

Central Agricultural University
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Shaping the Future of Agriculture in the N.E. Region

Convocation address by
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I am extremely happy to be here today when this young University serving one of the most beautiful parts of our country, both from the point of view of natural beauty and cultural richness, is providing a large number of well trained women and men to shape the future of agriculture in this region. This University is serving as a Centre of Excellence in teaching, research and extension education in the fields of crop and animal husbandry, fisheries, agro-forestry and agri-business. I wish to congratulate the outgoing alumni on their academic performance and social commitment. I also congratulate the Vice Chancellor, the Board of Management, faculty and the parents of the graduates of the year on their distinguished and dedicated service to the cause of agricultural education, research and extension. This convocation marks an important milestone in the history of this University. I would like to share some thoughts on methods of converting the rich natural resources of this region into jobs and wealth in an environmentally sustainable manner.

The Northeastern region is both a mega-biodiversity area as well as a “hot-spot” for genetic erosion. The rural population is around 82 per cent and depend largely on agriculture and allied sectors for work and income security. The forests harbour 8000 out of the 15,000 species of flowering plants occurring in the country. Of about 1300 species

of Orchids reported from India, the Northeast has the highest concentration with about 700 species. The species richness is highest in Arunachal Pradesh where over 5000 flowering plants occur and the lowest in Tripura with 1600 species. Bamboo is the lifeline of the Northeast and 63 out of 136 species found in India occur in this region. Unfortunately here again 25 species of bamboo fall under the rare and endangered category. The region is also home to the Eri and Muga silkworms. The Yak and the Mithun are unique animals which are threatened by the spread of non-edible invasive species like *Lantana*, *Eupatorium* and *Mekenia*. The cultural diversity of this region is well known with 225 tribes out of 450 in the country living here. In spite of the richness of culture and bioresources, there is extensive poverty and unemployment. The allocation of funds for the Northeast is quite high and all scientific departments are required to spend at least ten per cent of their budget in this region. The large outlay is however not getting converted into socially meaningful outcome.

During 1972-75, I set-up an ICAR Research Complex for this region with headquarters at Barapani in Meghalaya and with Centres in Arunachal Pradesh, Manipur, Mizoram, Nagaland, Sikkim, and Tripura. Agricultural Universities exist at Jorhat and Imphal. The Department of Biotechnology has also set up an Institute of Bioresources and Sustainable Development at Imphal. ICAR National Research Centres exist for Mithun in Nagaland, Yak in Arunachal Pradesh, Pig in Guwahati and Orchid in Gangtok. There are many other research institutions including the Northeastern Space Application Centre of ISRO and a Regional Centre of the Indira Gandhi National Open University.

Ecologically, the region has serious problems like the damage caused by deforestation and exploitative mining. The Uranium Corporation of India is trying to convince the people of West Khasi Hills that uranium mining can be done in an ecologically and socially desirable manner. In spite of an average annual rainfall of over 2000 mm in the region, water shortage during December – May is serious. The Cherrapunjee region (now known as Sohra), located in the East Khasi Hills District of Meghalaya experiences a serious water scarcity during December – April, although the annual rainfall exceeds 12,000 mm. Sohra is located on top of a limestone Plateau. Limestone sucks up the water. The surrounding hills are denuded and more than 50% of the forests have been lost. The only solution is to hold rainwater where it falls. Every household must have a tank to hold rainwater that can be collected from the roof. In Mizoram, every house collects rainwater in tanks made of tin or concrete situated either on the ground or underground. This water lasts for the post-monsoon months. The entire region can emulate this example for ensuring year-round water security. Fortunately, the Meghalaya Government has initiated steps for promoting a “*Jal Kund*” or farm pond movement.

The region produces about 5.8 million tonnes of foodgrains as against the requirement of about 7.5 million tonnes. The gap between potential and actual yields is high in most farming systems, ranging from 155 per cent in mustard and going up to 650 per cent in wheat. Thanks to the Horticulture Mission, area has increased under most fruits and vegetables. Mizoram produces some of the finest *Anthuriums* in the country and Sikkim is the home of beautiful orchids. However the productivity of fruits and vegetables is still

low. Hence “**bridging the yield gap movement**” assumes urgency, since most holdings are small and there is need for greater marketable surplus and cash income.

Based on considerations of ecology, economics and employment generation, the M S Swaminathan Research Foundation has developed the following three approaches to enhance opportunities for sustainable livelihoods in biodiversity rich areas such as the Northeast:

- ?? **Biovillages** – The biovillage paradigm involves concurrent attention to a) the conservation and enhancement of the ecological foundations for sustainable agriculture; b) enhancing the productivity and profitability of small holdings, and c) generation of multiple livelihood opportunities through crop-livestock-fish integration, biomass utilization, and agro-processing.
- ?? **BioParks** – these are designed to add value to plant and animal biomass through agro-processing and preparation of a wide range of market linked products. This University can establish a Rice Bio-Park in Manipur.
- ?? **BioValleys** – the aim of the Biovalley is to promote along a watershed small scale enterprises supported by micro credit and to link biodiversity, biotechnology and business in a mutually reinforcing manner. The biotechnology enterprises relate to the production and marketing of the biological software essential for sustainable agriculture such as biofertilisers, biopesticides, and vermiculture.

The above institutional approaches will help to foster an economic stake in conservation. The Northeast region has a mine of valuable genes in rice which confer resistance to several biotic and abiotic stresses. The genetic variability in rice includes a strain which is reported to be one of the tallest among the global rice germplasm. It would be useful to undertake a hybridization programme jointly with farm families involving crosses between such unique rices and modern varieties possessing a high yield potential and desired duration and grain quality. In West Africa, for example, rice yield was stagnant for a very long time, until scientists crossed a West African rice species *Oryza glaberrima* with the Asian Rice *Oryza sativa*. The hybrids were then given to farm families who selected appropriate strains suited to local conditions and tastes. These rices are known as New Rices for Africa (NERICA). There is similar scope for new rices for the Northeast, through farmer participatory breeding. Participatory research and participatory knowledge management hold the key to successful and sustainable agriculture in this region.

A high priority in this region is human resource development. Unfortunately, more than fifty percent of the scientific posts in the existing institutions in the field of agricultural research and education are vacant. Also many of the positions are held by persons from outside the region, several of whom do not have a long term stake in linking science with society in the region. There is now a trend to deviate from what is known as the “Bhabha Model of nurturing science”. Homi Bhabha built institutions around outstanding individuals and established the Trombay School to breed a new class of outstanding scientists, and science leaders. Unfortunately there is now a reversal of this paradigm

with the highest priority going to the brick and mortar aspect of institution building. I have therefore been suggesting that in the case of agricultural science about thousand women and men graduates should be selected from the region, provided with fellowships to do the M.Sc / Ph.d. degrees in appropriate agricultural and animal sciences universities and then inducted into ICAR's Agricultural Research Service (ARS). I got ARS established in the ICAR in 1974 in order to promote a Scientist - Centered System in personnel policies in the place of the then prevailing post-centered system. **A special Northeast cadre of ARS comprising of over 1000 women and men scientists belonging to the region will help to achieve what the Royal Commission on Agriculture emphasized as early as 1925, namely "However efficient the organization which is built up for demonstration and propaganda be, unless that organization is based on the solid foundation provided by research, it will be merely a house built on sand".**

The sad irony of the coexistence of poverty of people and prosperity of nature will continue so long as the political approach is on quantitative expansion of educational institutions without corresponding emphasis on the breeding of outstanding teachers and researchers from the region. **We must shift our emphasis from bricks to brains.**

During his recent visit to India, US President Barack Obama pointed out that India is fortunate to have over half of its total population of 1.2 billion under the age of 30. Out of the 600 million young persons, over 60 per cent live in villages. Most of them are educated. Mahatma Gandhi considered the migration of educated youth from villages to

towns and cities as the most serious form of brain drain adversely affecting rural India's development. He, therefore, stressed that we should take steps to end the divorce between intellect and labour in rural professions.

The National Commission on Farmers stressed the need for attracting and retaining educated youth in farming. The National Policy for Farmers, placed in Parliament in November 2007, includes the following goal — “to introduce measures which can help to attract and retain youth in farming and processing of farm products for higher value addition, by making farming intellectually stimulating and economically rewarding”. **At present, we are deriving very little demographic dividend in agriculture.** On the other hand, the pressure of population on land is increasing and the average size of a farm holding is going down to below one hectare. Farmers are getting indebted and the temptation to sell prime farmland for non-farm purposes is growing. Over 45 per cent of farmers interviewed by the National Sample Survey Organisation wanted to quit farming. Under these conditions, how are we going to persuade educated youth, including farm graduates, to stay in villages and take to agriculture as a profession? How can youth earn a decent living in villages and help shape the future of our agriculture? This will require a three-pronged strategy.

- (a) Improve the productivity and profitability of small holdings through appropriate land use policies, technologies and market linkages; develop for this purpose a “4C approach”, i.e., Conservation, Cultivation, Consumption and Commerce.

- (b) Enlarge the scope for the growth of agro-processing, agro-industries and agri-business and establish a “Farm to Home” chain in production, processing and marketing.
- (c) Promote opportunities for the services sector to expand in a manner that will trigger the technological and economic upgradation of farm operations.

Some years ago, the Government of India launched a programme to enable farm graduates to start agri-clinics and agri-business centres. This programme is yet to attract the interest of educated youth to the degree originally expected. It is hence time that the programme is restructured based on the lessons learnt. Ideally, a group of four to five farm graduates, who have specialised in agriculture, animal husbandry, fisheries, agri-business and home science, could jointly launch an agri-clinic-cum-agri-business centre in every block in the country. Agri-clinics will provide the services needed during the production phase of farming, while the agri-business centre will cater to the needs of farm families during the post-harvest phase of agriculture. Thus, farm women and men can be assisted during the entire crop cycle, starting with sowing and extending up to value addition and marketing. The multi-disciplinary expertise available within the group of young entrepreneurs will help them to serve farm families in a holistic manner. The home science graduate can pay particular attention to nutrition and food safety and processing and help a group of farm women to start a food processing park. The group should also assist farm families to achieve economy and power of scale both during the production and post-harvest phases of farming. Such as integrated centre can be named **“Agricultural Transformation Centre”**.

Opportunities for young entrepreneurs are several. Climate resilient agriculture is another area that needs attention. In dry farming areas, methods of rainwater harvesting and storage, aquifer recharge and watershed management as well as the improvement of soil physics, chemistry and microbiology, need to be spread widely. The cultivation of fertiliser trees which can enrich soil fertility and help to improve soil carbon sequestration and storage, can be promoted under the Green India Mission as well as the Mahatma Gandhi National Rural Employment Guarantee programme. A few fertiliser trees, a *jal kund* (water harvesting pond) and a biogas plant in every farm will help to improve enormously the productivity and profitability of dryland farming. In addition, they will contribute to climate change mitigation.

The “yuvu kisans” or young farmers can also help women’s self-help groups to manufacture and sell the biological software essential for sustainable agriculture. These will include biofertilisers, biopesticides and vermiculture. The Fisheries graduate can promote both inland and marine aquaculture, using low external input sustainable aquaculture (Leisa) techniques. Feed and seed are the important requirements for successful aquaculture and trained youth can promote their production at the local level. They can train rural families in induced breeding of fish and spread quality and food safety literacy.

Similar opportunities exist in the fields of animal husbandary. Improved technologies of small-scale poultry and dairy farming can be introduced. Codex alimentarius standards of

food safety can be popularised in the case of perishable commodities. For this purpose, the young farmers should establish Gyan Chaupals or Village Knowledge Centres. Such centres will be based on the integrated use of the internet, FM Radio and mobile telephony.

In the services sector designed to meet the demand driven needs of farming families, an important one is soil and water quality testing. Young farmers can organise mobile soil-cum-water quality testing work and go from village to village in the area of their operation and issue a **Farm Health Passbook** to every family. Farm Health Passbook will contain information on soil health, water quality, and crop and animal diseases, so that the farm family has access to integrated information on all aspects of Farm Health. Very effective and reliable soil and water quality testing kits are now available. This will help rural families to utilise in an effective manner the nutrient based subsidy introduced by the government from April 1, 2010. Similarly young educated youth could help rural communities to organise gene-seed-grain-water banks, thereby linking conservation, cultivation, consumption and commerce in a mutually reinforcing manner.

Young farmers can also operate climate risk management centres, which will help farmers to maximise the benefits of a good monsoon and minimise the adverse impact of unfavourable weather. Educated youth can help to introduce the benefits of information, space, nuclear, bio- and eco-technologies. Ecotechnology involves the blend of traditional wisdom and frontier technology. This is the pathway to sustainable agriculture and food security, as well as agrarian prosperity. If educated youth choose to live in

villages and launch the new agriculture movement, based on the integrated application of science and social wisdom, our untapped demographic dividend will become our greatest strength.

Let me conclude by urging both this University and the outgoing alumni to initiate Agricultural Transformation Centres in all the blocks in this region and issue to every Farm Family a Farm Health Passbook. Mahila Kisans (Women Farmers) and Yuva Kisans (Young Farmers) will determine the future of the agrarian and rural economy of this region. In the central budget of 2010-11, a *Mahila Kisan Shasaktikaran Pariojana* was introduced by the Finance Minister on my suggestion. I hope in the budget for 2011-12, the Union Finance Minister will help not only to intensify the Mahila Kisan programme in this region but will also initiate a *Yuva Kisan Shasaktikaran Yojana*, to help educated young farmers to organise Agricultural Transformation Centres. The Home Science graduates participating in the Agricultural Transformation Centre movement should also organise a “Feeding Minds – First 1000 Days” programme to ensure that there is no maternal and foetal undernutrition and that every new born child has an opportunity for realising its innate genetic potential for mental and physical development. Babies with low birth weight, as a result of foetal undernutrition suffer from handicaps in brain development and cognitive ability.

If agriculture goes wrong, nothing else will have a chance to go right. I wish you the joy of shaping the future of our agriculture, in a manner that “Food for All and For Ever” becomes a reality during this decade. Challenges are many, but opportunities are equally

many. Some crops like rubber may do better in this region than in Kerala when mean temperature goes up by 1-2? C due to climate change. I see a glorious future for the agriculture of this region in an era of climate change. This University and its alumni should play a catalytic role and shape the future of farming and farmers during this decade by harnessing the best in frontier science and by blending it with traditional wisdom and ecological prudence. You have my very best wishes.