, increasing danger of residual ill effects of chemicals, imbalanced use of fertilizers, deterioration in the physical properties and soil biology in the rhizosphere, and several other aspects of soil degradation are going to be more serious in future, than ever before. It is, therefore necessary to expose our graduates by strengthening the existing PG courses in soil science and or framing a few inter-disciplinary courses to maintain good soil health. The major aspects which need special attention for course curricula development in this vital field are:

- Integrated Nutrient Management system
- Balance sheet of nutrients under different production systems
- Crop root systems in relation to soil environment
- Organic manures and bio-fertilizers
- GIS application in soil and water resources mapping
- Precision farming for high input use efficiency

(ii) Water Management

Indiscriminate use of this scarce resource has resulted in soil degradation, hydrological imbalances, low efficiency and several other socio-economic and environmental problems. To optimize crop production under limited supply of water, the plant breeding and management strategies should be aimed at maximizing water use efficiency. In addition to crop transpiration, water may be lost from the system in conveyance, application, surface evaporation, transpiration by competing weeds and through run-off and deep percolation below root zone. Thus, an efficient utilization of water warrants adoption of better conveyance and application systems, selection of crops/their cultivars and management practices directed to increase water use efficiency and productivity/production on sustainable basis. Though most of the agricultural universities have adequate number of courses to cover various aspects of agricultural water management, the following areas however need special attention in terms of course curricula development at PG level:

- Socio-economic aspects of water management
- Water production functions in relation to availability of water and other inputs
- Soil- plant- atmospheric water relations and irrigation management
- Crop co-efficient and pressure systems of irrigation
- Rain-watershed management
- Water management in problematic soils and water conditions

(iii) Pest Management

Use of pesticides has become an integral part of modern agriculture. However, intensive and indiscriminate pesticide use, resistance build up in certain species to pesticides and increasing

public concern about their entry in food chain and their adverse effects on environment and human health have led to a wide spread appreciation of the integrated pest management (IPM). Development of suitable cropping systems based on IMP/IWM strategies, and transplanting them into action, selecting proper bio-control agents that have enhanced parasitic and survival ability and establishment of plant clinics in the rural areas through suitably trained graduates are some other potential areas needing further intensified efforts. The field of biotechnology and genetic engineering offer a great scope for development of bio-pesticides as well as resistant crop plants to selected herbicides. The course curricula which need attention in the area of IPM and IWM at PG level should include:

- Integrated pest management including pesticide resistance
- Integrated Weed management including herbicide resistance
- Degradation and residue management of pesticides in soil, plant and atmospheric systems
- Biotechnology in relation to pest management
- Plant clinics, application efficiency and quality control of pesticides

(iv) Integrated Farming System

Considering the requirements of ever increasing population and technological development, agricultural scientists should suggest suitable packages to the farmers under varied farming situations. In such new agro-technological packages, not only the crop production should be kept in mind, but holistic approaches of integrated farming systems, having the components of dairy, poultry, fisheries, bee-keeping, floriculture, mushroom culture, agro-horticulture, silvi-pasture, agro-forestry, etc., should be added to generate more employment and income of farming community on long term basis. There is also a great scope to augment farmers' income by suggesting suitable crop diversification like growing of export oriented crop commodities (Basmati rice, durum wheat), flowers, fruits, medicinal plants and hybrid seed production. All these agro-technological changes will demand intensive cropping, greater use of inputs and proper care of soil health and environment. It will also require a thorough knowledge of the whole system, marketing forces and socio-economic returns.

Major emphasis in course curricula development, therefore, should be given to strengthen this important area in which crop commodity-based education and research system should take the shape of cropping and integrated farming systems approach. This will need the incorporation of the following aspects in the course curricula of agronomy and allied disciplines.

- Composting and re-cycling of organic farm wastes
- Ecology of cropping system
- Integrated farming system
- Resource optimization

(v) Production physiology

There have been concerted efforts in the discipline of plant physiology to study the effects of different biotic and abiotic factors on plant functions and crop productivity. In such studies, generally, green house grown plants in pot are utilized without realization of real field situation. It is a known fact that in naturally lit screen houses, there is about 30-40% reduction in incident radiation, high humidity and limited soil volume in pots, and thus, the potted plants are relatively weak as compared to field grown plants. Reports in literature indicate substantial differences in crop responses to drought and salinity stresses between pot grown and field grown plants. With limited soil volume and high root density in pots, there is rapid development of plant water deficit and plants have very little time of adapting under such rapid drying conditions. It also generally happens that the plants with strong root system, which have a greater chance of survival and yield better under field conditions, are usually poor performer under pot conditions. Similarly, the pattern of salt distribution in soil under pot and field conditions could be different simply because of differences in the frequency and quantity of watering under two situations.

Similarly, one should be very cautious while interpreting the response of transpiration (T) or photosynthesis (PN) to environmental factors recorded on individual leaf and whole crop canopy under field conditions depending upon variations in water use efficiency and harvest index. Thus, we have to reorient our research and education programme in the discipline of plant physiology to make it production physiology and following areas would require strengthening/farming of new courses at PG level.

- Crop physiology
- Internal plant water status and crop productivity
- Crop modeling
- Root morphology and physiology in relation to input use efficiency in field crops
- Identification of potential stress tolerance traits in crop cultivars

(vi) Yield potential and its stability

In the past century the pace of varietal development in different crops has been quite encouraging. The new vistas in Indian agriculture were added in the form of Green Revolution by the introduction and development of high yielding dwarf varieties of wheat and rice, and development of a few hybrids of other crops, but now yield plateau has been observed in major food grains like wheat and rice even under high input system of agriculture. Thus, breakthrough in crop improvement programme may come by improving the partitioning of biomass towards useful components from whole plant (root and shoot) rather than shoot alone.

Heterosis or hybrid vigour has been exploited in several crops and a considerable scope exists to increase the productivity of crops through heterosis exploitation.

The important constraints facing the Indian agriculture production system indicates that sustainability under rain-fed conditions is perhaps the key issue for India. In recent past, there has been a modest progress to incorporate the traits for biotic resistance into suitable agronomic background. However, only very little efforts are made to identify and incorporate the potential traits for different abiotic stresses into high yielding varieties of field crops.

With the fast technological developments, the progress in system physiology has opened new possibilities in identifying potential traits to various environmental stresses and their measurements by relatively simple and impressive means. Recent time has also witnessed an exponential increase in understanding the molecular biology of stress tolerance in plants. The knowledge gathered in the field of stress physiology and biotechnology could permit us to incorporate desired traits through improved breeding technologies to achieve a second green revolution in the country.

There is now an emerging consensus regarding the desirability of the farmers participation in the development and release of variety, particularly for the unfavourable environments. The institutional system of plant breeding and seed productions have been benefited enormously from the genetic diversity of the difficult regions. Now it is time that plant breeding strategies are broadened, recognizing comparative advantage of farmers and plant breeders, to reconcile often conflicting objectives of equity, sustainability and efficiency. It is recognized that 20-25% yield advantage may be achieved only through the use of good quality seed. In this endeavour, the SAUs, ICAR institutions and other organization have geared up its breeder, foundation and certified seed production programmes to enhance the availability of good quality seeds to the farmers. These and several other above mentioned issues need special consideration while strengthening/ framing of new courses at PG level in the discipline of genetics and plant breeding. The areas which need strengthening the teaching programme in the discipline of crop improvement should include:

- Biotechnology and genetic engineering
- Farmers participatory plant breeding
- Breeding for biotic and abiotic stresses
- Management and conservation of plant genetic resources
- Seed technology
- Intellectual property, breeders' and farmers' right in patenting of seeds, other life forms and bio-based products

(vii) Atmospheric environment

Modern agriculture requires precise information on various agro-climatic parameters for harnessing maximum benefits from atmospheric factors by suggesting suitable agro technology and corrective measures against aberrant weather conditions for sustained development of agriculture. This would require delineation of agro climatic zones by proper inventory of edaphic and weather parameters, availability of other resources and prevailing cropping systems. It will help not only to intensify the execution of the concept of efficient crop zoning by producing a particular crop commodity in the ecologically optimum zone but also timely warning systems for taking necessary corrective measures against aberrant weather

conditions, pest and diseases. The use of remote sensing techniques in resource monitoring and crop-weather modeling for resource optimization should be advocated to modernize the discipline of agricultural meteorology. These areas should find proper place in PG course curricula to train our graduates in this important discipline. The course which need strengthening/inclusion in this field include:

- Crop weather forecasting
- Agro-climatic zonation
- Crop weather modeling
- Application of remote sensing techniques in agriculture
- Climatic change, green house effects and Indian agriculture

(viii) Post harvest technology and value added products

There is great scope to augment farmers' income and avenues for employment by proper allocation of resources to an array of options, i.e. proper packing and grading of fruits, vegetables, spices, and cut flowers and preparation/manufacturing of several value added products through post harvest technology for their proper marketing within and outside the country. The subject is particularly important to the disciplines of horticulture, vegetables, agro forestry and other allied branches. The PG course curricula which need strengthening should include the following areas:

- Post harvest physiology of fruits and vegetables
- Storage, packaging and marketing of seedlings and cut flowers
- Post harvest technology and value added products of field-tree and vegetable crops
- Spices, condiments and medicinal plants

(ix) Agribusiness Management

The spectacular success achieved by our neighbouring Asian countries such as Japan, South Korea, Taiwan, Thailand, Malaysia and China in the field of agro-industries and agro-business has positively inspired our planners and also the corporate sector to view agriculture in an entirely new light. The current level of export is very meager, but the speed at which the exports are growing is satisfactory. There can be no doubt about the immense and yet untapped prospects and potentials to view and convert India as an

agricultural power. There are positive indications in the direction. Food crops, plantation crops, poultry, dairy, sugar, cotton and oilseed are the areas in which India has made its mark. Sericulture, marine and inland fisheries are other areas in which considerable progress has been made. Only a few countries grow such a wide range of fruits, vegetables and flowers and rich variety of medicinal plants and herbs as India. India can also attain a commanding position in developing and extending world wide benefits of biological software comprising of highly promising and relatively inexpensive vermiculture, bio-fertilizers, bio-pesticides, tissue culture propagated materials, nitrogen fixing shrubs and trees. India is the leading producer of tea, coffee, cashew nuts, spices and jute fibre. With proper planning and production of greater exportable quality surplus, India can certainly emerge as a modest player in the global market of agricultural products. However, this will require proper linkages between agriculture and industry through strengthening the agricultural business management education in India. A few SAUs have taken a lead in identifying this need and decided to extend their education services to prepare competent personnel for careers in teaching, research and consultancy in agri-business oriented enterprises. A proper education and training to the farmers is also required in the changing scenario.

A few State Governments and Chamber of Commerce in collaboration with SAUs are eager to set up marketing intelligence system for providing information on national and international marketing trends and systems about agro-based produce/products for the benefit of the farmers. There should be a great deal of involvement of several rural development and financial agencies to help the agro-industries and farmers in this endeavour.

Keeping in view the above problems and objectives in view, there is an urgent need to strengthen the existing/framing new courses in SAUs at PG level in the following areas to make the agriculture as business oriented enterprise.

- Management of Agro-industrial projects
- Costing and pricing problems in agriculture
- Small business organization and management
- Marketing research and information system for agro-industrial projects

(x) Extension Education

A persistence weakness of agricultural extension has been a lack of adequate support from mass media like radio, television and electronic technology. The recent developments in electronics have opened up the new vistas of merger and convergence of mass media, computers and televisions for developing expert system of data base to achieve yet another revolution in the field of agricultural communication. This new technological development will go a long way in improving, monitoring and evaluation of extension service deliveries, their adoption and proper feed back regarding problems faced by extension advisory agencies and farming community for reshaping the Indian agriculture.

Knowledge is growing at the rate of 3000 words per minute and the gap between the developed and developing countries is widening simultaneously. Information is knowledge and knowledge leads to power and wealth. Our graduates, scientists, planners and farmers have to keep pace with newer developments. This is only possible if our institutions are connected to international networking with an access to international database and information on emerging technologies.

The following areas need special emphasis to modernize agricultural

extension education:

- Instructional technology management and multi-media network
- Entrepreneurial skill development
- Participatory rural development approaches and strategies
- Expert data base for rural communication and service delivery systems
- Multi disciplinary interactions and linkages among teaching, research, extension clientele

Conclusion and future action

In the light of all facts said above, the ICAR and IAUA may consider to develop AHRD aiming at enriching the quality of agricultural education based on new and modern trends which are challenging in new millennium. Starting a comprehensive degree programme such as B. Sc. Ag (Hons.) in specialized subjects, B.Sc.

(Ag- Rural Development) and B.Sc Ag (Ent. Development) to cope with the under-employment problems of agricultural graduates. In addition, the curricula development would require fine tuning and a lot of flexibility in education system, well trained faculty, adequate modern infrastructure, laboratory and field facilities and concerted efforts for the betterment of our whole education system to face the challenges of tomorrow.

Further, there is a need to provide proper linkages between SAUs, ICAR institutions and agro-based institutions, establishing/ strengthening of accreditation and students counseling and placement cells. New emerging and frontier areas to create much bigger revolution in new millennium including socio-economic and environmental issues as well as intellectual property rights need to be given top priority as these issues will dominate the next century.

9

Curricular Relevance of Higher Education in Agriculture Engineering Science in the new Millennium

A.N. Mathur

Introduction

Agricultural engineering education in India commenced in 1942 with starting of the course at Allahabad Agricultural Institute, Naini (now a Deemed University). The post agriculture two years undergraduate programme has made steady progress with the time. At present there are 26 institutions offering education in agricultural engineering with intake of about 800, 300 and 80 students and out turn of about 550, 150 and 25 degree holder at Bachelor, Masters and Doctoral level annually (Maurya, 2001). There is a feeling that higher education in agricultural sciences, which has tremendous growth and development, both quantitatively and qualitatively during 1960s-1970s, has shown a declining trend in its quality and agricultural engineering is no exception to it. As a matter of fact, the agricultural engineering education, which was attracting fairly good talent in agricultural education system earlier, is going down in student's preference now.

An analysis has been made for the penetration directly influencing the relevance and quality of agricultural engineering education in India. These factors might have caused the decline in the AE education in recent times. There is a urgent need for reorientation of agricultural engineering education to meet the challenges the country is facing such as global market, job creator in place of job seeker, changing national and international scenario in the areas of food processing and marketing.

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REORIENTATION OF AGRICULTURAL ENGINEERING EDUCATION:

Though, the choice of the agricultural engineering as an area of education is next to any general engineering but in recent years it is loosing attraction and not many bright students are opting for these courses as their first preference for career. The condition of the graduates in the field is not relevant to the level of the choice, as AE graduates have done excellent work in many areas of development. The ICAR and Agricultural Universities are aware of the problem and have initiated many steps to remedy the situation. The serious thoughts through the third Dean's Committees and adopting a basic frame for the syllabus have shown its impact.

Redefining Objectives of Agricultural Engineering Education:

The sectional committee of Accreditation Board has proposed following objectives for, Masters and Doctoral programme in agricultural sciences.

Goals and Objectives of Agricultural Engineering Colleges:

An objective is a generic term to cover goals, purpose, output, aims etc. and goal in higher under objective that a given project/ institution combined with others will achieve.

Goals:

1. Have an outstanding undergraduate programme in Agricultural Engineering.
2. Develop excellent and need based post graduate and research programmes in different branches of agricultural engineering.
3. Provides extension education services appropriate to the needs of the region with special emphasis on agricultural engineering.
4. Strive to achieve a national and international status as an institution of higher education in the field of Agricultural Engineering.

Objectives:

1. To organize and conduct undergraduate and postgraduate programmes in agricultural engineering leading to Bachelor's, Masters and Doctoral degrees fulfilling their prescribed objectives.
2. To undertake basic and applied research in different aspect of

agricultural engineering covering production, protection, value addition, marketing and management.

3. To develop technologies suitable for the region in the field of agricultural engineering.
4. To organize short term specialize training programme and vocational courses in the specialized area of agricultural engineering.
5. To organize programme related to transfer of technologies for agriculture and rural development.
6. To collaborate with other agencies involved in teaching, research and developmental activities in the field of agricultural engineering.
7. To provide consultancy services to farmers and other engaged in agricultural activities and rural development.

Under graduate Programme:

The third Dean's Committee in 1995 recommended restructuring of the courses and redistribution of areas. Some of the subjects of agriculture sciences have also been included. With the global opportunities in the marketing and mechanization it is necessary to review existing courses and include more courses on Computer, hi- tech agriculture, food processing and marketing, including export and management. The credit requirement for the degree can be increased to 180 credit to keep in line with the recommendations of AICTE. Many of the graduates of this discipline are getting good opportunity in management & marketing, social programmes through NGOs such as IFFCO, GVT etc.

Master Degree Programmes:

(i) To inspire and impact instruction in a set of specialized topics based on broad based undergraduate degree programme.

(ii) To adopt interdisciplinary approach by integrating related disciplines, for solving problems.

(iii) To introduce research methodologies for taking up research work including doctoral programmes.

Doctoral Degree Programmes:

(i) To inspire, challenges and impact instruction leading to advance level of intellectual attainment and creative endeavour.

(ii) To take up basic/applied research in strategic areas.

PG Curriculum in the New Millennium

The accreditation board through its sectional Committee on Curricula and Equivalence took a massive exercise of restructuring PG programme, numbering more than 90 at present. The board constituted 16 Broad subject matter Area Committees (BJMACs) including one for agricultural engineering. One of the major tasks assigned to these committees was to restructure master degree curricula. The PG academic regulations were developed with the input from these committees and finalized in the meeting of Deans of PG studies. The academic regulations prescribe credit requirement (50 for master degree and 70 for Ph.D. degree). The system of evaluation has internal cum external examination system. The credits for research and thesis are graded as satisfactory or unsatisfactory. The 10 point grading system with grade point requirement for a degree of 6.0/10 to pass in a course and 6.50/10 to obtain a degree. The regulations also make it compulsory for Ph.D. students to write and submit two research papers in reputed journals based on their research work, before they submit the thesis.

The recommendations are as follows:

(i) Nomenclature of the degree:

The master degree will be awarded in agricultural engineering with specialization and specialization will be mentioned in the certificate. For example- M.Tech. (Agricultural Engineering), Specialization -Soil and Water Engineering

(ii) Major areas:

Master degree to be offered is in the following three major areas, with as many sub specialization as can be justified by the universities:

i. Farm Power and Machinery

ii. Soil and Water Engineering

iii. Agricultural Process and Food Engineering

However, there is necessity of including some of the new emerging areas such as Renewable Energy, Post Harvest Engineering and Technology, Irrigation and Water Management etc also as areas of major specialization.

(iii) Core courses:

Against the recommendation of 9-12 credit compulsory courses in major area, a list of 7 courses with 19 credits have been identified, out of which a student can choose course up to 10 credits as per his requirement. These include courses in Computer, Mathematics & Statistics, Instrumentation & Control etc.

(iv) Seminar:

A student is required to take one credit seminar course compulsorily, though it is not part of core courses. The topic of seminar shall have a relevance to his major area of specialization.

(v) Optional courses

In each major area 18-23 courses have been proposed, out of which a student can choose 14 courses.

(vi) Supporting courses:

Under supporting courses, which have to be out side major area, 5 courses with 13 credits have been listed, out of which student can choose 10 credits. The students can also choose supporting courses from any other department, including the departments in agricultural engineering faculty as recommended by the advisory committees.

Doctoral Degree Programme:

The Ph.D programme in AE is based on the general recommendation of ICAR and has all the features of the ME. The student has some flexibility, which he can avail on the recommendation of the Major Advisor. There is a shift in major institutions in the country from Ph.D by Course Work to Ph.D by thesis. This allows a student to concentrate on the research instead of devoting more time on course work.

Accreditation and Approval:

The ICAR has started the system of Accreditation and it has to get momentum. Similarly, AICTE (NBA) and UGC (NAAC) also accredit and approve the AE degree and the institutions offering such programmes. The AICTE approval has enabled CTAE Udaipur to get support to the tune of more than Rs 150 lakh during last four years in the areas such as Irrigation Management, Soil & Water Engineering, Farm Machinery & Power, Food Processing alongwith basic engineering branches. The accrediting agencies are charging

high initial fee, as such ICAR should support the institutions to get them accredited by as much agencies as possible.

Conclusion

It can be concluded that agricultural engineering education, which was attracting the good talent under agricultural education system earlier, is loosing its place now. Among engineering disciplines also, agriculture engineering has not been able to achieve a place of pride. The reasons for this decline may be many including non-availability of suitable employment opportunities. A recent trend, which has been spread in all branches in engineering including agricultural engineering, is the shift to Computer & Information Technology. The remedy may lie in reorienting agricultural engineering education and improving curricula and their delivery system in view of global market opportunities, so as to produce graduates who are job creators rather than job seekers. There is a need to add more areas in the list of specialization, such as Renewable Energy, Irrigation Water Management etc. The concept of Ph.D by course work needs to be reoriented to give student more stress on research than studying a course. The institutions offering AE degrees should be supported to get approval from AICTE and UGC.

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10

Curricular Relevance of Higher Education in Home Science in the new Millennium

Pushpa Gupta*

The essence of education is to appreciate the transformation from raw to refined, from being primitive to being cultured and from being ignorant to being knowledgeable.

Every field of education is facing the challenges of the new millennium and they can best be met by reviewing and analyzing the milestones already crossed. Planning for future should consider the experiences of past, hence a glimpse of history of Home Science education is given here.

The history of Home Science Education in India can be traced back to nineteen twenties when it was introduced in some schools as Domestic Science/ House Craft/ Domestic Economy. The major thrust was on teaching home making skills to the girls. Home Science education was first inducted in higher education as diploma in domestic science at Lady Irwin College, Delhi in the year 1932. In the same decade in 1938, Madras University started a degree programme in Home Science. Thereafter, many other Universities introduced degree programme in Home Science in rapid succession. The first faculty of Home Science was established in 1950 at Baroda under M.S. University.

Another land mark was made in the history of Home Science higher education when it was included as one major discipline in the Agricultural Universities in India. The first College of Home Science was established in 1961 at Andhra Pradesh Agricultural University, Hyderabad.

Dual Dimensions of Home Science Education

The journey of more than half century has still not culminated in reaching the goal of conceptualizing Home Science to its optimum

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potentialities. Home Science education has a two pronged approach which has ample scope for practical family applications and professional possibilities. Need of the hour is to recognize and reorganize the curriculum in a manner that the students can have the option to choose their education programme as per their aptitude and ambition in life. Home Science programme can focus on basic practical applications in family life for those who do not have professional dreams and have specialized approach for budding professionals. The following table will illustrates the 2 tier focussed approach in which the home science education can be modulated for better results.

Table : Dual Dimensions of Home Science education

Specialization areas	Family Applications	Professional Possibilities
Human development & Family Studies	Infant, children & maternal health, provision of simulative environment for development, parenting for wholesome personality and performance, human resource development, care of persons with special needs, home care for the aged.	Guidance and counseling, creche and early childhood education centres, family parenting education, family welfare support and social service agencies, marriage and family counseling, research, production of toys and information material, creativity and recreation camps for children, adults and the aged, support for chronically ill, consultancy & teaching.
Foods and Nutrition	Nutrition, health-dietary practices, food selection, preparation, service and preservation, diet and health through the life cycle.	Clinical nutrition, dietetics, nutritional counseling, food service management, food product research and development, nutrition and health education and counseling, food processing & preparation related entrepreneurship, legal food counseling, product detailing, fitness and health programmes

Specialization areas	Family Applications	Professional Possibilities
Family Resource Management	Family finance, and savings, work efficiency, time management, energy conservation, care of home and environment, waste disposal, housing and interior design and decoration, home equipment use & care.	Consumer education, guidance and protection, ergonomics, environmental agencies and utility companies, hospitality management, interior design, research and quality control entrepreneurship
Textile and Apparel Designing	Wise choice, use and care of clothing for the family, quality and value concern of textile product, clothing for special needs- children disabled, elderly.	Fashion & textile design, pattern drafting, garment industry, apparel and textile testing, product development and manufacturing, quality control, research, occupational apparel design, entrepreneurship.
Extension & Communication management	To extend the knowledge required for day tc day living in each areas (as discussed above) to the family deprived of such vital information	Extension education in rural and urban areas, social service, consultancy, distance education, media planning & production, rural development programmes of GOs and NGOs extension training, entrepreneurship.

The mission of Home Science Education in Agriculture University is much different than the other Home Science Colleges governed by UGC under traditional Universities. The main focus of Home Science programmes in SAUs is on the farm families and the purpose is to prepare girls to meet the needs of the rural families and enhance the capacities of rural women as contributors to food production and consumption, environmental conservation, better family living and development of human resources. At present there are 17 Home Science Colleges in SAUs.

Until 1997-98 Home Science under graduate degree programme

in SAUs, was of 3 years duration after 10+2 schooling but from 1998-99, one year has been added making it 4 year H.Sc. honours degree programme (3+1 year pattern) as per recommendation of 3rd Deans' Committee of ICAR and a thorough deliberations in Home Science Deans meeting held at Udaipur in June 1997. A second revision was made and a 2+2 degree programme emerged where one year was added to the professional courses. Some of the colleges have started 2+2 pattern of degree programme from 2002-03. Whereas some colleges could not start the new programme because of inadequate facilities.

Table : Existing 4 year degree programme (ICAR)

3 + 1 pattern

First 3 years (6 semesters)	Credits	4th year (2 semesters)	Credits
Basic Sciences & Humanities	16	Professional electives	18
Agriculture & environmental	13	RAWE	21
sciences			
Computer Science	6	Implant training	
Home Science courses	86	Total	39
Total	**121**		

2 + 2 pattern

First 2 years (4 semesters)	Credits	Last two years (4 semesters)	Credits
Courses		Professional electives	50 (40)*
Basic Sciences & Humanities	17	Implant training	10 (20)*
Agriculture Sciences	3	RAWE	10
Core courses of home science	60	Supporting courses	10
Total	**80**	**Total**	**80**

* Credits in parenthesis for course on dietetics

Status of Home Science today has widened. It has burst its bounds and has increased in scope. It is not confined to strengthening home and family life only but it is an education having major role for community and national building specifically to empowerment of women.

Consequently, the major thrust of existing 4 year degree programme is on skill development and internship for self employment opportunities and intensive rural work experience to prepare them to work for rural development.

The eligibility requirement for admission and mode of admission is 10+2 schooling with PCB/PCM/Home Science Group/ Agriculture. Admissions are done through entrance test in some colleges wherein 15 per cent seats are filled through national level entrance test organised by ICAR.

The evaluation is done by Internal and External examination. Proportion and modalities are decided by the respective Universities.

The discipline of Home Science had struggled a lot for existence but it is heartening to note that it is now an established and well recognized discipline in higher education both by UGC and ICAR. Relevance of Home Science Education today specially in SAUs is a vital issue to be critically reviewed, thoroughly examined and re-casted in the light of contemporary challenges in the society and the world scenario as well as changing role of women in and outside the home and family.

Need to re-organize Home Science education

1. Home Science as a discipline in higher education is still not well recognised in the society. People have limited and narrow perception of Home Science. It is considered an education imparting home making skills and is considered suitable only for girls. Even the present nomenclature does not reflect the subject properly undermining its scope and perspective.
2. The under graduate programme of Home Science of 3+1 pattern does not prepare students adequately for different careers and self employment. Attitude of girls for Home Science education has also undergone a change. Earlier many of the parents and girls wanted to pursue Home Science graduation to excel in scientific and successful home making while presently they want job oriented degrees. But the course curriculum is not in line with the requirements of the industries and other prospective employment organisations. Hence, job opportunities for home science graduates are very few. Further there is an increasing number of alternative job/skill oriented courses available such as computer education, computer aided textile designing, garment designing, beauticulture, dietetics, interior designing, costume and fashion designing, journalism, business management, bakery etc. These courses are attracting more

and more girls as they can acquire jobs immediately after completing these courses while there is decline in enrolment in Home Science degree programme all over. In fact there is increasing preference for Agriculture, Dairy Science and Veterinary education over Home Science education by girls in SAUs.

3. Under graduate degree programme of Home Science in SAUs is of 4 years duration while it still continues to be of 3 year duration in traditional Universities. If 4 year programme is not very sound and saleable, enrolments will decline. Hence, it is the most appropriate time to critically review and assess the recently introduced reorganized programme of 4 years, so that it can be made most relevant and career oriented. Rural Home Work Experience and Internship/In-plant training also need to be planned well for effective implementation and outcome.
4. Home Science in SAUs is being criticised as urban oriented education lacking rural orientation and sensitivity to the rural problems and needs.

Thus there is a need of critical assessment of present home science programme in SAUs and re-organising it to make it most suitable and befitting to meet the challenges of today and making it more relevant to keeping pace with fast changing society and rapid advancements in science and technology. There is also need to analyse and review the career development opportunities and research possibilities relevant to the local situations.

There is growing concern to make home science education more professional, career oriented and gender neutral.

Proposed action plan to be deliberated for implementation

In this era of globalization, there is a dire need to chalk out action plan which after deliberation at various professional forums can be implemented to save the falling grace of a dignified discipline of Home Science. I put forth three major action plans to make Home Science curriculum more relevant to the global demands of the new millennium.

Re-baptizing the field by the change in nomenclature

Home Science is a science which deals with human beings as individuals, members of family and community in respect of nutrition,

development, resource management, textiles and apparel designing, capacity building and empowerment.

Recently there has been lot of deliberations on the appropriateness of the nomenclature of the discipline. There is a divided opinion on this issue. According to one opinion, Home Science is very appropriate nomenclature and should not be changed as now it has got a recognition in the society. Changing its nomenclature now would mean beginning to struggle once again for new recognition. The second opinion is that the present nomenclature does not reflect the professionalism and the career orientation of the discipline and hence is conceived as an education of home making skills. It is also gender bias and attracts only girls.

Since human resource development is the major thrust of home science discipline, the proposed name should reflect the perspective of the discipline rightly. It should also sound gender neutral which will attract boys also. By changing the name, the discipline can be made more professional with wider recognition and better job opportunities.

The various alternative nomenclatures suggested like Human Ecology, Human Science, Family and Community Science, Family and Consumer Science, etc. also do not sound very appropriate. There is need to change the name of the discipline but the word "technology" could be added which is an important component of different courses. Thus the new nomenclature of Home Science may be –

Family Science and Technology

Realistic re-casting of Home Science programme

There are two types of degree programme in Home Science operating in the country i.e. 3 year and 4 year programmes. The B.Sc. Home Science programme in 19 colleges of SAUs is of 4 year duration (3+1 pattern and 2+2 pattern). Three year degree programme is offered in more than 200 colleges across the country which are governed by UGC. So far the 3 year programme was of general nature but recently the programme has been re-organized by UGC adding specialization with focus on entrepreneurship development and job oriented courses making it 1+2 pattern.

It is evident that a large number of colleges, universities offer 3 year programme while very few colleges of ICAR offer 4 year degree programme. This means a large number of graduates come out

from a 3 year degree programme. Addition of one year to the degree programme in Home Science colleges under SAUs has resulted in decrease in enrollment in majority of the colleges. Following points have emerged in informal discussion with the parents, the students themselves, teachers and other educationists.

1. The 4 year duration of B.Sc degree programme is considered long when 3 year degree programme is available in all the states. Parents prefer 3 year degree programme for their daughters and do not want to waste their one year. There are many other alternative professional courses available which are of 2-3 year leading to diploma or degree programmes like BBM, Fashion Designing, BCA, Information Technology, Mass Communication, Journalism etc. which are also professional and have contemporary relevance.
2. The students graduating from 3 or 4 year degree programme are treated at par for job selections, competitive examinations and admission for post graduation.

The teachers and students have suggested that vocational thrust to the programme with entrepreneurship development can also be provided within 3 year programme on UGC pattern.

I would take this opportunity to present some curriculum models before this august body.

Table : Proposed Models of UG Programme

Model Programmes	Eligibility for admission
1. General B.Sc. Home Science Programme	10+2 Sc., H.Sc., Ag., Arts, Com.
2. B.Sc. (Home) Textile and Apparel Designing	10+2 Science (PCB, PCM, H.Sc.)
3. B.Sc. (Home) Fashion Designing	10+2 Sc., H.Sc., Ag., Arts, Com.
4. B.Sc. (Home) Foods and Nutrition	10+2 Science (PCB, PCM, H.Sc.)
5. B.Sc. (Home) Clinical Nutrition & Dietetics	10+2 Science (PCB, PCM, H.Sc.)
6. B.Sc. (Home) Family resource Management	10+2 Sc., H.Sc., Ag., Arts, Com.
7. B.Sc. (Home) in Interior Designing	10+2 Sc., H.Sc., Ag., Arts, Com.
8. B.Sc. (Home) Human Development & Family Studies	10+2 Sc., H.Sc., Ag., Arts, Com.
9. B.Sc. (Home) Home Science Extension & Communication Management	10+2 Sc., H.Sc., Ag., Arts, Com.

Note: *More degree programme can be added*

- Duration of each programme - 3 years Eligibility - Sr. Sec. School

1st year will be common for all the programmes. Total credit load of each programme will be 120

Table : General B.Sc. H.Sc. Programme

1st Year (2 semesters)

	Courses	Cr. Hrs.
1.	Computer Education – I & II	4
2.	Agriculture Sciences	4
3.	Rural Sociology	2
4.	Home Science core courses	25
6.	Animal Sciences	2
7.	Environmental studies	3
	Total	**40**

II and III Year (4 semesters)

	Courses	Cr. Hrs.
1.	Professional communication	3
2.	Entrepreneurship development	3
3.	Major courses of Home Science	60
	(12 cr. of each department)	
4.	Statistics	2
5.	Seminar	1
6.	NSS / NSO / NCC	1
7.	Rural work experience in Home Science	4
8.	Electives • Guidance and counseling • Milk product preparation • Value addition to food products • Floriculture • Weaving and Hosiery • Any other such courses	6
	Total	80
	Grand Total	**120**

Table : B.Sc. (Home) Textile and Apparel Designing
II and III Year (4 semesters)

	Course components	Cr. Hrs.
1.	Designing and construction of clothing for family, commercial clothing, merchandizing and marketing	26
2.	Textile science	15
3.	Costumes, historical textiles and embroidery	10
4.	Care, maintenance and storage	12
5.	Supporting courses from other departments (one course from each department of H.Sc.)	12
	Total	**80**

Table : B.Sc. (Home) Fashion Designing
II and III Year (4 semesters)

	Courses	Cr. Hrs.
1.	Skill oriented courses related to fashion designing	63
2.	On the job training	5
3.	Supporting courses from other departments (one course from each department)	12
	Total	**80**

Table : B.Sc. (Home) Foods and Nutrition
II and III Year (4 semester)

	Courses	Cr. Hrs.
1.	Biochemistry and physiology and microbiology	9
2.	Food processing preservation and storage	9
3.	Nutrition education	8
4.	Human nutrition	12
5.	Nutrition management in health and disease	9
6.	Food sciences	12
7.	Institutional food science management	9
8.	Supporting courses from other departments (one course from each department)	12
	Total	80

Table : B.Sc. (Home) Clinical Nutrition and Dietetics
II and III Year (4 semesters)

	Courses	Cr. Hrs.
1.	Courses related to clinical nutrition and dietetics	48
2.	On the job training (one semester)	20
3.	Supporting courses from other departments (one course from each department)	12
Total		**80**

Table : B.Sc. (Home) Family Resource Management
II and III Year (4 semesters)

	Course components	Cr. Hrs.
1.	Consumer science	9
2.	Basis of resource management	12
3.	Household equipments	9
4.	Interior designing and furnishing	12
5.	Family finance	9
6.	Housing, space and environment management	9
7.	Ergonomics	8
8.	Supporting courses from other departments (one course from each department)	12
	Total	**80**

Table : B.Sc. (Home) In Interior Designing
II and III Year (4 semesters)

	Courses	Cr. Hrs.
1.	Skill oriented courses related to interior designing	48
2.	On the job training (one semester)	20
3.	Supporting courses from other departments (one course from each department)	12
	Total	**80**

Table : B.Sc. (Home) Human Development and Family Studies II and III Year (4 semesters)

	Courses	Cr. Hrs.
1.	Human development	15
2.	Marriage and family life	9
3.	Family and child welfare	9
4.	Early childhood education	15
5.	Children with special needs	9
6.	Parent and community education	6
7.	On the job training	5
8.	Supporting courses from other departments (one course from each department)	12
Total		80

Table : B.Sc. Four Degree Programme

- 1+3 pattern
- 1st Year common for all degree programmes
- II, III and IV year

Components	Credits
Specialization	70
Supporting courses	20
Project work &	10
In-plant training	20
Total	**120**

Table : Revised M.Sc. Programme (ICAR)
Duration – 2 years

Discipline	Area of specialization	Course programme	Cr. Hrs.
Food Science and Nutrition	• Community Nutrition • Food Science & Human Nutrition / Food technology and Human Nutrition	Core course Optional / specialization Seminar	11 9 1

Discipline	Area of specialization	Course programme	Cr. Hrs.
	• Food Service Management and Dietetics	Research / dissertation	15
Textiles and apparel designing	• Apparel Designing & Manufacturing • Textile Designing	Supporting courses from other departments	14
Human Development & Family Resource Management	• Child Development • Family Studies • Consumer ergonomics • Entrepreneurship management		
Extension & Communication Management	• Distance Education • Development programme Management • Extension training Management • Home and farm Journalism		
		Total	**50**

Table : Revised M.Sc. Programme in Home Science (UGC)
(Family and Community Sciences) Duration – 2 years

Discipline	Area of specialization	Course programme	Cr. Hrs.
Foods & Nutrition	• Dietetics • Community Nutrition • Institutional Food	Core courses Optional / specialization	28 20 6
	Service Management • Bakery and Confectionary	Research / dissertation Research and Statistics courses	6 60
Textiles & Clothing	• Garment Design • Textile Design		
Human Development	• Early Childhood Care & Development • Education of the Child with special needs		

Discipline	Area of specialization	Course programme	Cr. Hrs.
	• Family & Child Welfare		
Resource Management	• Interior Design • Management of Family and Organizations • Consumer Studies		
Extension & Communication	• Development Project Management • Media Development		

Table : Proposed M.Sc. Programme in Home Science

Duration – 2 years

Discipline	Area of specialization
Foods & Nutrition	1. Foods & Nutrition
	2. Community Nutrition
	3. Food Science technology & Human Nutrition
	4. Food Service Management & Dietetics
	5. Nutrition and Dietetics
Textiles & apparel deigning	1. Textiles & apparel deigning
	2. Apparel Designing and Manufacturing
	3. Textile Design
Human Development & Family Studies	1. Human development and Family Studies
	2. Dynamics of Human Development
	3. Early Childhood Care & Development
	4. Family Dynamics
Resource Management & Consumer Sciences	1. Consumer Ergonomics
	2. Consumer Sciences
Home Science Extension & Communication Management	1. H.Sc. Ext. Extension & Communication Management
	2. Communication & Instructional Technology
	3. Training for Human resource Development
	4. Home and Farm Journalism

Table : Course Distribution

Courses	Cr. Hrs.
Core courses	9
Optional / specialization	21
Seminar	1
Supporting courses	
1. Research and Statistics courses	6
2. Courses from other departments	6
Comprehensive	2
Dissertation	15
Total	60

Short Term Certificate and Diploma Courses

One of the mandates of Home Science education in SAUs is to cater to the needs of rural families. The formal education programme of Home Science should reach the rural girls and women. Due to many constraints the rural girls do not seek admission in the Home Science Colleges. It is proposed that short term certificate and diploma courses should be offered through KVKs and also the college. Following courses are proposed.

1. High school diploma of one year for rural girls and boys after 10th pass
2. 3 to 6 months certificate courses for girls and women. Minimum 8/10 class schooling.
3. UG diploma of one year for rural girls and boys after 10+2 schooling.
4. PG diploma of one year for rural girls and boys after degree. These diploma should be offered in the college as they require high professional and technical input.

Courses could be in food processing and preservation, homestead technologies, garment production, toy making agro-based enterprise management floriculture, textile designing, dyeing and printing, weaving and hosiery, mushroom cultivation and processing, fruit and vegetable production, health and nutrition, organization and management of early childhood education centres, reproductive health education, food for family, clothing construction, agriculture technology, dairy product technology, etc. More need based courses can be added.

Suggestions:

The action plans suggested however could only be effectively implemented under competent personnel and conducive infrastructural climate. Following suggestions are worth contemplating upon for practical execution of future plans.

a) Adequate financial support should be provided to hire competent guest faculty from industry/organization for teaching professional electives. In many Home Science Colleges, the strength of faculty and technical supporting staff is not adequate to run 2+2 / 1+2 degree programme. Thus, the financial support to create new positions in Home Science Colleges must be provided. Every department should have 1 Professor, 1 Associate Professor, 5 Assistant Professors, and 2 STAs to run UG and PG programmes. Vacant positions needs to be filled immediately for which ICAR should communicate with the state governments

b) Staff needs to be given vigorous training in all the professional courses. ICAR should provide financial support for HRD.

c) Contingency amount should be increased in order to meet additional requirement of laboratory and field practical in the professional electives. Student contingency should be Rs. 2000/student at UG level and Rs. 3000/student at PG level, for RAWE/In-plant training1000/student should be provided.

d) ICAR should provide support for strengthening laboratories as per the requirements of professional electives. Each department should be provided at-least 5 computers with accessories because majority of these professional electives are based on computer applications.

e) Each KVK should run 2-3 short term diploma / certificate courses for women empowerment for which adequate support in terms of man power, equipment, space, books etc. should be provided. Home Science colleges can serve as technical resource centre for these programmes.

I conclude by reaffirming that Home Science is a unique discipline which educates and trains individuals to face the challenges for self and family, has application of knowledge for better family life at the same time has tremendous professional

possibilities where it prepares individuals for various jobs or self – employment. Thus the mission of H.Sc. in the new millennium should be empowerment of students for family life and also empowerment for career life and self employment. It is time to synchronize these two fold objectives of Home Science and develop linkages with other departments, State institution, NGOs, corporate sectors for creating more job opportunities for the Home Science graduates.

While continuing to address the basic thrust, the new millennium agenda for Home Scientists should be enhancing and widening the professional dimensions of the field. The growth of food industry and the technological advancements there in, growing importance of textile and fashion designing, increasing professionalism in space and interior designing, the upsurge of satellite telecommunication and internet, the growth of agro-based industries, scientific design of ergonomically sound work stations, labour saving equipments, professional approach to management issues have all necessitated professional focus and thrust on home science education. Developing entrepreneurial skills and initiative should become major concern of Home Science in order to facilitate employability of graduates who will increasingly be called upon not only "job seekers" but also "job creators". Besides through KVKs and other outreach programmes, Home Science Education should reach the rural girls and women for their better family living and economic empowerment.

11

Curricula Relevance of Higher Education in Horticulture & Forestry Sciences in New Millennium

S. S. Negi* and Jagmohan Singh**

After attaining independence in 1947. primary emphasis in agriculture in India \\as placed on achieving self sufficiency in food grains. Development of high yielding varieties and matching production technologies and their adoption in areas of assured inputs such as water and fertilizers resulted in food self sufficiency, ushering in green revolution during the sixties. It was precisely during this period that state agricultural universities were established to give a fillip to overall growth of agriculture.

During its first phase, horticulture education remained a low key issue as horticulture received very little attention till the third five year plan inspite of the fact that India has a wide variety of climate and soils on which a large range of horticultural crops can easily be raised. It was then realized that horticulture as a component of agricultural system deserve more attention than it was receiving. Due to suitable topography and agro climatic conditions of the country, horticulture has enormous potential for achieving sustainability of small land holdings, increasing employment. improving environment and providing nutritional security. Horticulture is also a favoured occupation for export oriented production. This realization culminated in due emphasis on horticultural education in the National Agricultural Research System.

Forestry education though more than 100 years old was a preserve of the federal and state forest services of the country till 1971 when compulsory forestry courses were started for B.Sc (Agri) students. Subsequently, forestry education because an

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integral part of agricultural education when B.Sc Forestry degree programmes were started in State Agricultural Universities in 1985. Today, it has developed into a multi- disciplinary faculty integrating various disciplines of physical, biological and social sciences.

At present, the horticultural and forestry education in India is being carried out by the SAUs. ICAR and ICFRE institutes mostly as part of agricultural education. There are some few SAUs which have separate Colleges of Horticulture and Forestry to cater to the special needs of horticulture and forestry education in the country. New imperatives During the last one decade, several changes took place which necessitated complete overhauling of course curricula in agricultural education which became applicable to horticulture also. Some of the changes are listed below:

- Shift from public sector jobs to private sector employment.
- Shift from quantity to quality produce.
- Shift from high yields to sustainable yields.
- Shift from local market focus to global markets.
- Shift from high inputs to cost effectiveness.
- Shift from exploitative to environmental friendly technologies.
- Shift from theoretical to application oriented education.
- Shift from fixed education for degree generation to variable education for job generation.
- Shift from traditional to upcoming and frontier areas and subjects.

This paradigm shift necessitated concomitant changes in the development of suitable curricula in horticulture so as to meet the aspirations of the students as well as the stakeholders. In order to meet the changed situations, efforts were made independently by State Agricultural Universities and ICAR to revise the course curricula to make it more relevant.

Course Curricula

With food self sufficiency, focus during mid 80's shifted to multifaceted development of farming systems. It was realized that specialized courses in various faculties should supplement to the more traditional agricultural colleges. It was during this period that colleges of Horticulture and Forestry disciplines were established

at several SAU campuses. As of today there are 13 Colleges of Horticulture and 8 Colleges of Forestry in the country. Horticulture courses were further divided into more specialized subjects such as pomology, fruit breeding, horticultural technology, vegetable crops, floriculture, landscaping etc. This updated course curricula proved fairly relevant to the national needs and generated need based human resource. However, the legal socio-economic and environmental changes proved to be too fast and drastic for the horticultural system to sustain for long. The need was felt to re-schedule the course contents and this time the ICAR introduced its own course curricula for B.Sc (Hort.) with emphasis shifting from zone/state to the whole country. ICAR, New Delhi constituted the Third Deans Committee in 1995 to look into all the relevant issues and formulate a uniform syllabus at LJG level. This exercise culminated in the development of the course package which has now been adopted by all the universities offering horticulture degrees. This new package, besides rationalizing the relative weightage given to different aspects is also aimed at reducing the variation in competence level of horticulture and forestry graduates passing out from different Universities. The newly introduced system has several advantages over the traditional system, vet due to rapid changes even this system is proving inadequate in terms of the relevance of course contents to the emerging demands of the stakeholders. There is therefore a need for making modifications in the existing horticultural education system to make course curricula more relevant to education, research and extension.

The current PG syllabus, more or less is merely an extension of UG topics in a slightly more detailed manner with little scope for inducing scientific understanding of the issues involved. Horticulture and Forestry education worldwide has undergone a sea change. Emphasis needs to be shifted to new approaches like molecular biology genetic engineering, precision experimentation, computer aided modeling and forecasts. GIS and remote sensing. Without exposure to latest trends, the PG students coming out of Agricultural Universities Find it difficult to gainfully employ themselves. The Post graduate programme (M.Sc and Ph.D) being run at present in the country suffer from obsolete syllabi wide variation in course contents and different evaluation procedures. Thus, there is an

urgent need to revise and update the courses curriculum at higher level with some inbuilt flexibility to address the emerging issues in horticulture and forestry sectors. Such syllabus, apart from bestowing uniformity, should also introduce topics relevant to the regional, national and global needs. This may be done by deleting obsolete topics, modifying contents and formulating more optional courses.

New Courses needed

The following approaches through the introduction of vocational courses should supplement the present day horticulture and forestry courses to increase their relevance:

- Mushroom production.
- Production of quality planting material (nursery production).
- Large scale production of biofertilizers and bio pesticides.
- Development and use of plant disease diagnostic kits.
- Bee keeping technology.
- Organic farming.
- Short rotation forestry.

These courses need to be introduced and fine tuned so that the students find them as useful for building of self-confidence and for self employment. These courses can remain relevant only if constant feedback is received from the passed out students who have taken these courses for their self employment.

Rural Horticultural/Forestry Work Experience

Basically this is a concept of "learning by observing, doing and analysing". This was one of the novel concepts introduced by the Third Deans Committee. This is a rare opportunity to imbibe the true spirit of farmers indigenous knowledge in the perspective of modem science. Although one semester has been dedicated for this purpose, yet a large number of modalities need fine tuning. For example, the accompanying staff can not be spared for whole of the semester to stay in villages with the students. Many students, mainly those coming through ICAR nominations do not understand local languages and dialects and thus can not make full use of the training.

Many points need to be properly considered and worked out as

- Earmarking of the staff for RHWE/RFWE. The teachers should be well versed with local language and customs to properly communicate with farmers and students.
- Proper and safe stay of the students in the villages.
- Exposure of the students to peak periods of horticultural operations.
- In-built mechanism of students participation in farmers field operations and forest management.

Horticultural Industrial tie up programmes

With shrinking job opportunities in the public sector, horti-industrial tie ups are needed for increasing the prospects of the students for self employment as well as their employment in the horticulture based industry. This expose equips the students not only to learn the scaling up processes involved in horti-industry but also to learn legal and codal formalities involved in setting up horticulture based industrial units. Whereas the students need to be taken periodically to horti-industry, emphasis should also be placed to introduce such relevant courses which provide theoretical knowledge about broad industrial policies. Also industry should be involved for framing course curricula to make it user friendly.

Courses on Intellectual Property Rights and patenting

With the provisions of WTO as would be applicable to our country also. there is now an urgent need to include courses on IPR. provisions of the Convention on Bio-diversity. and similar other international commitments, germplasm cataloguing. molecular taxonomy, etc.

Although, there is now a lot of emphasis on patenting of original research carried out by the students as well as by the faculty, yet. there is only inadequate awareness regarding the codal and legal formalities to be followed. It is now necessary to introduce a course on patenting covering various aspects. This not only will he a step forward for confidence building but will also keep the students abreast with the most modern trends in horticulture.

Eco-tourism

Eco-tourism is a novel concept in tourism which is intimately

linked with innovations in horticulture and forestry. Present day trend in tourism is shifting from traditional tourism to eco-tourism comprising visits to heritage parks, fossil parks.. forest grooves, eco-lodges. landscapes designs etc. There is not only a need to create awareness, but also it should form an integral part of course package for higher education in horticulture and forestry. The course curricula for eco-tourism should place emphasis on the following :-

- Eco-tourism origins, evolution and trends
- Operating successful eco-tourism business
- Eco-tourism planning for governments and communities
- Educating the eco-tourists
- Leo-tourism marketing, etc.

Need for Educational Technology Development Cell (ETDC)

There is a need to establish Education Technology Development Cells in SAUs which should act as a think tank for effecting changes in the existing curricula to make the same more relevant as per emerging needs. This cell should maintain regular liaison with the University alumni, concerned industry, prospective employers and the financiers which may help the students in establishing their on business in horticulture.

Faculty or upgradation

A suitably qualified faculty is the core strength of any educational programme. With multi pronged budgetary restrictions in University funding, it is difficult to fill up the posts which fall vacant and to nominate teachers for much needed trainings. There is acute shortage of staff in the emerging areas in horticultural education and research. For example, competent staff in bio-informatics, core molecular biology, biostatistics, computer aided modeling and simulation studies, patenting international conventions on biodiversity germplasm and their social-legal aspects, national agricultural policy, banking, etc.

It would not suffice to depute teachers for trainings because a fixed number of days of training are required for their promotion. It is rather important that they be deputed only for such trainings for which campus competence lacks.

Assured provisions for University funding

Most of the Universities are confronted with the problem of financial deficits which affect not only the much needed infrastructure development but also day to day functioning. It eventually limits the development and implementation of the education system in its true meaning and spirit. Usually, compromises have to be made for restricting expensive practicals. field visits, students exposure lo horticultural industries etc. During earlier years, it was mandatory for students to undertake comprehensive tours of the country to gain knowledge about existing horticultural models. Due to shrinking finances, however, the tours have been minimized depriving the students of 'their legitimate right to gain knowledge by seeing and interacting with people in other parts of the country. Most of the grants made available by the state governments are used for payment of salaries and only little funds are left for properly implementing course curricula.

Presently funds available for libraries are inadequate to subscribe to need based journals and CDs. For assuring relevance of course curricula, it is essential that the faculty and the students keep themselves abreast with current trends of technological advances in their fields of specialization. Also. libraries essentially need to be equipped with internet facilities, etc.

Conclusions

The course contents have to be constantly upgraded with change in socio-economic conditions of the stakeholders and more access to improved technologies. During the past. horticulture and forestry education has played a significant role in producing human resource and infrastructure and developing production. protection and processing technologies which resulted in quantum Jumps in the ever changing social-economic and environmental conditions. The relevance of the course curricula followed hither to is well established. During the recent past. however, the pace of change has gained momentum which has necessitated the development of an inbuilt mechanism for coping up with the multifaceted changes in the overall structure of horticultural and forestry education.

In my opinion, due emphasis on the following points should help in maintaining the curricula relevance of higher education in horticulture and forestry.

1. Establishment of Education Technology Development Cells which should provide the needed feed back to the University.
2. Identification of core faculty for teaching which should be competent, sincere and committed for the cause of horticultural education, this faculty should be nominated in preference to others for relevant trainings so that their knowledge and skill are updated for the benefit of the students.
3. Availability of adequate funds for ensuring overall development of the universities so that not only the classroom education is improved but also the exposure of the faculty and students to places of educational interest is ensured.

Due to lack of adequate funds, several compromises have to be made even if the course contents are very relevant. It is therefore important that curricula relevance of higher education in horticulture is not to be viewed in terms of course contents only but in a rather more holistic model. A mechanism may help to keep on changing so that it does not lose relevance.

The stakeholders are constantly exposed to the ever-changing imperatives. If a proper feedback is received by the F.TDC. requisite modifications can be made in the curricula. Obsolete courses can be modified or dropped, need based new courses can be introduced and commensurate trainings can be imparted to the core teaching faculty. This mechanism, if followed properly should ensure a long term curricula relevance of higher education in horticultural sciences.

While dealing with higher education in horticulture, it has generally been appreciated that usually course contents and written academic regulations to implement them are fairly adequate. In spite of this several glaring deficiencies are noticed at execution level. Proper implementation of current system of education is near adequate and is quite relevant with its inbuilt mechanism for effecting modifications. Courses have been thoroughly overhauled and streamlined by third Deans' Committee of ICAR, New Delhi which now need further refinements. It is a time when implementation pail should be improved which can be ensured with proper co-ordination of the ICAR, State Governments, Universities and the clientele. Overall progress in horticulture during the recent past has proved the curricula relevance of higher education and will continue to do so with timely and proper rectification of the deficiencies in the system as and when noticed.

12

Demand driven avenues of Higher education in the context of Globalization

S.S. Baghel*

Globalization and Education

Globalization of the world trade has affected every sphere of life including higher education. The WTO covers two multilateral clear-cut areas of agreements *viz.*, trade in goods and merchandise (GATT) and trade in services (GATS). Higher Education is also covered under the GATS. In India, in recent years, unsuitable/ adverse decisions on educational philosophy and policy had taken place. After the establishment of the WTO in 1995, India had to go against the advices of a good number of its previous Education Commission Reports which were based on Indian soil. In other words, after globalization, India has to shift her own suitable social sectors to ones without seeing their suitability to our population. Education from the basic right has become a source of income for the rich and foreign investors, which is more clear in Higher Education. The economic value of higher education also has considerably jumped up.

Even the Academics, worldwide are not happy to the GATS. A joint declaration on Higher Education and GATS initially signed by four key organizations of developed countries *viz.*, the Association of Universities and Colleges of Canada, the American Council of Education, the European University Association and the Council for Higher Education. Accreditation in September, 2001 states that Higher education exists to serve the community and is not a commodity, a fact which WTO Member states have recognized through UNESCO and other international and multinational bodies, convention and declaration(after Parhar,2002). Thus, the Academics and Academic Administrators of these countries

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requested their countries for any commitments after 1995 towards globalization of Higher Education. This however, seems to has little influence on their ministries' decisions towards economic growth.

GATS (General trade related services), under the WTO agreement provides for legal access/right to all signatories to trade in all services except those provided exclusively by the government. As services account for about 70% of the market transactions in the developed world, it is of great significance . Education is also covered by this agreement and since then the economic value of education has considerably shoot up. The major beneficiary in the business of exporting higher education is the USA which may stand in the first place followed by other developed countries. USA earned six billion dollars through international students in 1992-93 and this rose to ten billion dollars in the year 2000. France, Germany, England and Australia are other major exporters. Though India has six per cent enrollment ratio in higher education, she may become a passive consumer alongwith the other developing countries (Table 1).

Table : Growth of enrolment in Higher Education

Year	Number of students (in million)
1950-51	0.26
1960-61	0.65
1970-71	1.95
1980-81	2.75
1990-91	4.73
1999-2000	7.73

(after Parhar. M.(2002), U.N. 40:27)

Demand Driven Avenues

Demand in mainly relates with three factors *viz.*, :

1) Need base 2) Quality of product and 3) Low fee structure.

1) Need based demand :

In Indian market, most of the youths seek for job oriented traits. In recent years there has been a sharp decline of demand for higher education in some professional traits like agriculture, mainly due to the governments policy for downsizing of the

Universities. Some areas like Biotechnology became highly demanded.

2) Quality of product :

The produce of Indian Universities, though, considered of reasonably good quality , many students are being attracted by foreign countries like USA and other European countries. In Institutes like IIT's the demand, on the other hand, are enormous, showing the need for quality assurance to draw a good demand.

3) Fee Structures :

Indian market has a good advantage of having low fee structure as compared to other countries. It is still affordable by many middle class groups.

GATS's Higher Education services :

Under the Gat's Higher Education Services provisions two types of activities are covered :

Firstly - Teaching of practical skill (Training) in post secondary but sub-degree, technical and vocational training institutions and

Secondly - Education provided by the Universities, the colleges affiliated to them , and the specialized professional institutions recognized to be university level institutions.

Higher education service is different from other service sectors in that, there is a public – private mix in the form of a high degree of public involvement co-existing with private funding and commercial activities. Academics and academic administrators are concerned about the impact of GATS on higher education in key areas of access and equity, funding, quality and even intellectual property rights.

Status Indian of Higher Education (after Parhar, M. UN-40(27)

The Indian Higher education consists of first degree and two years post graduate education. The age groups for higher education is 17-23 years. Students enrolment in higher education increased significantly in the last five decades. It increased to 0.26 million in 50-51 to 7.73 million in 1999-2000 – almost 30 times in the last 50 years (Table 1).

There has been extensive diversification of courses at undergraduate and post graduate levels. Many new disciplines have been introduced at both the levels. There has been a positive shift towards jobs oriented vocational courses at the undergraduates level.

In India, the main development in higher education during last 50 years was a quantitative expansion. The US estimates that the students enrolled in post-secondary instituted in 1998 were 14.6 million students and projected to 17.5 million by 2010 (NCES 2000). Similarly, other countries like Japan, France, U.K. etc. has carried out similar projections and planning to cope with it.

Demand Projection

Looking into the enrolment between the period 1980-81 to 1999-2000, the demand in higher educated is projected in table 2. (after Parhar, 2002). During 1980-81 to 1990-91 the number of students in higher education increased from 2.75 million to 4.93, million to 4.93 million. In the following decade- 1991-92 to 1999-2000 was enrolment increased from 5-30 to 7.73, million. Thus, there is an overall increase of more than decade. If the rate continue, in 2006, 2011 and 2016 the enrolment in higher education will be 9.53 million, 10.91, million and 12.29 million respectively.

International Student's demand in Higher Education

The overall trend of students in Indian University during the last decade (Table 3) shows that there has been decline in the international demand for higher education. It might be due to several factors of which quality could play a major role. After 1997-98 onwards however, a steady increase.

Table : Enrolment projection in Higher Education

(after Parhar, 2002 UN 40(27)

Year	No. of students.
1980-81	27,52,437
1990-91	46,24,868
1999-20001	77,33,612
2006 *	95,25,770
2011 *	1,09,05,806
2016 *	1,22,85,842

Region	92-93	93-94	94-95	95-96	96-97	97-98	98-99	99-00	00-01	2-Jan
East Asia	108	114	182	168	208	202	153	147	202	248
Western Asia	1747	1380	1225	646	363	676	385	579	776	948
South & C.Asia	2392	2658	2070	2850	1838	2261	1741	2207	2243	2519
South East Asia	836	1703	1537	1168	370	480	468	563	642	597
Australia	28	36	49	40	28	35	32	31	44	45
Northern Africa	1698	1341	1031	471	388	367	254	305	398	309
Western Africa	117	98	73	52	28	38	34	44	59	51
Eastern Africa	5143	5572	4674	3496	2238	2204	1724	2165	2484	1967
Middle Africa	31	10	14	3	15	37	7	10	5	7
Southern Africa	35	87	59	59	11	20	18	31	23	35
Northern Europe	51	66	50	60	30	39	36	43	61	103
Western Europe	60	66	30	28	22	27	29	38	53	93
East Europe	24	32	21	20	29	60	26	34	43	37
Southern Europe	18	20	16	18	6	11	12	5	22	20
North America	134	247	418	299	166	132	117	270	317	411
Central America	12	8	3	9	1	4	1	5	6	7
South America	5	5	5	1	1	4	3	0	1	14
Miscellaneous	326	254	430	699	144	234	238	512	405	734
Total	**12765**	**13707**	**11888**	**10087**	**5841**	**6701**	**5323**	**6988**	**7791**	**8145**

Conclusion

Whether India can continue to have a policy which will be truly Indian, beneficial to our citizens, facing the strong influence of globalization.

The discussion paper on government subsidies in Indian prepared by the GOI in 1997 considers higher education as a non merit good and suggests a drastic cut in government subsidies from 95 to 25 per cent over a period of five years. The report on a policy framework for reforms in education submitted to the Prime Minister also endorses reductions in public appending ignoring the suggestions of Kothari Commission. These reports push toward the general international trend of profiteering in higher education and taking all the money earning opportunities to private parties sidetracking the primary and conventional courses to the public funding.

The government run or aided public institutes are surrounded by problems like lack of infra-structure, lack of suitable people or faculty etc. In short, India would be heading for an intellectual slavery or a subtle neocolonization by the developed world.

To compete with the developed world, India needs a sizeable investment. Though higher education is unavoidable for us, in this unequal competition, protection of the interest of our youths – both students and employees will be a tough job.

The impact of globalization has greatly influenced Indian policies on higher education. Since a majority of our villages and urban youths are going to be left out from getting higher education provided by the quality education providers, educated youths are going to be under paid and exploited by the private institutions. This would hasten the growth of frustrated and exploited youths day by day. It would be necessary to ensure that equal opportunities are available to our citizens and they are not exploited.

Original signing of International treaties under pressure or following the west blindly may not be in the interest of our people. It is necessary to make sure that equal opportunities are available to our citizens and they are not exploited.

To have a good demand, we should make our institutions/ answerable to the following questions : (after Stella,A.2000) UN-38(45)

- Are we performing better than earlier ?
- Is our organ/institute performing better than other units in the organization ?
- I s there any other organization from whom we can learn ?
- I s there any practice that will improve our performance ?

13

Indian Higher Educational Services Under WTO Regime

*P.K.Jain**

Introduction

Concerns have been voiced about the role of W.T.O. into Social Service Sectors such as education, health and environment under the General Agreement on Trade in Services (GATS). However, most of these concerns stem from misunderstandings and lack of information about the liberalisation process under the GATS. The central idea of GATS is that progressive liberalisation of trade in commercial services like higher education and health will promote economic growth in WTO member countries. The Doha declaration of Nov. 14, 2001 mandates member countries to submit initial request for specific commitments in these services and then expected to make initial offers by the end of 2003. **This paper is an attempt to raise trade related issues in education services that India needs to address and suggest policy options for strategic management of trade in higher educational services.**

Assessment of Potentials :

Is there a potential for growth of trade in educational services, especially when significant contribution to this sector comes from the government? Is trade in educational services compatible with WTO norms? As per article 1.3 of GATS, government services remain outside the purview of GATS, provided they are not meant for commercial purpose and do not have any competition from private service suppliers. Hence, as per this article, education does come under the purview of GATS trade liberalisation, since there are already many institutes, colleges, high schools, and coaching classes operating in the private sector in India. These private service providers are in direct competition with government-run institutions. Moreover, one must not forget that leading public educational institutions like the IITs, IIMs and agricultural universities

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were funded primarily by foreign funds. Shrinking budgetary resources for education are in no way helping the cause of promoting knowledge in India. The per capita total government expenditure on education for 1995 was less than $10 per year in India as against $1,400 in US [UNESCO 1998]. Moreover, the share of higher education in total planned resources has decreased steadily, from 1.24 per cent in the fourth Five-Year Plan to 0.35 per cent in the Eighth Five-Year Plan [Joshi 1998]. As a result, the state of affairs in government educational institutions is pathetic. Even if the government substantially increases its educational spending via deficit financing, it amounts to an inflation tax. Hence, **private sector participation and trade in educational services seems imperative.**

The paucity of funds highlights the fact that capital is a scarce factor and human resource an abundant factor in India. According to the celebrated Heckscher Ohlin (1933) theory of trade, products/ services that use the abundant factor more intensively get exported and abundant factor gains from such trade. With abundant qualified human resource, India must export educational products that use our human resources intensively. To achieve this, as we discuss a little later, India needs to create favourable circumstances domestically and negotiate effectively at the WTO forum. An argument is always made that India is experiencing a brain drain, that is, although the ownership of the knowledge inputs (read human resource) is Indian, ownership of the generated knowledge is with the west (Khadria, 1999).

Classification of Trade in Educational Services :

Investment in education and knowledge is being considered as an integral factor of growth. In the past decade, awareness of knowledge as an engine of growth has gained ground and education is now looked upon as a tradable service. Developed countries are also keen to use this opportunity to avoid underutilisation of infrastructure that exists in their educational institutions.

Empirical studies show that the contribution of total factor productivity (TFP) to GDP growth is quite significant in an open economy. This happens because of competition, and, as the endogenous growth theorist would argue, due to improvement in physical and human capital, and access to knowledge. Table 1

shows that in the post-liberalisation period, India's GDP growth-rate is relatively high, and almost half of this growth-rate is accounted for by increase in total factor productivity. Trade in educational services will further contribute to the total factor productivity leading to a higher growth-rate in GDP.

The efforts of WTO to include education in the GATS agreement should be seen in the above-discussed context. Therefore, India has to pay serious attention to the GATS agreement as applicable to educational services, identify opportunities and competitiveness in various subsectors, and negotiate WTO commitments accordingly. These issues are discussed below.

There is a two-way classification of trade in educational services. First, the WTO Classification List (W/120) describes five categories, namely, primary education, secondary education, higher education, adult education, and other education. It must be understood that GATS do not make it mandatory for member countries to open up all the educational categories. In fact, one can reject opening up of all the categories. Based on a country's assessment of prospective gains, specific categories can be opened up. For example, countries that are substantially dependent on trade have already opened up all categories. These include some of the East European countries and New Zealand. It must also be noted that at the Doha meeting, formal communications for trade in educational services were put forward by the English-speaking countries, namely ; New Zealand, US and Australia. New Zealand, in its communication (S/CSS/W/93), seemed to explore opportunities in adult and/or other education services such as driver education. The US, in its communication (S/CSS/W/23), has so far proposed that countries commit to opening up of adult education and other education services such as educational testing services and training. Australia, in its communication (S/CSSIW/ l 10), is suggesting opening up of secondary education. And there are many other countries including India which have not made any commitments yet.

The second classification is based on the nature of trade in (educational) services. Article 1.2 of GATS classifies trade into the following four modes.

i) **Cross-border supply :** It includes courses through distance education, online courses through the Internet, educational testing services, and educational materials that are provided overseas. It will also include sale of paperback editions of books and sale of educational CDs.

ii) **Consumption abroad :** This refers to import of educational services through movement of the consumers/students to other country for pursuing education. A clear example is that of Indian students studying abroad and spending on educational fees and all related expenses of their stay.

iii) **Commercial presence :** It means actual presence of an educational service provider of a country in another country. For example, a foreign university may start a school of journalism in India, giving a foreign degree to the students.

iv) **Movement of natural persons :** As the title suggests, it involves people moving between countries to provide educational services. Indian teachers going abroad to teach in high schools in the US is one such example

The Table 2 provides a complete listing and possible examples of category-cum-modes of each type. As the table indicates, there are 20 types (5 x 4) of trade in educational services.. India will have to make, in its communication, specific requests to other countries, propose changes, and indicate its readiness to commit in select types of trade. While doing this, India must ensure that the safeguard instruments available in the GATS document are credible and enforceable.

Competitiveness of Indian Educational Services :

For the negotiations on trade in services, Indian authorities not only need to respond to the proposals and commitments made by others, but put forward India's own proposal and select commitments that are in the best interests of the country. A prerequisite for that is to generate adequate data on the status of educational service providers and users and its aspects related to trade. Based on that, the authorities will be fully able to comprehend India's competitiveness in various sub-sectors of educational services. However, based on the information available at this time, critical observations on India's competitiveness can certainly be made.

Educational testing services :

The US hopes educational testing services (and training) to be included in the country commitments. This is not surprising as the US already has well-established educational testing service providers and it would like to utilise the potential outside the country. India too has a long experience of providing educational testing services. The quality of testing services is well demonstrated by all-India qualifying tests such, as the Common Admissions Test (CAT) of the IIMs, Joint Entrance Examination (JEE) of IITs, NET examination of CSIR-UGC and Graduate Aptitude Test in Engineering (GATE). If the experience of these services is adapted for various fields and, if such services can be offered on a round the-year basis with sufficient computerisation and use of Internet facilities, India stands to gain from liberalisation of such services. However, markets for such services will have to be actively sought. Hence, India may commit to liberalise these services, but an adjustment period of at least six years is necessary for upgradation and, marketing of these services to potential clients. Moreover, the willingness of stockholders to conduct this activity in the private sector needs to be assessed. Only then can India become competitive both in the foreign and domestic markets.

Students on foreign campuses:

In 1995-96, 31,743 Indian students had enrolled for courses in the US [UNESCO 1998]. Currently, however, the number must have already exceeded 40,000. Moreover, there are a few thousand more Indian students studying in Europe. However, one may not worry too much about such imports of services. A significant proportion of these students would be (post) graduate students on teaching/research assistantships and fee waivers (see 'Teachers and Researchers Working Abroad'). Moreover, value must be attached to foreign educational experience, which certainly widens the horizons of young minds.

As far as export of such service by India is concerned, that is, foreign students coming to India for study, the current prospects are not too bright. India already gets some 5,455 international students from neighbouring developing countries [NIEPA 2001]. However, getting students from developed countries, even from east European countries, would be difficult as our standards of

campus facilities are in general poor. However, there is scope for developing high-value niche, markets for some of the programmes that India may offer. Marketing of programmes-on education in arts and culture, Sanskrit and other languages and literature, and traditional medicinal sciences like ayurveda could be effectively done by upgrading the campus facilities for some of the specialised institutions in India. A glaring example of this is the programme offered in ayurveda by the department of -ayurveda at the University of Pune. It has twinning agreements with universities in Italy, Germany and other countries to send their students here for part of the study.

Moreover, there may be niche markets for management education as well. India has one of the best management schools in the Asia-Pacific region. The Indian Institute of Management, Ahmedabad, although it does not have any foreign students enrolled in its two-year programme, has a successful exchange programme for students.: More than 45 students , go abroad for a term for which they do not have to pay fees. One must also remember that fees in western countries are much higher than those in India. Promoting such exchange programmes on a reciprocal fee-waiver basis will certainly be useful to India both in terms of not losing foreign exchange and providing Indian students an opportunity to broaden their world view. In doing so, Indian institutes will move towards upgradation of their facilities and infrastructure in the near future. The institutes then can also attract foreign students for their regular postgraduate programmes in the long run.

Establishing schools abroad :

At present, many countries including the US are only looking inwards as far as secondary education is concerned. However, an Indian proposal should include scope for commercial presence of institutions in secondary education. India's CBSE system of secondary education is quite robust compared with the state-board systems. In fact, there are more than 100 (Indian) CBSE schools abroad. With Indian diaspora spreading rapidly all over the globe, there would be great demand for CBSE-like schools in the UK, US, Fiji and other parts of the world. Of course, some initial ground-work will have to be done by identifying and bringing together private providers and the prominent figures from the non-resident Indian

community. In the long run, the school system could be expanded away from the ethnic Indian focus that will be required in the short-term. On the import side, India need not worry much as the system of secondary education is both cost and quality competitive. As far as establishing institutions of higher education abroad is concerned, India's competitiveness is in doubt as it needs to address the core issues of capital expenditure requirements. Instead, domestic higher education problems be addressed first to stay import competitive. However, one exception must be brought to our notice. The Central Institute of English and Foreign Languages (CIEFL), Hyderabad has successfully launched an English language teaching (ELT) programme in Kyrgyzstan. The institute won the contract although t here was strong competition from other countries [Kolhatkar, 1999]. India must capitalize on such experiences and duplicate the efforts elsewhere.

As far as the presence of foreign higher education institutions in India is concerned, India should allow it; however, the process of liberalisation must be gradual so that domestic educational institutions are capable of effectively competing with the foreign institutions. India will need a transition period of at least six years to upgrade campus facilities. Upgrading facilities in all institutions will be difficult; however, select import-competing institutions must be able to upgrade their facilities. Among other things, these facilities will include: availability of course schedules on the Internet, telephone registration system for courses, option of payment of fee through credit cards, well-equipped dormitories, classrooms, libraries and sports facilities of international standards, and facilitating growth of off-campus housing infrastructure in the private sector for faculty, staff and students. Moreover, accreditation system for foreign educational institutions will have to be developed. Indian authorities may need to study how developed country governments manage the accreditation system in their own countries.

Teachers and researchers working abroad :

Although the annex to GATS mentions that movement of natural persons is excluded from GATS, it clearly provides scope for negotiating commitments on movement of persons in specific services. India must put in its proposal to include commitments on movement of teachers and researchers both at the secondary

and higher education level. Already, about 10,000 secondary school teachers are working outside the country for some time now, and increasingly there is a growing demand for Indian teachers, especially in mathematics, sciences, and English. The trend will continue given the scarcity of teachers in the developed world and the sufficient supply of qualified teachers in India. Nevertheless, there is a need for making projections of export of this educational service. The export of teachers need not be construed to imagine that Indian schools will be deprived of their valuable asset. In fact, a healthy market for teachers will encourage many more to join the profession domestically as well.

Moreover, it must be remembered that many of the Indian (post) graduate students who go abroad for higher studies receive teaching and/or research assistantships and tuition waivers. This is a form of export of educational service in the form of movement of natural persons. The fact that western countries need foreign (post) graduate students to teach independent courses in their universities shows the need for qualified university-level teachers abroad.

Strategies for Proposals, Commitments and Domestic Reforms :

India must therefore act in self-interest. The country must manage to send a, proposal and commit to areas where there are strategic opportunities to be exploited through trade. It also entails radical reforms in the domestic educational infrastructure. In this context I suggest the following:

India should endorse the US view of including educational testing services to be included in the country commitments. However, India should ask for phased liberalisation. A lead-time of at least six years is necessary to upgrade India's reputed testing services to compete effectively with foreign suppliers in the domestic market, and gather market intelligence to focus on adaptation of services for the export market.

India may commit to all modes of trade in higher education as well. However, it must be borne in mind that India will have to actively seek niche markets for India specific knowledge programmes, Moreover, infrastructure upgradation of our premier and import competing institutions must be done on a, priority basis so that

they can effectively compete with foreign institutions based in India. Again, for this purpose, India' must propose gradual liberalization. A transition period of at structured, time-bound fashion. The least six years is needed to bring our priority institutions on par with the foreign ones in terms of infrastructure and facilities.

The country may make a specific proposal to other countries to commit themselves to commercial presence in secondary education. This is in view of the prospect that accredited private high schools of CBSE standard stand a good chance of being exported. More than 100 already existing other counties. Similar US schools exist in India and elsewhere that are primarily meant for non-resident US citizens.

India may propose a specific commitment on inclusion of teachers and researchers both at the secondary and higher education level under the trade mode, 'movement of natural persons'. With increasing demand for teachers in developed countries India may want to ensure opportunities for its human capital. The commitments will also apply to (post) graduate students who go abroad and earn teaching/ research assistantships and tuition waivers. In this respect, India may seek equal pay for these persons, no deduction of social security tax, and no mandatory deduction for teachers/individual retirement accounts. Even if social security tax is deducted, it should be recoverable when a person returns to his/her home country. Moreover, there need not be penalty for withdrawing money from the teachers' retirement account when one returns to his/her home country.

Australia, in its 'communication, has expressed its desire to screen people desiring temporary immigration. However, it considers restrictions by other countries on foreign equity participation in educational institutions as a deterrent. These expressions are quite asymmetric in nature. If countries wish to have unhindered entry of their capital into other countries, they must also allow; legitimate entry of human capital into their own country. Screening of Indian educationists desiring to temporarily immigrate to countries such as Australia is indicative of protectionist trade policy. Such propositions must be opposed during the negotiations.

Indian authorities must request for assistance from UNESCO and/or other world bodies for improving educational infrastructure in the country. This has been done in other WTO agreements such as Agreement on Sanitary and Phytosanitary measures (SPS) and Agreement on Technical Barriers to Trade (TBT). Moreover, such assistance must be provided in a structured, time-bound fashion. The motivation for such request is that developing countries such as India will find it extremely difficult to cope up with issues that will suddenly arise if commitments were to be adhered to immediately after an agreement is reached.

To compete effectively with developed nations, to upgrade facilities and infrastructural needs, developing countries must have a transition period of at least six years, after which complete implementation of the agreement can be undertaken.

For a smooth transition to the new liberalised environment, encourage WTO member countries to have more student exchange programmes so that exchange students could become the young ambassadors, messengers and promoters of India's educational services in their respective countries.

Strategies for domestic reform :

Authorities must develop a database on all categories of education regarding number of educational institutions, their enrolment (domestic and foreign), faculty strength, financial sources, and quality and accreditations. Further, market intelligence regarding the situation in other countries be sought through diplomatic attached in the Indian embassies abroad.

Existing reputed educational testing services will have to be modemised. To compete with testing service such as say, GRE, GMAT and TOEFL, our reputed testing services such as CAT, GATE, JEE, NET and others must be 'upgraded and modemised. A committee can be constituted to suggest up-gradations and implementation of the suggested upgradation. The upgradation will be in terms of year-round availability of the testing service, computerised and Internet-based testing, and universal acceptability of the tests by various academic institutions, including foreign institutions. Moreover, assessment will have to be done on whether or not private providers can take on the mantle of running such services for its efficient functioning.

Improvement in the educational infrastructure must take priority. The following items need to be addressed if the infrastructure of import-competing institutions has to be of international standard: University course schedules must be available on the internet; Automated telephone course registration for every term must be available to students; Payment of fees by credit card should be a standard option; Classrooms, libraries, dormitories and sports facilities should be of international standards;

Off-campus housing arrangements must be facilitated through the private sector for faculty, staff and students.

The authorities must study the system of regulation and accreditation of educational institutions in foreign countries. Indian accreditation system and laws for foreign institutions must be developed taking into account the treatment given to them in their respective countries.

To sum up, the WTO framework and structure need not be construed as the Lakshya-Gruha, where Pandavas would heave been reduced to ashes by the Kaurawas. Instead, it should be considered as the Mayasabha of the Pandavas. Once one manages to figure out where the water is and where the floor, one can certainly enjoy and benefit from the stay.

Table - 1 : Contribution to GDP by TFP in a Liberalised Trade Environment

Source	Absolution contribution (per cent)		Relative contribution	
	1960-85	1985-00	1960-85	1985-00
GDP Growth rate	3.66	5.95	1.00	1.00
Contribution by				
Labour	1.62	1.77	0.44	0.30
Land	0.08	0.04	0.02	0.01
Capital	1.17	1.29	0.32	0.22
TFP	0.79	2.85	0.22	0.48

Source : Economic and Political Weekly, May 11, 2002.

Table - 2 : Two-way Classification of Trade in Educational Services

Trade mode	Category of Education			
	Primary	Secondary	Higher	Adult/other
Cross border supply Consumption abroad	Toddler books, cassettes, CDs	Educational CDs, study guides e-gurukul services	Distance learning, educational CDs, study guides, textbooks, e-gurukul	Similar items on self-help, sports dieting, etc. and periodicals
Commercial presence	x	x	Pupils studying abroad, twinning programmes	Participants going abroad for training courses
Movement of natural persons	x	Indian schools abroad, US schools in India	University presence in foreign land	Training, MDPs facilities offered in host countries
	x	Indian math/ science teachers working in schools abroad	Professors teaching abroad and vice versa	Trainers working abroad and vice versa

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14

THREATS AND OPPORTUNITIES OF HIGHER EDUCATION IN AGRICULTURE IN THE CONTEXT OF GATS

R.P. Singh and K.A. Varghese***

Historical perspective of Agricultural Education

Agriculture was started as one of the 18 arts in Nalanda and Takshila Universities. Agriculture as a Science started in 1905 at IARI, Pusa and in the same year Agriculture colleges at Kanpur, Nagpur, Coimbtore and Lyalpur were started. In 1907 College at Pune and in 1908 College at Sabour were also started. In the year 1929 Indian Council of Agriculture Research (ICAR) was launched. At the time of independence there were only 17 Colleges of Agriculture, all attached to General Universities. During this period the responsibilities of agricultural research and extension were with State Departments.

The high priority for self-reliance in food production and the need to interface agricultural education, research and extension paved the way to establish separate Agricultural Universities on the Land-Grant pattern of USA. The G.B.Pant University of Agriculture and Technology, Pantnagar was the first Agricultural University established in 1960.

Institutional Net work for Agricultural Education in India

The formation of the Division of Agricultural Education in ICAR in 1966 was a good beginning to formulate agricultural education in a systematic manner in the country. Today there are 34 State Agricultural Universities (SAUs) which include four SAUs on Animal, Veterinary and Fisheries and one on Horticulture and Forestry. There are four Deemed Universities (DU) under the direct

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control of ICAR and also Allahabad Agriculture Institute as a Deemed University. Besides, one Central Agricultural University (CAU) at Imphal, three Central Universities (CU) having faculties in Agriculture also add to the institutional net work for agricultural education.

In the institutional set up, there are 200 colleges under State Agriculture Universities, 6 Colleges under Central Agricultural University, 10 Colleges under Deemed University, 3 Colleges under Central Universities, Faculty of Agriculture in IIT, Kanpur and about 41 Colleges affiliated to General Universities all over the country.

Intake Capacity

The present intake capacity for agricultural education is about 13500 students at Under-Graduate level in 11 separate faculties (including about 3000 in private colleges). It includes 8600 in agriculture, 2000 in Veterinary, 750 in Ag. Engineering and 750 in Home Science. The 11 faculties in agriculture and allied Sciences include (i) Agriculture (ii) Veterinary Science (iii) Agricultural Engineering (iv) Home Science (v) Forestry (vi) Horticulture (vii) Dairy Technology (viii) Fisheries (ix) Sericulture (x) Food Science Technology (xi) Agricultural Marketing/Banking and Cooperation The intake is about 6000 students at PG (M.Sc.) level and 1550 students at Ph.D level.

Challenges of Agricultural Education

Down sizing the scale of employment in public sector (Government Departments, Universities, Banks, etc.) and large number of vacancies in educational institutions form a major challenge. Increasing rate of unemployment of graduates and post-graduates adds to the gravity of the problem. About 43 per cent of graduates and 23 per cent of post graduates are unemployed as per a recent study by Applied Manpower Research Institute. Low level of entrepreneurship development due to present curricula is yet another issue. There is great need to modify/redesign curricula to meet the private sector requirements for graduates with creativity, business management orientation and also to develop entrepreneurship in them. Lack of financial resources to develop infrastructural requirements to train resource persons as per needs of the time so as to train agricultural graduates to meet market demand is a major challenge. General complacency in food

production and falling investment in agriculture on account of present comfortable situation makes the situation more crucial. Slow picking up of agri-advisory services and other self employment opportunities needs immediate attention so as to gear up the situation. Developing knowledge base in frontier areas and experience in real life situation in students also seek proper attention to minimize the mismatch in supply and demand of manpower in agriculture. Only 2 out of 60 graduates take up agri-business/agri-clinic scheme.

Opportunities for Higher Education in Agriculture

The General Agreement for Trade is Services (GATS) under WTO have opened up avenues for talented scholars with creativity and business orientation for service in other countries. Export avenues for agricultural goods of comparative advantage will increase employment opportunities for domestic production and processing and also for export related activities.

Strategies needed

The strategies to overcome the challenges in higher education may include steps like linkages and intensive tie-ups of SAUs with development departments, industries, NGOs etc., facility and faculty upgradation, development of faculty competence and capability in emerging areas of Science and Technology, vocational courses for skill development, realistic assessment of the nature and type of manpower needs, curriculum planning and reorientation to meet manpower needs and distribution of Four year graduate programme for basic courses, skill development/hands on training and learning in multi-disciplinary subjects.

Higher Education under GATS

During the Uruguay Round of the General Agreement on Trade and Tariffs (GATT), in 1994, there was a consensus that trade in services be also covered under a multilateral agreement in view of the substantial growth of services and the shift in the composition of GNP of most countries in favour of the service sector. Under WTO two areas were clearly identified for multilateral agreement trade in goods and merchandise (as in GATT) and trade in services (covered by GATS).

It is a multilateral agreement based upon the premise that progressive liberalization of trade in commercial services will

promote economic growth in trade in WTO member – countries. It provides legally enforceable right to trade in all services and covers all services except those provided entirely by government. The agreement presently covers 12 specific services, including educational services. The approach adopted is a progressive one and covers all services through negotiated commitments and progressive liberalization.

Trade in Educational Services

In the GATS guidelines Education, Services are classified into five categories and trade in these may be carried out under four modes. The categories of education services may include : primary education services; secondary education services; higher education services; adult and continuing education services and other education services.

WTO has recognized four modes of trade in education that receive legal protection through GATS. These are:

(i) *Cross-border supply :* This is the supply of services across national borders, from the territory of one country into the territory of another. Distance education using print media or any other kind of educational material that is sent across national boarders, or online education via the Internet, falls in this category.

(ii) *Consumption abroad:* This involves the movement of the consumer of services to another country to get the required service.

(iii) *Commercial presence:* This requires the actual presence of a (foreign) service provider in another (host) country. In the case of education this involves the setting up of programmes, course of institutions, by a member country in another country.

(iv) *Movement of natural persons:* This means the presence of an individual from one country in another to provide service. In education it means the presence of a foreign teacher in a host country.

Higher Education in India

(i) India has the second largest higher education system in the world. At the end of May, 2002, India has 293 Universities and university level institutions, over 13000 colleges, about 7.5

million students and over 3,50,000 teachers. It is thus very well endowed in terms of both infrastructure and human resources. But at the same time, 89.59% of total enrolment is in general education. This is unlike the advanced world where general education enrolment is in the range of 30 to 40%.

(ii) **Limited opportunities for academic excellence:**

There are around fifty institutions in India which have grown to become centers of academic excellence in various disciplines. Their standard of education is comparable to the best in the world. Sadly, most of them remain insulated as long as they enjoyed complete state patronage. It is these premier institutions which must take the lead to market quality Indian higher education among the international student community not only for earning valuable foreign exchange, but also for familiarizing the scholars of the world with the rich cultural diaspora of India. It is high time our policy markers, leaders in academics and industrialists should formulate clear cut strategy for internationalizing Indian education.

(iii) **Decline in the state allocation for technical education**

There is a decline in the allocation towards higher and technical education. This is in tune with the global trend where in governments the world over are reshaping themselves less as direct producers and providers of goods and services, and more a facilitators and regulators of economic activity. It is clear now that to survive, the academies of higher education will have to explore diverse sources of income such as sponsored research projects, faculty consultancy endowments and alumni contributions. All these will also result in frequent institute-industry interactions which in turn shall form the basis of a responsive pedagogy, in tune with industry needs.

(iv) **Large dependence on state exchequer and limited policy backup:**

Education establishments in Indian have been enjoying state patronage ever since the independence. Not only have we failed to attract students from potential countries in South-East Asia, the Gulf and Africa to the economical and diverse fold of the Indian higher education, but, we have also fallen

short in the use of New communication and Information Technologies (NCiTs) to reach out to students worldwide. It is only due to the absence of a proactive government policy that distance learning programmes: courses via the internet, virtual university campuses and twinning arrangements have not been initiated in a big way.

(v) **Limitations of Indian University System:**

- It is still dominated by the traditional set up of rules, regulations and statutes that offer little scope for quick improvement in its present work-system and the required level of autonomy and flexibility.
- The academic structure is rigid and the teaching and evaluation methodologies are outdated. There is need of academic reforms which will make the system flexible.
- The work culture of Indian universities is a static and rigid mode of functioning leading to bureaucratic standards.
- The universities have little internal urge to accept a change and dynamic mechanism that is susceptible to changes.
- The level and quality of innovation and research has low social and educational relevance.
- Our universities are often reduced to the level of examination conduction bodies.
- The growing number of institutions, unrestricted growth of students, faculty and courses do not match with qualitative mechanism for improvement and knowledge advancement.
- The absence of innovation and lack of willingness to overcome rigidity.

15

Employment – Oriented Agricultural Education

Dr. P.K. Dashora

HIGHER EDUCATION AND QUALITY IMPERATIVE

There is a general feeling that the quality of education and specially that of higher education is not well in our universities. When India became independent there were 27 universities and 700 colleges. It gave a high status to students in society. On the completion of their graduation students used to get jobs with high social and economic values. People preferred to put their degrees with their name. Today we see a complete reversed situation. There is a phenomenal growth in the number of universities and colleges. The enrolment of students including those who are enrolled in open universities has put India at number one in the world. It is also felt that this unplanned growth has resulted in the dilution of quality of education with the development in the field of science and technology, the expectation from university system also grew in magnitude and diversity. We need technocrats and managers in suitably developing our country. Expertise in the fields of commerce, banking, engineering, atomic energy, defence, medical sciences, etc. are to be built up by the institutions of higher learning. All efforts in this direction has yielded in terms of quantity. We have become number one in terms of scientific manpower but when we examine the quality of the products of our universities, not only laymen but those having the stature of high academicians and sitting on the commissions and committees also feel that there is much wrong with the quality of higher education. The National Policy on Education, 1986 has declared that urgent steps are required to be taken "to save the system from degradation".

The quality of higher education should be assessed in view of its social and economic relevance. During late 1980s and early

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1990s new theories of economic growth pointed out that the real motive force of economic development is people. These theories were developed by eminent economists like Paul Romer and Robert Lucas. These theories present human capital models which show education allows the whole production process to benefit from "Positive externalities". If quality of education is not ensured the process of development can not remain a faultless process.

Before exploring the issue of quality of education, the purpose of education need to be examined. In fact, education should ensure three basic functions:

i. Transmission of cultural values and traditions.

ii. Education for self-emancipation, self-actualization and aesthetic appreciation.

iii. Education for social change in the changing time and context.

These three broad functions of education can be termed as "classical humanism", "Progressivism" and Reconstructionism" respectively. "Classical humanism" is knowledge oriented. It apprises the individual with the store of knowledge mankind has accumulated, synthesized and experienced in the past. It is concerned with the promotion of intellectual and cultural values. It aims at the transmission of knowledge, culture and value system from one generation to another.

"Progressivism" is concerned with the development of individuals and the value of diversity. It recognizes the aspirations of an individual, his curiosity, his creativity, his experiments and his experiences. Education is not seen as a process of transmission of closed truths but as a way of enabling the learners to learn how to learn.

The ideology of "Reconstructionism" is society-oriented. It is concerned with mutually agreed social conduct. It assumes that man can improve himself and his environment. Education is seen as an important agent for bringing about social, economic, intellectual and spiritual advancement through rational planning. Education today seems to have failed to accomplish any of the objectives or fulfil any of the functions mentioned above. Preservation of cultural values, persisted quest of the truth, self actualization, aesthetic appreciation and emotional refinement seems to have been replaced by bankruptcy of intellectual integrity, emotional barrenness and moral depravation. Commenting on the

present state of education in our country Nani Palkiwala has said that our universities and educational institutions are producing a large number of degree holders who are ethical idols and moral illiterates. The function of education has limited itslef to a weapon of earning easy money without any urge for aesthetic creativity, personal emancipation and social responsibility.

The success of life has been viewed in terms of four "Purusharths" of life "Dharma" is the first in the four "Purusharthas" of life. The next three are "Artha", "Kama" and "Moksha". Dharma is a concept signifying the moral code, a sacred obligation, a dutiful way of life. Our system of education does not take into consideration the first "Purushartha". In fact, it starts from, aims at end and remains at the second to "Purshartha" the "Artha" without providing a sound foundation of the "Dharma". Mahatma Gandhi visualized a welfare state. Universities can play a central role in the development of welfare state. Universities have capacity to initiate the thorough process of our youth and develop qualities such as gentleness and compassion in them. Dr. Swarnpalli Radhakrishanan said the "weakness of the present generation is that it is rootless and the true function of a university is to take it back to its roots". Swami Chinmayananda said "we are very moral individually but in community living there is no morality". Our universities have not been teaching the morality in community living.

Bertrand Russell believed that the world can be transformed if the basis of education is "knowledge wielded by love". In present educational set up universities have failed to impart the training of character and make students fearless and affectionate. Vivekanand said that the education is "the manifestation of the perfection already in man" We have been chanting "Sa Vidya ya Vimuktiye" meaning education is what which provides freedom. But present education system provides slaverary. Our graduates hunt for job after pasing examination from universities. Talking about the wisdom in the modern times T.S. Eliot has said-

Where is wisdom?
We have lost it in knowledge.
Where is knowledge?
We have lost it in information

I would like to add to this, Where is information? We have lost it in examinations, guides, grades, coaching class, pass books and so on.

The term quality of education has wider counotations. It refers both t excellence and standards. The standards of teaching can be high or low but quality teaching means excellence. Generally quality assurance denotes standards not the excellence. In either context quality of education should be viewed with reference to the clientable of education. Student joins higher education to widen his knowledge to face the ever growing competition and to earn the degree. In any case present education is not equipping its all clients for these purposes. The student who is the customer is not satisfied with the quality of education. On the other hand, teachers too have failed to bring out the best of their capacities and deliver the goods. The teacher-student interface is very week. Lack of motivation on the part of students and the lack of commitment on the part of teacher have adversely affected the quality of higher education. In present situation we must make efforts to strengthen the teaching learning process to optimize the output in the form of quality of higher education.

The role of parents in improving the quality of higher education is of vital importance. Unfortunately no one has ever given a systematic thinking to it. In India, where a large proportion of students for their higher education live away from their home either in hostels or his some rented accommodation, role of parent should be much more than the financial supporter. They are required to maintain a else link with the teachers, principal and other student functionaries to have first hand information about the development of their wards. Only in rare case we find such vigilant parents.

Particularly when we view the higher education in the present set up, the improvement in the quality of higher education can be envisaged through the improvement in the curriculum, improvement in the faculty, improvement in the teaching methodology and the improvement in the quality of students taking admission to a particular course. Incorporation of all these improvements require a big courage, political will and patience.

There should be some objective criterion and procedure for the measurement of quality, learning, teaching, research including Ph.D. research, extension activities, educational administration and the quality of departments and university. In my opinion one must ensure the quality of teaching and it should be precisely measured. For a teacher effective communication, good delivery of scheduled lectures, subject knowledge, unbiased assessment of students and

involvement in the overall development of students should be the necessary trats for the quality teaching. Similarly one may objectively identify the parameters for quality learning in terms of motivation for real scholarship, study of good text-books, deep critical thinking, number of hours spend in library, quality of notes prepared, participation in academic discussion and the marks/grade obtained in all India competitions.

Quality of research can be assessed by the journals in which papers are published, the recommendation of research, use of research findings by other workers and so on.

The quality of administration can be measured by the academic environment, encouragement to various academic and co-curricular/extra-curricular activities, goals for individual and goal for each units motivation, unbiasedness, and high moral and ethical standards etc.

The quality of university can be viewed in terms of the competence of faculty members, performance of students and the contribution made for the improvement of the society.

Universities are the centre of universalization of education. Its role is much different then the role of a "Research Institution". In universities teaching and learning are the primary activities. Whereas in research institutes research is the activity of priority. Hence in order to improve the quality of higher education we must concentrate on the teaching – learning activity at these centres of higher studies.

With the globalization of the economy, higher education has been considered as a non merit good. The discussion paper, Government Subsidies in India (1997) issued by the Ministry of Finance provides a rationale for withdrawal of subsidies to Higher Education Sector. It will have a social cost without ensuring the quality of higher education in terms of teaching, learning, educational administration and institutional environment. We shall not be able to achieve the purpose of education in general and higher education in particular. Hence we should all, without any delay be particular about the quality of higher education. Otherwise the future of our young generation will be in the dark.

NATIONAL SYMPOSIUM ON

UNIVERSITY AUTONOMY AND QUALITY IMPROVEMENT OF

HIGHER EDUCATION

PROGRAMME

Date 13-11-2003

Inaugural Session : 10.00-11.30 hrs

Venue: RCA Auditorium, MPUAT, Udaipur

Chairman of the Session	: Shreeji Shri Arvind Singhji Mewar
Chief Guest	: Dr. Mangala Rai, Secretary DARE & DG, ICAR
President : IAUA	: Dr. S.S. Baghel, Vice-Chancellor, CAU, Imphal
Vice-chancellor of Host University	: Prof. Ram Pratap Singh
Saraswati Vandana	
Welcome with Flower	
Welcome address	: Prof. Ram Pratap Singh Vice-chancellor, MPUAT, Udaipur
Presidential Remarks	: Dr. S.S. Baghel, President, IAUA
Address by Hon'ble Chief Guest	: Dr. Mangala Rai, Secretary, DARE & DG, ICAR
Chairman's Address	: Shreeji Arvind Singhji Mewar
Vote of Thanks	: Dr. A. N. Mathur, Nodal Officer & Dean, College of Technology & Engineering, MPUAT, Udaipur
Tea Break	: 11.30 - 11.45 hrs

TECHNICAL SESSION - I : 12.00-14.00 hrs Venue : Hotel Paras Mahal

Status of Agricultural Education in India

Chairman	: Dr. Mangala Rai, Secretary DARE & DG, ICAR
Co-Chairman	: Dr. A. Alam, Vice-Chancellor, SKUAST, Srinagar
Rapporteur	: Dr. Ritu Singhvi, Assoc. Professor, MPUAT, Udaipur

PRESENTATION

Dr. J.C. Katyal DDG(Edn.) ICAR	: National Agricultural Education System - Status, Strength and Weakness
Dr. Tej Pratap VC CSKKV, Palampur	: Emerging requirement and Modeling of Higher Education for Self-employment
Dr. S. L. Mehta ND-NATP, ICAR	: Future Opportunities of National Agricultural Education System
Dr. A. Alam VC SKUAST Srinagar	: Relevance of Information Technology in Quality Improvement in Higher Education
DISCUSSION	
Lunch Break 14.00-15.00 hrs	

TECHNICAL SESSION - II : 15.00-17.00 hrs

University Autonomy - Concepts and Issues

Chairman	: Dr. A.G. Sawant, Member, ASRB, New Delhi
Co-Chairman	: Dr. Parmatma Singh, Vice-chancellor, RAU, Bikaner
Rapporteur	: Dr. Suman Singh, Assoc. Professor, MPUAT, Udaipur

PRESENTATION

Dr. K.N. Nag Ex. VC RAU, Bikaner	: University Autonomy - A Need
Dr. V. B. Singh Ex. VC. MPUAT, Udaipur	: Autonomy-Issues for Sustainable Quality Education
Dr. S.N. Puri VC, MPKV, Rahuri	: Accountability in Autonomy - A Real Perspective
Dr. G. S. Sharma Dean RCA, Udaipur	: Organization and Management of Agricultural Education System in India
DISCUSSION	

Date : 14-11-2003

5.30 to 9.00 hrs — Visit to Nathdawara

9.00 to 11.15 hrs — Visit to
1. Rajasthan College of Agriculture
2. College of Dairy & Food Science Technology
3. College of Home Science
4. College of Technology & Engineering

Note: 15 min in each college

TECHNICAL SESSION – III and IV : 11.30-16.00 hrs

Challenges and Opportunities of Higher Education vis-à-vis Teaching, Research and Extension Education and Excellence and Quality Assurance in Higher Agricultural Education in the Context of Globalization

Chairman	:	Padamshri Dr. J.S.P. Yadav, Ex-Chairman, ASRB, New Delhi
Co-Chairman	:	Dr. Kirti Singh, Ex-Chairman, ASRB, New Delhi
Rapporteur	:	Dr. Asha Singhal, Associate Professor, MPUAT, Udaipur

PRESENTATION

Dr. D. P. Singh VC JNKVV, Jabalpur	: Curricula Relevance of Higher Education in Agriculture Sciences in the New Millenium
Dr. A. N. Mathur Dean, CTAE, MPUAT, Udaipur	: Curricula Relevance of Higher Education in Agriculture Engineering in the New Millenium
Dr.(Mrs.) Pushpa Gupta Dean, CHS, MPUAT, Udaipur	: Curricula Relevance of Higher Education in Home Sciences in the New Millenium
Prof R. P. Singh VC, MPUAT, Udaipur	: Threats and Opportunities of Higher Education in Agriculture in the Context of GATS
Dr. J.C. Katyal DDG (Edn.) ICAR, New Delhi	: Accreditation of Agriculture Education in India-Concepts and Requirements
Dr. S.S. Baghel VC. CAU, Imphal	: Demand Driven Avenues of Higher Education in the Context of Globalization
Dr. P.K. Jain Dean RCA, Udaipur	: Higher Education under WTO regime
Dr P. K. Dashora Assoc Prof, MPUAT, Udaipur	: Employment Oriented Agricultural Education
DISCUSSION	
Lunch Break 13.00-14.00 hrs	

VALEDICTORY CUM PANEL DISCUSSIONS : 16.00 –18.00 hrs

Chairman	:	Dr. A.S. Faroda, Chairman, ASRB
Rapporteur	:	Dr. (Mrs.) Pushpa Gupta, Dean, MPUAT, Udaipur
Panelists	:	Dr S. N. Puri , VC, MPKVV, Rahuri Dr S. S. Magar, VC, BSKKV, Dapoli Dr S. L. Mehta, ND, NATP, ICAR, New Delhi Dr R. C. Maheshwari, ADG, ICAR, New Delhi Dr R. P. Singh, MPUAT, Udaipur
Presentation of Reports of the Technical Sessions	:	Session - I Session - II Session – III and IV
Secretary's Remarks	:	Dr. R. P. Singh, IAUA, New Delhi

NATIONAL SYMPOSIUM ON "UNIVERSITY AUTONOMY AND QUALITY IMPROVEMENT OF HIGHER EDUCATION" LIST OF PARTICIPANTS

S. No.	Name	
1.	**Padamshri J.S.P. Yadav**	Ex.Chairman, ASRB, New Delhi
2.	**Dr. Kirti Singh**	Ex.Chairman, ASRB, New Delhi
3.	**Dr. Mangala Rai**	Secretary, DARE & DG, ICAR, New Delhi
4.	**Dr. A.S. Faroda**	Chairman, ASRB, New Delhi
5.	**Dr. S.S. Baghel,**	President IAUA & Vice-Chancellor, CAU, Manipur
6.	**Dr. A.G. Sawant**	Member, ASRB, New Delhi
7.	**Dr . S. L. Mehta**	National Director, NATP, New Delhi
8.	**Dr. J.C. Katyal**	DDG, ICAR, New Delhi
9.	**Dr. R.C. Maheshwari**	ADG, ICAR
10.	**Dr. R.P. Singh**	Vice-Chancellor, Udaipur
11.	**Dr. Anwar Alam**	Vice-Chancellor, Srinagar
12.	**Dr. S.N. Puri**	Vice-Chancellor, Rahuri
13.	**Dr. S.S. Magar**	Vice-Chancellor, Dapoli
14.	**Dr. D.P. Singh**	Vice-Chancellor, Jabalpur
15.	**Dr. Tej Pratap**	Vice-Chancellor, Palampur
16.	**Dr. S.S. Ghosh Calcutta**	Vice-Chancellor, Belgachia,
17.	**Dr. S.N. Pandey**	Vice-Chancellor, Ranchi
18.	**Prof. Debabrata Das Gupta**	Vice-Chancellor, Mohanpur, Nadia
19.	**Dr. Parmatama Singh**	Vice-Chancellor, RAU, Bikaner
20.	**Dr. Nagendra Sharma**	Director, NDRI, Karnal

21.	**Dr. K.N. Nag**	Ex. VC, RAU, Bikaner
22.	**Dr. V. B. Singh**	Ex. VC, MPUAT, Udaipur
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31.	**Dr P. K. Jain**	Director, MLSU, Udaipur
32.	**Shri R. Kumaraj**	Registrar, Chennai
33.	**Dr. P.K. Mishra**	TS to VC
34.	**Dr. L. L. Dhakar**	DEE, Udaipur
35.	**Dr. Pratap Singh**	DR, Udaipur
36.	**Dr. G.S. Sharma**	Dean, RCA, Udaipur
37.	**Dr. A.N. Mathur**	Dean, CTAE, Udaipur
38.	**Dr. Pushpa Gupta**	Dean, C.H.Sc., Udaipur
39.	**Dr. A.K. Sankhla**	Dean, CDFST, Udaipur
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41.	**Dr S.C. Mahnot**	COE, Udaipur
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45.	**Mr. D.N. Purohit**	Comptroller, Udaipur

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