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To,
All DDGs, ICAR/Vice Chancellors, SAUs/Directors, ICAR Research Institutes

Sub: Inviting suggestions/ comments on proposed Policy on Higher Agricultural Education, and Guidelines for setting up new CAUs-reg.

Sir/Madam,

You may be kindly aware that ICAR constituted a Committee under the Chairmanship of Dr. Panjab Singh, Former Secretary DARE & DG, ICAR to develop a **Policy on Higher Agricultural Education**, and to develop the **Guidelines for setting up new Central Agricultural Universities** in the country. You will be happy to know that the Committee has submitted the draft of Policy on Higher Agricultural Education after extensive interaction with different stakeholders in agriculture and allied sciences.

The draft is being placed on ICAR website to solicit **your valuable feedback/comments, if any, on the proposed policy/guidelines by 10th December, 2012**.

Yours faithfully,

(Kusumakar Sharma)

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Policy for Higher Agricultural Education

1. Introduction

Education development world over has led to promoting economic development bringing in economic empowerment, human development, social equity and inclusive growth. In the community of nations, countries which have been in the fore-front of developing quality education have acquired leadership. Government of India also gave major emphasis on developing primary, secondary and higher education for promoting development in all sectors and using science and technology for human development. It has also been well recognized that there is no short cut but to develop education for growing population to harness human resource in different spheres for national development and occupying eminent position globally.

India has had a rich history related to agricultural knowledge in ancient India. Agriculture was included in the curricula in Nalanda and Takshila Universities as one of the 18 arts. The formal education in agricultural sciences started way back in 1877 with the establishment of an Agriculture College at Saidapet in erstwhile Madras state and later establishment of veterinary colleges at Bombay in 1886, Calcutta 1893, Madras 1903, and six agricultural colleges at Kanpur, Layalpur (now in Pakistan), Coimbatore and Nagpur in 1905, Pune in 1907 and Sabour in 1908. At the time of independence, there were 17 Agriculture Colleges.

Realizing the importance of agriculture in Indian economy, the Govt. of India initiated series of reforms immediately after independence. Self-sufficiency in food grain production became an over-riding priority. Pandit Nehru said, “Everything else can wait but not agriculture”. India achieved remarkable growth in food grains production from 51 million tons in 1951 to around 252 million tons in 2011-12, which is unprecedented and admired world over. The cradle of this success has been the establishment of institutions of higher agricultural education which developed skilled human resource, which in turn led to generation of new technology, and their dissemination to the farming community. This was ably assisted by sound government policies and high receptivity of the farming community. Establishment of Postgraduate School at IARI in 1905 and given Deemed University status in 1958 was a bold step at the development of skilled human resources in agriculture. Based on the recommendation of first and second Indo-American joint teams, the first Agriculture University was set up in Pantnagar in 1960 on the Land Grant Pattern of USA. It was soon followed with establishment of more universities in other states. Presently, all states have one or more Agricultural University. In all, there are 56 State Universities, five Deemed Universities (four of them are constituent institutes of ICAR), four Central Universities with strong Agriculture Faculty and, one Central Agricultural University for the States of North-eastern region.

Agricultural universities set up in India initially were multi faculty mono-campus universities. With time, most of them have become multi-campus. Eighteen universities have become single discipline universities (Animal and Veterinary Sciences 12, Fishery Sciences 2 and Horticulture and Forestry 4). Most of the states have now more than one SAU with Karnataka alone having six universities. Presently, the number of colleges stand at 623 (360 in SAUs/DUs, 160 colleges affiliated to SAUs and 103 colleges in general universities and other institutions). These institutions annually admit about 40,000 students with an outturn of 24,000 graduates, postgraduates and doctorates in agriculture and allied sciences in the country. At undergraduate level education is imparted in 13 disciplines while at postgraduate level, it is imparted in more than 90 subjects. One of the redeeming features of higher education is that 55% students are from rural background and on an average 36% are girl students.

The extensive spread of agricultural universities and colleges has opened opportunities for higher agricultural education throughout the country and has paid rich dividends because of integration of education, research and extension education. It was a major departure from the traditional system of education in the country. The Land Grant Pattern Model of USA based on Morrill Act (1862), was successfully implemented because of initial support from Land Grant Universities of USA. The Land Grant pattern provided for major (50%) support from federal (central) government in terms of endowment/corpus fund, and state government contributing 35% for making universities autonomous; the remaining to be raised by the university. During early period of university establishment, all the states were keen to develop agricultural education and therefore, provided whole-hearted support for development of agricultural university. ICAR also provided substantial support amounting to 30-35% of its budget. This led to establishment and nurturing of universities which ultimately led to propelling of agriculture growth as can be seen by green, white, blue and yellow revolutions.

With the globalization of trade and economy, Indian agriculture is facing a number of challenges. Despite the contribution of agriculture to GDP declining from 55% (1950) to 14.5 % (2012), it still has important role in driving national economy as 55% of the population is still dependent on agriculture and it provides raw material to many industries. The agriculture in many areas is becoming non-remunerative and farmers are losing interest in agriculture. With the opening of world economy, our farmers have to be globally competitive in terms of quality and cost of agriculture produce. The sustainability and profitability of agriculture continues to be our major concern.

With the coming in of IPR, the knowledge sharing among different nations has also shrunk, necessitating technology development by the scientists in the country. This puts enormous responsibility on National Agricultural Education and Research System to develop technologies

indigenously. The technology led agriculture growth can be possible only by strengthening institutions of higher agriculture education.

India has tremendous advantage in having a very large proportion of its population in the age group of 15-49 years while many other countries have aging population. Through providing high quality education and skills, the power of human resource can be harnessed for national development. Much of this work force is in rural areas and with formal and non-formal education, it will be possible to develop entrepreneurial and technological skills for off-farm enterprises and help in reducing the pressure on farming system. Therefore, the agriculture education holds key for national prosperity. About 70 years back, while addressing the youth of rural India, Gandhi ji had said "The divorce between intellect and labour has paralyzed our agriculture. Combining labour with intelligence cannot fail to win the confidence of labour." This is much relevant today than earlier.

2. Status of Higher Agricultural Education

The State Agricultural Universities (SAUs) are established through the enactment of Legislative Acts of the respective States. Through a Cabinet decision in 1973, the Department of Agricultural Research and Education was given the responsibility of coordinating agricultural education in the country and it has been discharging this function through the Indian Council of Agricultural Research (ICAR). ICAR is equivalent of UGC in the matters of regulating agricultural education in the country. The major financial support to SAUs comes from the respective State Governments which also exercise the functional and policy controls. ICAR provides professional and partial financial support for enhancing the quality, relevance and uniformity of higher agricultural education in the country. The efforts include (i) quality assurance in higher agricultural education in the country through policy support, accreditation, academic regulation, personnel policies, review of course curricula and delivery systems, development support for creating/strengthening infrastructure and facilities, improvement of faculty competence and admission of a portion of students through all India competitions; (ii) enhancement of performance and visibility of SAUs by augmenting their strategic strength in a specific niche area of research and education, experiential learning towards imparting an appropriate blend of knowledge, skill and attitude to the students, and fostering need-based partnership and linkages, and (iii) promoting excellence and expertise in education and research at national level by creating chairs/positions through National Professor, National Fellow and Emeritus Scientist schemes, and by providing incentives, awards and rewards through scholarships and fellowships to students and teachers.

In order to ensure uniform structure and effective governance in agricultural universities through regulations, ICAR developed a Model Act in 1964 which was revised from time to time and the last revision took place in 2009. For quality assurance in agricultural education, ICAR established an Accreditation Board in 1996, for a comprehensive process of accreditation of SAUs. ICAR also undertakes periodic revision of course curriculum and academic regulations through the Deans Committees. So far, four Deans Committees have already worked at regular intervals.

Initiatives launched by ICAR have paid rich dividends over the years, but there exists vast scope for improving the standards in academics, university's governance, financial health and policies on human resource development. Several new initiatives have to be taken both at the system level as well as the individual university/institution levels in several thrust areas like creating an enabling environment for innovation and creativity, developing systems capacity for educational planning and quality assurance, and developing institutional partnership and networks.

The National Agricultural Education System presently comprises of 56 State Agricultural Universities, one Central Agricultural University, and four ICAR Research Institutes with deemed-to-be university status. These universities together have 360 constituent colleges and 163 affiliated colleges with an annual intake capacity of about 39,000 and out turn of about 24,000 students, besides 103 colleges are attached to general universities.

3. Issues and Concerns

Indian agriculture is presently at the cross-roads. During the 10th and 11th Plans, the agriculture growth has been about 2.8% which was below the targeted 4% growth. Since agriculture growth is a driver of economic growth, it is of paramount importance to propel agriculture growth by use of new technology and strategies. As has been mentioned in earlier section, skilled human resource is a key to addressing new challenges. Globally technology is changing very fast and in view of the IPR and other trade related issues coming up-front, it is necessary that a new innovative approach is put in place for producing globally competitive skilled human resources. The skilled manpower should not only develop cutting edge technologies but must also bring about major transformation in agriculture for getting higher economic returns to the farming community with relatively much less investment. Application of new knowledge in science and technology will become prime infuser of sustainable surge in agricultural production and productivity across diverse agro-ecologies of the country. Additionally, regional inequalities in development coupled with rise in natural resource degradation, climate change, increasing population, opening of global economy have brought affront new daunting challenges. Therefore, these circumstances make it

imperative to restructure agricultural education in a manner that it meets to the expectations of all stakeholders (students for employability, farm men and women for livelihood security, farmers for new knowledge and skills and country for economic growth and meeting the international obligations) and concerns of sustainability and profitability in agriculture.

Another concern facing the nation, is the regional imbalance in human resources development. States such as Maharashtra, Karnataka and Andhra Pradesh have high involvement in agricultural education whereas States like Bihar, Chhattisgarh, Rajasthan, Madhya Pradesh, Himachal Pradesh, Jammu & Kashmir as well as other Himalayan states have much less enrolment. It is an indication of emerging gap in human resources for pushing agriculture development programs in these states. Additionally, in areas like Veterinary and Fisheries Sciences, Dairy Technology, Food Technology, there is already shortage of graduates and postgraduates. This is mainly on account of lesser number of colleges in these disciplines and therefore, need to have a strategy to correct these imbalances for taking major advantage of technology development and pushing agricultural growth.

Various initiatives taken in the recent past have led to substantial improvement in the quality of agricultural education but the situation is still much below the expectations of the stake holders in many institutions. The pace and quality of technology generation and human capacity building in most of the SAUs have not matched with global change mainly for want of defined vision, inadequate state funding, faculty strength, poor governance, lack of autonomy and environment for nurturing and retaining talent, extensive inbreeding, and mismatch of infrastructure for quality education and research. Establishment of new and / or sectoral agricultural universities and colleges without matching resources has compounded the problem. The new challenges faced by the Indian Agriculture are formidable and call for development of a new class of human resource who are equipped with new skills and knowledge to propel agricultural growth.

Despite the substantial increase in educational institutions after independence, there is hardly any attempt that links trends of employment needs of various sectors of economy (public, private or self-entrepreneurship, agri-industry), and clients (student, farmers) with manpower produced by higher agricultural education system. With this persisting neglect, there is no visible concern on making projections on manpower demand and supply at the national level. The system lacks a country level computerized manpower information system

with the facility of updating, retrieval and dissemination of information to serve the policy objectives corresponding to development and utilization of graduates and postgraduates that the education system turns out every year.

The present day education policy does not address the issue of social relevance in totality. Issues like poverty, gender inequality, malnutrition, sustainability, regional imbalances and focus in economic equity, agri-business, agriculture marketing, value addition, international trade and other related disciplines are not addressed adequately. Agricultural education will have to come out of its past mould of a rigid framework in order to successfully take over the role of continuing education when the education process is adjusted to the needs of landless, marginal and small holder farmers who are generally illiterate and unskilled. Along with sustainable development, the education system need to be harmonized with existing and emerging issues related to World Trade Agreement, free market economies and new agriculture. The new agriculture is poised to become price competitive and its produce acceptable quality-wise, meet stakeholders needs, peer's concerns and market vibes. Greater infusion of frontier science subjects, legal aspects and good practices of trade, ethics of IPR and GMO, and modern information and communication techniques will become more important to promote efficiency, awareness, equity and competitiveness in agriculture. In pursuance of that, development and institutionalization of easily accessible and user friendly knowledge systems to support decision making by various client groups will become necessary.

More than anything else, inadequate and substandard quality of human resources in agricultural universities is a serious concern. The number of scientists/faculty in the AUs decreased significantly during 1990s and has depleted further. Research capacity in the AUs is slowly eroding because of no-replacement of retiring faculty. The faculty strength in most of colleges is at 50 per cent or below and the variations are quite large. Moreover, 46 per cent of faculty strength in AUs has put in more than 15 years of service. Newly recruited teachers constitute only 17 per cent as there has been no significant recruitment in AUs during the last ten years. Only recently, some AUs have undertaken recruitment. In essence, the younger teachers are less and older staff are in majority. The other important dimension in the quality of faculty is the inbreeding of faculty, numbers of faculty with PhD from abroad are far less nowadays. The recruitment policy of several states prevents AUs from appointing non-natives of the state. Falling faculty strength has disastrous effect on the composition of cadre distribution. Instead of the recommended ratio of 1:2:14 (Professors, Associate Professors and Assistant Professors) in 1990s the actual ration at present is 1:2:3.

Such depletion of faculty strength without replenishment has further aggravated due to the starting of new UG and PG programmes at various campuses.

Funding Crunch in Agricultural Universities has been a perpetual problem affecting the quality of education and research. The Agricultural Universities have been created on the lines of Land Grant pattern of the USA, meaning that the funding sources should be apportioned with Center having responsibility to bear 40%, State to bear 50%, and 10% should be from internal resources. However, over the last five decades the funding has changed drastically with State funding is around 77% while the Central funding has declined to 23%. The establishment cost of Agricultural Universities has risen substantially to 87% while operational budget has declined to 13%. It is evident that the universities are starved of operational funds, which affects the quality of academics and the research and development. This situation is further aggravated with the creation of multiple universities in the states, bifurcation or sectoral division of universities and implementation of V and VI pay recommendation.

Declining Quality of Students Admitted to Agricultural Universities is an alarming trend. Only about 4.5% of students opt for agricultural education and that too not by choice. The school education does not create orientation or liking for higher agricultural education with the result, quality intake of students to agricultural universities has deteriorated considerably. It is imperative to bring the agri-education into the mainstream of education and strictly scrutinize the quality of students admitted to UG programmes in agri-education. The old concept of rural background as a statutory requirements for student's admission is long forgotten. With enforcement of Common Entrance Tests along with medical and engineering sciences, it has only allowed a large number of urban and sub-urban students enter agricultural Universities whose previous knowledge or genuine liking to agricultural sciences is questionable.

The faculties in the AUs are specialists in their respective disciplines but do not have any faculty development training in the science of education. The orientation programmes arranged by the universities for newly recruited teachers are of very short duration and the teachers do not get exposed to the field of educational technology. The budget constraints of the university prevent teachers from attending faculty developments programmes or career advancements training programmes elsewhere. However, the universities look for training opportunities at no cost to the university, which limits the training opportunities for young teachers. There are many teachers who hadn't had any training in the "Science of

Educational Technology". The universities generally prefer to send their faculty for faculty development programmes in their respective specializations through Summer and Winter Schools sponsored by the ICAR, but rarely in field of science of education.

Teaching methods adopted by the faculty of the agricultural universities are still very traditional and the lecture method still dominates the teaching environment. Teachers do not employ a variety of teaching methods in both UG and PG courses. Curriculum is followed at present with the sole aim of completing the prescribed course content within the semester time, without regard to learning by students. Moreover, the evaluation or examination system is predominantly based on testing the memory to recall the information provided, irrespective whether the students understand, synthesize, analyze, evaluate, and apply the information gained. According to the data available, 43% graduates and about 25% postgraduates remain unemployed due to lack of several job skills and a lack of confidence required in the private sector positions.

4. Vision and Mission

Vision

"To have enabling environment and institutions of excellence and relevance in place to impart higher education and to improve the livelihoods through growth and sustainable social development."

Mission

"To transform the agricultural education into a demand-driven efficient system, providing academic services and output of high quality in education, research and extension, promoting centers of excellence, and providing skilled, analytical and globally competitive human resources to meet the national needs for sustainable and inclusive growth."

5. Recommendations

5.1. Attracting students to agricultural education

Students pursuing higher education have agriculture as their second, third or even later choice. Highly motivated and talented young people from low income families and also, from remote and/or rural areas are not sufficiently encouraged to get into agriculture. To attract the young talented students to agriculture and allied streams, the image of agriculture must

undergo a change and admission process be modified with introduction of better incentives to those opting agriculture as a career option.

Admission process should not solely rely on test scores and school grades but also include the candidate's background of agriculture, values and ethics of vocation. The image of agriculture can further be improved by focusing on developing professional opportunities in production, processing, marketing and supply. Also, vast scope of research and service to mankind can be made as an attraction proposal at +2 levels. Simultaneously, series of incentives such as specialized scholarships, awards and rewards and future incentives/job security could be made focus points.

5.2. Academic reforms

The semester system of education should be made mandatory in all institutions as it enlarges curricular space, encourages and supports accelerated learning opportunities, and has the ability to accommodate diverse choices that dynamic and motivated students may like to have.

Higher education has thus far been largely examination-centered. The end term examination, to a great extent, insulates students from quest of knowledge, the excitement of discovery and joy of learning, and often leads to insensitive cramming up of superficial information. It may therefore, be more prudent that the assessment of student performance be carried out through a combination of internal and external evaluation where the internal assessment should be the continuous one.

For the complex, highly diverse and large system of higher education, there can not be a uniform and standard agenda for reforms. Several states have taken initiatives and adopted innovative practices to improve their systems which the others may also follow. Bringing innovations in education should be a regular practice.

Teachers today need technology skills along with content knowledge. Thus, training in instructional or teaching technology is important to all those who are in the teaching profession.

There is a need of sound learning environment in the university/college that provides active learning opportunities, feedback on progress, optimized environment, flexibility in teaching strategies for a variety of learning systems and needs.

Teachers must be encourage to take up the leadership roles. Unless teachers assume this responsibility, change in the process of learning is not possible. Teacher should endeavor to develop relations, train other teachers and involve students in the process of learning.

There is need to develop communities of learners rather than imparting passive training. The role of teacher should be to act as facilitator while students learn through experience.
Teachers must be trained and use appropriate strategies and methods for learning tasks such as small group interactions for cooperative learning, lectures/presentations for providing basic factual information, hands on training in apprentice situations and so on.

There is need to concentrate on e-learning i.e. convergence of learning and IT in future in order to utilize the power of ICT.

5.3. Curriculum improvement

a. The curriculum reorientation is necessary to enable the future graduates and post-graduates to acquire knowledge, skills and entrepreneurship ability and self confidence. To achieve this, basic reforms in the system are needed which bring lot of flexibility and new thoughts. Such as enhancing the practical work and programmes like experiential learning, freedom in PG studies to cross over from one discipline to another to accommodate the new demands put on graduates about complexity of knowledge and skill combination that will require unique subject combinations, free inter-university movement, permitting basic science students to enter post-graduate courses of agriculture and allied sciences and altering the focus of curriculum from primary to secondary agriculture.

b. To achieve them, the basic model of the current system will have to be altered suitably. For example, the entire degree program can be divided into three segments. The first segment will have to be of two years of common courses imparted to all agricultural and allied sciences students. During the next two years, students will have the flexibility to choose from a cafeteria of degree courses from different streams. Further one year additional specialization in specific subject may be there to earn a post-graduate degree as an integrated five year post-graduate degree.

c. The system of course work after post-graduation that leads to PhD degree also needs further improvement with exit options. It is possible to do so by combining the NET system and course work system by offering a M.Phil. degree. The M.Phil degree should also be considered as a part of Ph.D. course work for those wishing to pursue Ph.D. course.

d. There is need to change the delivery of curriculum and the system of examinations to evaluate the students. The focus in classes and laboratories and other curriculum activities must be students- centered learning via active students participation, work in groups and discussion.

e. Disciplines of social sciences like economics, agri-business management, marketing and rural sociology, and agricultural ethics and policies need to be emphasized for promoting market driven agriculture.

f. Introduction of diversified credit based degree system instead of fixed duration system and credit transferability shall enhance opportunities to students from rural areas to pursue their academic interests.

g. Similarly the choice-based credit system will provide opportunities for the students to pursue courses according to their needs and aspirations, inter-institution transferability of students (following completion of a semester), part completion of an academic programme in the institution of enrolment and part completion in a specialized (and recognized) institution, improvement in educational quality and excellence, flexibility for working students to complete the programme over an extended period of time, standardization and comparability of educational programmes across the country, etc.

h. Curricular revision should be a dynamic process where updation or revision to a limited extent should be done every academic year. This should be carried out in terms of current knowledge, national and international developments, and relevance of new ideas, concepts and knowledge to the concerned discipline. Curriculum review at University level shall be done at five yearly interval at national level with built-in mechanism for frequent updating to meet the challenges of advancing technology or local economic or industrial compulsions.

i. Short term topical courses for limited semesters may be developed by the faculty within their academic interests and in keeping with the thrust of the programme.

j. The course curriculum should give emphasis on skills in demand for private sector employment, particularly in areas of value addition, packaging, biotechnology, agro and social forestry, horticulture, animal husbandry and fisheries, scientific storage and transportation of perishable and on global marketing.

5.4. Faculty improvement

Improving faculty in terms of strength and competence must be recognized as key factor for reinforcing the quality in the current education system. Universities should have autonomy for recruitment of the faculty and re-employment of superannuating faculty based on a long term

recruitment policy of academic and non-academic staff. The number of Emeritus Scientists/Professors should be increased across the system by the ICAR. Schemes like post-doctoral fellowship, visiting faculty, adjunct faculty and sabbatical leave to supplement the faculty should be introduced. In addition, opportunities for physical exchange of faculty/specialists, creation of necessary infrastructure like video-conferencing facilities that will benefit both the teachers and students, should be created.

For continuous encouragement and improvement in faculty competence in relevant subject areas, two types of trainings of teachers at national and international centres are needed- (i) relatively of longer duration (3 to 6 months) in priority theme areas and (ii) continuing life-long learning in the form of refresher courses of shorter duration (10 to 30 days) in educational technology and in the subject domain of a teacher's expertise. Newly recruited teachers may undergo orientation programme is area of education technology, research management and human resource management. Faculty development may be taken up systematically by encouraging participation in seminars, workshops, training programmes.

The faculty constraint in agricultural Universities (AUs) should be addressed through a two pronged strategy; one by way of recruitment of certain proportion (say 15%) on all India basis through a central agency like Agricultural Scientists Recruitment Board, and second by adopting the concept of "Rolling Faculty" by making use of the eminent superannuated scientists/professors. In addition, it is time now to make provision for engaging accomplished professionals from the private sector in academics.

Inviting overseas accomplished professors and researchers to Indian AUs and research institutes for varying periods of time for imparting training in frontal areas, interaction on curriculum development, education technology would lead to capacity development of a large number of faculty and students. This will also result in formulation and initiation of research programmes in frontier areas.

Career advancement policy may be redesigned with realistic performance based personal and promotional policy.

5.5. Inclusive growth

The higher agricultural education in India has witnessed many fold increase in its institutional capacity since independence. However, the enrollment ratio in agriculture and allied sciences, even at present, is less than 1% out of the total enrolment at national level. While Agriculture provide livelihood to about 60% of the population, but it has only 3% of the total institutions in higher education, offering education in agriculture and allied sciences. Also, while 70%

population resides in rural areas, 90% of the higher agricultural education institutions are located in urban areas. This creates hurdles in inclusive growth. A recent study shows that existing education system produces about 24000 graduates every year while the projections indicate that nearly 54000 manpower will be required every year by 2020. The shortfall will be high in case of rapidly growing sectors such as horticulture, dairy, veterinary, fisheries and agricultural engineering. These sectors are seen as the future engines of growth that would require substantial manpower to achieve the growth potential. Besides the problem of enrollment in agriculture, there exists a serious regional imbalance, interstate disparity, inter social group imbalances in terms of gender, caste, religion and occupational disparities.

Thus, to achieve the inclusive growth, it is essential to enhance the enrollment rate, provision for equal access to all, creating educational facilities for backward and disadvantaged groups, and promoting sectoral education in areas where manpower requirement is expected to grow. For this, there is need for increasing the capacity of students intake, establishing new colleges/universities in backward and disadvantaged areas, creating new Central Agricultural Universities, and encouraging private participation in education through affiliated colleges or agricultural universities. Sectoral and regional manpower need assessment should be carried out periodically in agriculture and allied sectors.

In order to strengthen degree programmes in the emerging and frontier areas of science and technology, some fellowships need be earmarked in cutting edge areas. For maintaining the increasing trend of girls seeking admissions, scholarships/fellowships for all girl students should be instituted. Also, a separate provision of special research grants should be extended for innovative PG research.

Farm graduates need be empowered by linking production and post harvest technologies in a mutually reinforcing manner. For this, the agricultural universities should set up Agricultural Technology Parks. These parks could promote technology incubation and dissemination. It will also establish economic viability of new technologies. Such parks, linked to appropriate public and private sector enterprises from the point of view of marketing arrangements, will help to enhance self-confidence of farm graduates and stimulate them to take a career of self-employment.

5.6. Institutional Development

In order to make the agricultural universities globally competitive in terms of availability of state of art infrastructure, highly qualified and trained faculty; excellent research, teaching and

learning facilities and student amenities; adequate financial support will need to be provided. Universities will need to strengthen themselves in terms of the following-

- University employment and business advisory services and promotion centers with one stop window for generating awareness for self employment opportunities in agriculture and allied sciences.

- Centers of Excellence be established in new and cutting edge areas at selected locations.

- There is large number of private colleges offering degree programs in agriculture and allied sciences. Quality of education in them is a concern in view of inadequate academic manpower, infrastructure and other facilities. These colleges need be assessed and incentivized on well defined parameters set by the Accreditation Board of ICAR.

- Agricultural education has not received technological boost because of lack of research in education per se. Therefore, an institution should be established to carry out exclusive research to develop educational technologies suitable under Indian conditions by studying various models in this regard.

- Central Agricultural Universities, one each in different regions of the country should be established in center of excellence mode to act as nucleus to other SAUs of that region and providing leadership in education and research.

- Government could consider upgrading of a few selected universities that have potential in excelling and create a few world class universities.

- Three pronged strategy i.e. transformation of existing institutions, creation of new institutions and networking of all institutions must be ensured while keeping the regional balance.

5.7. Governance and Structure

ICAR Model Act provides guidelines for the powers and functions of the bodies, authorities and officers of the agricultural universities; constitution of Board of Management and other statutory bodies, and selection procedures for Vice Chancellors and faculty. However, there is wide disparity amongst SAUs with respect to implementation of the provisions of Model Act, particularly with respect to the selection process of Vice Chancellors and constitution of Board of Management- the two most important offices of a university. Having a national level panel of eminent academicians/scientists available, from which the states can choose their state

level panels for appointing the Vice Chancellor is recommended. The panel should be updated every year.

Autonomy in functioning of the universities should be ensured by the state governments and the financial support from ICAR should be contingent to providing financial autonomy and meeting minimum norms and standards in adherence to the Model Act.

ICAR established National Accreditation Board in 1996, through which it undertakes promotion and coordination of agricultural education. However, accreditation is not mandatory. Accreditation is done for academic regulation and maintenance of minimum norms and standards, and for quality assurance. ICAR's linkages with agricultural universities are, so-far, mostly advisory in nature. Since ICAR has the responsibility to promote and coordinate agricultural education, it is essential to vest necessary statuary authority in it to enforce academic, research and extension education regulations.

As suggested in the National Policy for Farmers, the agricultural education should be accorded a status of professional education and treated in similar ways for resource allocation by the Planning Commission.

5.7. **Globalization and partnership**

Rapid changes in information and communication technology, and globalization make networking, collaboration and partnerships increasingly feasible for promoting the agenda for reforms and restructure knowledge, innovation and experience sharing across geographical, political or even institutional boundaries.

Many of the AUs established during 1960-70 have benefitted immensely from collaborations with US Universities in their initial years. Such efforts are again required to energize the educational system. Therefore, the country once again needs similar initiatives.

India has developed competence in several areas of agriculture and allied sciences. The Deemed Universities and SAUs should start their overseas campuses for human resource development, particularly for ASEAN, SAARC and African nations. Overseas universities may be allowed to develop partnership with Indian universities on mutually agreed terms.

Greater linkages at national and international levels are required for improving the quality assurance mechanism and process, periodic revision of course curricula and syllabi, infrastructural capacity building, faculty exchange and development, internship of students,

joint degree programmes, and extending / sponsoring education and research opportunities both within the country and to the other under developed countries.

Appropriate models of public-private partnership should be evolved for higher agricultural educational development and activities.

Linkages with industry and potential employers can be achieved through their participation in university administrative and academic bodies. Exchange programs for professionals, and summer placement opportunities, mentoring and career programs may be developed for students in PPP mode enabling them to work in non-academic settings.

Greater collaboration is needed between the teachers and scientists of different faculties within the universities and with those of other public institutions (like ICAR, DST, DBT, CSIR, ICMR) and private/other institutions including general universities for harnessing the strengths and potential for mutual benefits.

5.8. Centre- State Partnership

The centre-state partnership as enshrined in the Land Grant System, has played a pivotal role in nation's agricultural growth and, now need to address the changing regional, national and global issues confronting the agricultural sector. Therefore, agricultural education need to be placed as a subject under the Concurrent List of the Constitution of India so that it receives adequate attention both from state and central governments.

The Vice Chancellors of Agricultural Universities used to be part of the Plan processes of the respective States till VII Five Year Plan which facilitated reflections of the needs of agricultural universities in the Plan allocations. Such participation of Vice Chancellors in Plan processes need to be revived.

With the proliferation of agricultural universities in the States, a separate Department of Agricultural Research and Education (DARE) be created in the Ministry of Agriculture of each State on the pattern of DARE in Government of India for effective coordination and good governance.

The growing demand of human resource in various sectors necessitates the creation of new universities/colleges. However, keeping in view the integration of agricultural education and research systems, the creation of sectoral universities are jeopardizing the very purpose of

holistic agricultural education. Creation of sectoral universities should be discouraged as a policy of higher agriculture education. Also, the sectoral universities may be converted into multi-faculty universities.

5.9. Non-formal education

Till recently, the emphasis in the system has been largely on formal education leading to the production of graduates, post-graduates and doctorates. Very little effort has been, thus far, put on generation of intermediary skills at diploma and certificate level. Even though lately, there have been few initiatives on the part of some SAUs, a far greater effort is needed to promote diploma level education on the lines of engineering education. This needs urgent attention in view of the expressed preference and requirement of many states and other stakeholders for para-professionals in agriculture. Future demand-driven non-formal education can also be considered in a public-private partnership mode by setting up agricultural training centres.

In order to make knowledge and skills a vehicle for agricultural transformation, capacity and capability building of farmers and rural people through vocational education is imminent. Since technologies multiply endlessly and so do the market demands, education of rural communities will necessitate repetitive, open ended dynamic approaches. Distance mode of education using modern information and communication technologies, offers a unique opportunity and avenue to reach the un-reached for improving their livelihoods and incomes. Evolving mechanisms of partnership by the KVKs of the agricultural universities with local NGOs in this drive may also be quite useful. Therefore, a 3-tier system of agricultural education needs to be promoted. First tier should produce top academicians and scientists, second tier should train agriculture professionals and managers, preferably after graduation and third tier should produce field level professionals for implementation of programs.

5.10. Financial Sustainability

The agricultural universities in India are established and being established on the Land Grant Pattern of USA which involves financial contributions from the State, Centre and the resource generation by the respective university. The share of Centre in the university budget declined with time primarily due to proliferation of universities without commensurate increase in budget for agricultural education. Presently, the State governments are providing the major share of finances to the agricultural universities. However, these grants are barely meeting the establishment costs, leaving the universities starved off for operational funds. It is constraining

the universities in expanding innovative approaches in higher agricultural education. For the financial health of SAUs, it is imperative to establish a strong center-state partnership for funding in the ratio of 50:50 between center and state.

In addition, the universities be permitted and encouraged through policy intervention to attract private funding and create endowment funds. The Government should extend tax exemption benefits to such donors.

6. Epilogue

Education is universally recognized as an important investment in building human capital, which is a driver for technological innovation and economic growth. Human resource development is critical for sustaining, diversifying and realizing the potentials of agriculture. Agriculture education system in India has distinctly evolved during pre-independence era on the British system of education and in post-independence era, on the US Land grant Colleges pattern. It has to now evolve in tune with fast changing national and international scenario.

The policy interventions target achieving excellence and improved quality of higher agricultural education; increased access to agricultural higher education and technology especially in remote and backward areas; SAUs and DUs reaching higher levels of performance and their students excelling in academic and professional performance; increased institutional efficiency due to improved governance framework; professional development of faculty and other staff leading to higher resource generation; increased employability and earnings of graduates due to enhanced skills and entrepreneurship development, and developing agri-entrepreneurs who turn out to be job providers. Also, India will become a preferred destination of foreign students for agricultural education because of improved infrastructure and enhanced skills and competencies for meeting new challenges. There will be greater attraction for private sector to fund S&T initiatives. Concurrently, the productivity will increase due to empowerment of farm women, rural youth, farms and non-farm rural workers, and the poverty will decrease due to input use efficiency and creation of more rural livelihoods. There will be increased availability of marketable produce leading greater interest of agri-business firms, and the agricultural education system will enjoy financial sustainability.

Guidelines for Establishment of Central Agricultural University

Central Agricultural Universities, one each in different regions of the country may be developed to act as nucleus to other SAUs of that region for deciding on matters of scale and type of agricultural human resource development, technological needs and kind of extension education approaches. There should be linking between the CAU and the SAUs of the region in which the CAU may lead the way for fulfilling the basic and strategic research needs of farm technology development and the SAUs may take further efforts in forward linkage mode for refinement, field testing and demonstration of technologies including promotional efforts for wider adoption. A CAU should have at least 500 hectare contiguous and cultivable land for the research farm. Admissions in the CAU should be on the pattern of the admissions in the four ICAR deemed universities.

The CAU concept shall be the model way of projecting the integrated agriculture and allied faculties and must include agriculture, horticulture, animal sciences and veterinary, fisheries science, food technology, dairy science, agri-engineering, agri-business management, basic sciences and humanities and even home science, so that credit based degree system can be implemented. This will also provide an opportunity to have inter faculty studies. They will be mono-campus, multi -faculty universities and shall follow the model act of ICAR in true spirit. The CAUs shall be directly governed by ICAR and the appointment of the Vice Chancellor shall be made by the President of India as in case of general CUs. Current model of CAU in the North East has already become multi-campus where integrated education is not possible. The detailed guidelines for CAU with respect to the governance, academics, administration and faculty recruitment have to be prepared by yet another committee once the policy of establishment of regional CAUs is accepted in principle.