

# ELEVENTH ANNUAL CONVOCATION

January 16, 2016

## CONVOCATION ADDRESS



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Former Secretary, DARE &  
Director General, ICAR, New Delhi



**Junagadh Agricultural University**  
**Junagadh-362001**  
**Gujarat**

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Hon'ble Governor and Chancellor Shri Om Prakash Kohli; Shri Babubhai Bokhiria; Minister of Agriculture & Cooperation, Dr. A.R. Pathak, Vice-Chancellor of Junagadh Agricultural University; Dr. R.L. Shiyani, Registrar; Vice-Chancellors of other agricultural universities in Gujarat; members of Board of Management and Academic Council, invited guests, faculty members, dear students, representatives of press & media, ladies and gentlemen!

I feel honoured to be present amongst this august gathering of academia, policy makers, and students participating in the eleventh annual convocation of this vibrant university. At the outset, I convey my heartiest congratulations to all the students who have successfully completed their respective degrees and earned awards for excellence. I also congratulate the faculty members who worked hard to impart quality education, required knowledge and skills to serve the society with a human face.

The Junagadh Agricultural University is functioning in a typical landscape representing arid and semi-arid conditions of the State. Hence, drought, erratic rainfall, low fertility and salinity due to ingress of sea water are the major constraints limiting agricultural production in the region. Despite these constraints, I am quite impressed with the report presented by Dr. Pathak that this university has responded remarkably to address effectively most challenges facing agriculture here. Besides, vagaries of monsoon and climate extremities, innovative and hardworking farmers of Saurashtra have made tremendous progress. Fortunately, the Saurashtra region is blessed with rich biodiversity of Gir forest, Girnar and Barda hills and enjoys 865 km sea coast. Saurashtra is also home of famous Gir breed of cattle, Jaffarabadi buffalo, Zalawadi goat and Kathiawadi horse. The university is pioneer in developing pearl millet and castor hybrids. Thanks to the efforts of this university, the famous Gir Kesar mango has now been registered as Geographical

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Indication (GI) representing Gir region of Junagadh and Amreli districts.

Agriculture plays an important role in India's economy, Over 58% of rural population still depend on agriculture despite reduced share in the country's GDP (from 53% in 1950 to 13.7% in 2014). Total factor productivity (TFP) again improved during the Eleventh Plan, similar to 1980s level. The noteworthy feature was that this growth became possible due to increase in productivity. Hence, we must appreciate that agricultural research has played a vital role in country's transformation.

It is very heartening that Gujarat has witnessed an average agricultural growth of about 10.6 per cent in the last decade as against the national average of 3.5 per cent. Gujarat has also emerged as a major player with 40% groundnut, 35% cotton, 70% of castor production and 22% of the marine fish at the national level. The State is the largest producer of castor, cumin, fennel seeds and Psyllium husk in the world. The state has also pioneered the milk cooperative movement in the country.

While Punjab and Haryana are known for Green Revolution, Gujarat is globally famous for White Revolution in the country. Thanks to dairy cooperative movement under the leadership of Late Dr. V. Kurien, we have now become the largest milk producer in the world (140 million tons). Gujarat is similarly contributing significantly towards 'Blue Revolution' through unprecented growth in aquaculture, besides being second in marine production (3.56 lakh tons) from its 1600 km coastline. There is tremendous potential for increasing inland fishery since out of 89,000 ha area suitable for fish production, currently only 5,200 ha has been used for aquaculture.

We all know that the world population is projected to grow from present 7.0 billion to nearly 9.0 billion by 2050 and that of India will be 1.6 billion. We are adding one Australia (around 16 million) to our population each year. Hence, all our progress gets nullified on account of population pressure. Therefore, continuous challenge before us is to produce enough nutritious food to ensure both food and nutrition security at the household level.

Our agriculture is currently at cross-roads. Stagnation of production in most of the crops, erratic behaviour of climate, higher input cost, lower farm income, degradation of natural resources,



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inadequacy for quality seed and planting material, and diminishing land holdings are some of the major concerns that require our urgent attention.

In this context, I would now like to touch upon two major areas that need urgent attention for accelerating our agricultural growth. The first is to protect our crops, animals and farm produce against emerging biotic and abiotic stresses like diseases, pests, droughts and climate change. The second is about careful application of biotechnology to improve productivity, enable better resilience to stresses and also enhance the income of our farmers. It is rather unfortunate that today we have a policy paralysis concerning use of genetically modified crops. Due to wrong public perception, mainly on account of lack of informed knowledge, there are difficulties even in conducting confined field trials. On the contrary, to meet our future demands on account of growing population and the rising cost of cultivation due to costly inputs, we see no viable alternative but to adopt biotech products that are safe for human consumption as well as environment. I, being an optimist, do see great opportunities in offering through adoption of GM food crops like Maize, Soyabean, Canola etc.

Dear graduates, your efforts must not be deterred by others around you. In mid-nineties, we could make it possible to test and release Bt cotton in India to save the millions of resource poor farmers. As a result, fast adoption of Bt Cotton on more than 10 million hectares in India, that too in just over one decade, is indeed a remarkable success story. I am a great admirer of Late Dr Norman Borlaug, the only agricultural scientist who received the prestigious Nobel Peace Prize. He had been great champion of agricultural biotechnology. He was instrumental in advising India to introduce Mexican dwarf wheat varieties for meeting our food demands in mid-sixties. We neither had ability to produce needed quantity of food nor the money then to buy. At that time also, we faced same opposition for the adoption of dwarf wheat and rice varieties. Thanks to the Green Revolution that we could make spectacular progress on food front. Instead, the land so spared could be put to more effective use to produce other crops, fruits, vegetables etc.

Plant improvement, whether as a result of natural selection or the efforts of plant breeders, has always relied upon creating, evaluating and selecting the right combination of alleles. Fortunately an array of

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molecular markers is now available. Single nucleotide polymorphism (SNP) allow complete automation and thus enable high throughput application that is essential for handling a large number of samples in a short time and for taking quick decisions. Several different aspects of crop improvement that can be addressed through molecular breeding include estimation of genetic diversity, construction of high density genome maps, mapping and tagging of genes of agricultural importance, map-based isolation of genes and marker assisted selection (MAS) and dihaploid breeding. Hence, molecular Breeding adds value for the genetic enhancement of available germplasm.

Nanotechnology, an emerging new science, can be gainfully employed in tackling some of the emerging problems. Nanomaterials, nano-tools and nano-devices would become a blessing to agriculturists. Nanotechnology can revolutionize agriculture by improving the ability of plants to absorb nutrients, rapid disease detection, molecular treatment of diseases, efficiency of herbicides and pesticides, developing most efficient farm machinery, facilitate exact quantity of pesticides application, food processing and above all much needed value addition.

For sustainable agriculture and much needed resilience, we need now a twin pillar strategy i.e., besides genetic improvement, major effort should now be on good agronomic practices (GAP). Climate smart agriculture would require better adapted varieties and species, timely farm operations, conservation agricultural practices and integrated nutrient and pest management. We must also adopt resource saving technologies such as: conservation agriculture for much needed carbon sequestration and for restoring health of our soils with low organic matter content. As stated earlier, the new sciences like biotechnology, nanotechnology, ICT etc. do offer ample opportunities to mitigate adverse effects of climate change. Hence, all available options for reaping the benefits to our society, we need to explore all available options.

Reducing post-harvest losses is another area which now needs urgent attention. On an average, post-harvest losses of 4 to 6% in food grains and 12 to 15% in fruits and vegetables have been reported. The challenge is, therefore, to minimise such losses and provide options to farmers for value addition for higher income. Agro-processing is now

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regarded as a sunrise sector of the Indian economy, in view of its huge potential for both employment and income generation. Some estimates suggest that in developed countries, up to 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. However, in India, only about 3 per cent of the work force finds employment in this sector revealing vast untapped potential for employment. Once properly developed, agro-processing sector can make India a major player at the global level for marketing and supply of processed food, feed and a wide range of plant and animal products. This approach will also help in taking full benefit of globalization of agriculture.

Agriculture must liberate India from the twin scourge of hunger and poverty while ensuring sustainability of our natural resources. It must also address effectively the concern of malnutrition among children and empowerment of women; being important sustainable development goals (SDGs). To ensure these, the needs and aspirations of resource-poor smallholder farmers must be addressed in the first place through innovation-led accelerated and sustainable agricultural growth. Historically, the adoption of high yielding dwarf varieties of wheat and rice under the 'Green Revolution' era addressed both; hunger and poverty. However, of late, the yield gaps in agriculture and the income divide in farm and non-farm sectors have been widening; primarily due to the gaps in the required knowledge, skills and timely access to improved technologies. Out scaling of appropriate technologies to timely reach the farmers has emerged as a complex issue. Why farmers are unable to access or adopt the new technologies are the issues that haunt the development officials and scientists alike. Further, the growing challenges of natural resource degradation, escalating input costs, market volatility and above all the effects of global climate change too contribute to the decline in yield as well as farm income, thus making agriculture both non-profitable and unattractive. Therefore, it is paramount to ensure an inclusive growth in agriculture through innovative and synergistic approaches for achieving sustainable food and nutrition security. Thus, 'agriculture research for development' (AR4D) requires a paradigm shift to 'agricultural research and innovation for development' (ARI4D).

Agricultural extension in India and elsewhere requires constant transformation. The current transitional phase also needs a 'renewed



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interest' and 'policy attention'. Public extension system played a vital role during the Green Revolution era, but it was mainly confined to the irrigated areas. This past success was also due to a holy alliance among researchers, extension specialists, farmers and policy makers. At the same time, the technology dissemination approach remained 'top-down' focusing on individual farmers. The current scenario of Indian agriculture is confronted with multi-faceted challenges arising due to inefficient management of natural resources such as: water, soils, agro biodiversity, etc. All these have led to decline in factor productivity and farm profitability. Apparently, this complexity of problem cannot be overcome by routine transfer of technologies. Rather, efforts would be needed towards translational research; requiring out scaling of innovations through 'Out of Box' extension systems. Also, conscious deployment of rural youth, women and progressive farmers could help in a speedy transfer of technology and the needed impact on livelihood of smallholder farmers. Farmers' welfare needs to be ensured through, for example, 'Farmer First' approach to equally benefit both; the producers and the consumers. Further, in view of diverse demand of new innovations, new products, new information and new extension services, we now need to shift from "Top-down" to "Bottom-up" approach, involving farmers' participation at the grass-root level, while ensuring confidence building among the farming communities to take risk and adopt more scientific and resilient agriculture. In the process, knowledge sharing on good agricultural practices, without dissemination loss, and incentives for critical inputs become highly critical to achieve future development successes in agriculture sector. At the same time, partnership among key stakeholders becomes vital for promoting further growth in agriculture. In the process, care is also needed to overcome complacency that has crept in the public extension system. Hence, this necessitates greater vibrancy in National Agricultural Research and Extension System (NARES) requiring active involvement of stakeholders (farmers, NGOs, private sector, scientists and policy makers) and a shift in the extension approach towards out scaling of innovations for greater impact on smallholder farmers through higher productivity and income.

In this context, extension approach now has to focus around the farming communities rather than the past individual farming households approach. With the increasing challenges of addressing land

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degradation, soil quality and water use efficiency needs, the Natural Resource Management (NRM) related innovations, unlike the adoption of high yielding varieties showing immediate impact on crop productivity, are likely to need more lead time to translate and assess the impact on farmer's fields. This obviously throws a new institutional challenge for needed reforms in existing extension system, which is mostly dependent on public organizations. Thus, in the present situation role of private sector becomes highly relevant and critical, especially for involving the rural youth and women in agricultural extension. Empowering youth (both men and women) through vocational training and building a cadre of 'Technology Agents' to provide technical backstopping as well as custom hire services to the smallholder farmers would go a long way in linking research with extension and thereby accelerating agricultural growth. We also need to link now the 'land with lab', the 'village with institute' and the 'scientists with society' to ensure faster adoption of efficient resource utilization technologies that would benefit both the producers and consumers. In the transformation process, the Agriculture Technology Agents need to become "job creators" and not "job seekers" and provide the best technologies as well as quality inputs on farmers' door steps. Another strategy could be to create 'Agri-clinics', where technology agents are able to join hands to ensure single window system of advisory services, so that farmers need not run from pillar to post.

Agricultural Education System (AES) in India is one of the largest national networks in the world, comprising 60 State Agricultural Universities (SAUs), 5 Deemed-to be-Universities, two Central Agricultural University and four Central Universities having agriculture faculty. ICAR works in partnership mode with SAUs and has contributed significantly to generate well trained human resource. Our experience of over 60 years of land grant system of agricultural education now needs introspection as well as reorientation to make it more relevant and vibrant to meet current challenges successfully. The proposed National Agricultural Education Project (NAEP) to be funded by World Bank should be seen as an opportunity to overcome existing deficiencies in our system.

As you step forward, try to remain young at heart and be open to new ideas. Endeavour to be the best in the world in whatever you choose to be. India needs gold class graduates. Necessary qualities of a



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good citizen are sincerity, integrity and compassion to humanity. My advice to young graduates is that be prepared always to change your mindset. You must have 'Out of Box' thinking and aspire to be 'job creators rather than job seekers'. Instead of looking for white collar jobs in the Government sector, you must think of becoming young entrepreneurs to identify and promote new innovation and work hard towards its success. Ample options are there in the horizon like protected cultivation, micro-irrigation, fertigation, bio-fertilisers, bio-pesticides, small farm mechanisation, post-harvest processing and value addition, herbal medicines, ICT for advisory services, insurance sector, credit and marketing etc. Hence, you must move forward and grab available opportunities. Remember, sky is the limit.

I personally see a bright future for you all. However, you need to be more inquisitive as well as innovative. We see this happening in the western world, and now we see it happening in China. Innovation is key to the success. Fortunately, for you the private sector is growing fast, banks are opening their coffers, and enabling policies to 'Make in India' are being launched with major support under skill development mission. You just have to harness these opportunities with much needed confidence and an element to take risk. Also be proud of being alumni of the Junagarh Agricultural University, and do carry its name to newer heights by being honest and diligent. Remember it is not intelligence alone but your hard work and determination that would lead to success. Never ever compromise on ethics. This nation is yours. Hence, it is your moral responsibility to protect, conserve and replenish available natural resources and pass on to future generations with great dignity and responsibility. According to late Dr Abdul Kalam, you must have dream but to achieve your goals you must work hard. Be rest assured, the success will ultimately be yours.

At the end, while congratulating all graduating students, I wish to also congratulate their parents for the constant guidance and support provided all through. My best wishes to you all for a very successful career.

**Jai Hind.**