

“LIVING WITH CHANGE”

Commencement Address

By

**Norman E. Borlaug
Texas A&M University**

December 20, 2003

HOWDY!!

LADIES and GENTLEMEN:

Congratulations to all of you who today will receive degrees from the College of Agriculture and Life Sciences, College of Science, College of Medicine as well as the Bush School of Government and Public Service. This is an auspicious day! I also salute your professors, university staff, parents, families and friends who have helped make it possible for you to achieve this important goal.

Since 1944, when I joined the first pioneering International Agricultural Research and Production Programs – the Mexican Government-Rockefeller Foundation Program – I have encountered the greeting “Howdy” in many countries of Latin America, Asia and Africa without fully realizing its sentimental values. I first came to Aggieland the spring semester of 1984 as a visiting professor, for what I imagined would be one semester per year for three or four years. I apparently became infected with the Howdy virus. For here I am, nearly 20 years later, engaged in teaching about international agriculture and food problems, converted to and enjoying the friendly stimulating spirit of “Howdy-Land”.

You, who graduate today, will – in 20, 30 and 40 years – recall with fondness the memories and value of your years at TAMU-“Howdy-Land”. Treasure the memories which prepared you, for your life in the real world.

I want to spend the next few minutes addressing the subject “Living with Change”. Change is one of the few certainties in life. It seems that virtually everything changes – either for better or for worse – nothing stays the same. Indeed, individuals, communities or nations which accept status quo, most likely are committing themselves to a retrogressive standard of living. In my line of work I often refer to people with extreme conservatism about science and technology as “neo-Luddites.” The original “Luddites” were followers of Ned Ludd in England during 1810-20 who tried to destroy new, machine-powered textile manufacturing looms, which marked the beginning of the industrial revolution. Today, we have “neo-Luddites” in Western Europe, Japan, India, Kenya, Ethiopia and the United States, who are trying to stop the application of new knowledge in molecular biology—the so-called biotechnology--from being applied to improve our food system by development of improved plant and animal species.

As I look back on my own career of six decades in agricultural research and food production in the developing world, two major streams of change have had major impacts on my work—population growth and the application of science to develop improved food production technology. During my lifetime—nearly 90 years—world population has grown from 1.6 billion to 6.2 billion people—a four-fold increase. Although world population growth rates are slowing, we are still adding nearly 80 million people per year to world population, most of them, unfortunately, are in food deficit nations.

Population growth, plus increasing incomes that lead to better diets, are the parameters that those of us on the food production front must factor into our work.

The challenges of achieving sustainable agricultural production with equitable distribution of sufficient food for the 9-10 billion people likely to be on Earth by the end of the 21st Century are daunting. So far, advances in agricultural research and production—and the efforts of the world's farmers, ranchers and fishermen—have kept world food production ahead of population. Even though nearly one billion people are hungry it is not because of food unavailability in the market but rather because they are too poor to buy it.

I often ask the critics of modern agricultural technology what the world would have been like without the technological advances that have occurred over the past 50 years. Had we tried to produce the 2 billion ton world cereals harvest of the year 2000 with the crop yield technology of 1950, we would have needed a total 4.5 billion acres of land—of the same quality—instead of the 1.8 billion acres that were actually used. Obviously, such a surplus of land was not available,

especially in populous Asia. Moreover, even if it were available, think of soil erosion, loss of forests and grasslands, and impact on wildlife species that would have occurred had we tried to bring an additional 2.7 billion acres of land under the plow. Thus the use of high yield production technology saves land for “mother nature” and by so doing protects the environment, an indirect benefit often overlooked by most of the uninformed urban population.

Many in this audience may not know about the so-called “Green Revolution,” a term coined in 1965 by the Administrator of USAID, Dr. William Gaud, to describe the rapid introduction and diffusion into India and Pakistan, and from Pakistan to China, of new types of wheat and rice varieties that had much higher genetic grain yield potential and disease resistance than had ever been seen before. When these new seeds were combined with fertilizers, irrigation, and improved crop management, and widely demonstrated on farms, they led to tremendous increases in food production. Between 1965 and 2000 cereal production in Asia tripled, leading to a 25 percent increase in per capita food availability, literally saving hundreds of millions from hunger and starvation.

I was privileged to have been involved in the development of the broadly adapted disease resistant high-yielding wheat varieties and production technology, and to have trained and led the international team of young scientists that sparked the Green Revolution in Asia. These wheat varieties were actually developed in Mexico, initially under the Mexican Government-Rockefeller Foundation Program and its spun-off organization the International Maize and Wheat Improvement Center (CIMMYT). Today, the high-yielding “Mexican” wheat varieties, or their derivatives, are grown on 70 million hectares worldwide (175 million acres), and have added several hundred million tons to the world wheat harvest annually.

Over the past 17 years, I have been involved with former U.S. President Jimmy Carter and Yohei Sasakawa of Japan in an initiative in Africa called the Sasakawa-Global 2000 agricultural program. Our aim is to bring a Green Revolution in food production to millions of small-scale farmers. Unfortunately, progress has been slow; much less than achieved in Asia 35 years ago. Sadly, food production in sub-Saharan Africa remains in crisis, even though technology is available to double and triple yields of the major food crops. Consequently, I have come to the conclusion that unless Africa’s rural infrastructure—especially transport systems, energy, water, schools, and clinics—is significantly improved, all other efforts to reduce poverty and hunger, improve health and education, and secure peace and prosperity will not make much progress.

The Importance of Infrastructure for Development

The contrast of difficulties of introducing modern high yield agricultural production technology into Pakistan-India versus sub-Saharan African countries relates back to the primary purposes and location of the railroads and roads in the Colonial period. In South Asia the economic need of Britain was for an agricultural product – cotton fiber – for its textile industry; the railroad was built into the Punjab – the best agricultural region – roads were built to deliver cotton to railheads; irrigation systems were developed to further increase cotton production.

When the high yield wheat and rice production technology were widely demonstrated in the early 1960's and shown to be capable of increasing grain yield per acre three to four fold, the main remaining obstacles to increasing production were unavailability of fertilizer and government policies devoid of economic incentive for the farmer. When these obstacles were removed, following nasty debates at top governmental policy levels, in which I was personally involved, **production soared!**

By contrast in sub-Saharan Africa, the main interest of the Colonial Powers was minerals and not agricultural products – so the railroads were built to the mines. Agricultural development was largely neglected. Development of sub-Saharan countries continue to be hobbled by lack of infrastructure, especially roads. Roads bring schools; soon schools catalyze development of public health services; bus and truck service begin to break down cultural, ethnic, linguistic and tribal barriers and **Everything begins to change!**

Resisting Change

The tremendous progress made in agricultural science and technology, education, medicine, public health, communication and transportation during the 20th Century has permitted the majority of people in the developed industrialized nations, to leave farming and move from the countryside to better paying positions in the city. In most industrialized countries, less than 3 percent of the population is now engaged directly in agricultural production, and less than 20 percent live in rural areas. As a result, most people in the developed nations have lost touch with the land, and are ignorant about the complexities and magnitude of producing and equitably distributing food for all who come into this world.

Urban ignorance about agriculture in the industrialized developed nations—indeed about biological sciences in general—has allowed a radical environmental

elite to capture and distort essential environmental movements and by using fear tactics confuse the public about modern agriculture. These anti-technology critics argue that humankind is being poisoned by modern high-yield agriculture and should return to traditional organic methods. These anti-science and technology zealots are trying to retard—and even stop—the application of new science and technology, especially the new transgenic-biotechnological tools that offer so much promise for the future. While it is almost certain that they will not be successful, we still must remain vigilant to make sure that such a catastrophe does not happen. I have had the sad experience of being close to and seeing the monstrous effects of Lysenkoism (pseudo-science) destroy science in the former Soviet Union and contribute enormously to that country's collapse, while also spreading this dogma to many other countries.

Use Reason in Environmental Protection

Over the past 30 years, we all owe a debt of gratitude to the environmental movement in industrialized nations, which has led to legislation to improve air and water quality, protect wildlife, control the disposal of toxic wastes, protect soils, and reduce the loss of biodiversity. However, in looking to the future, our ecological impulses must be grounded in rationality. Logic – based on scientific data not sentiment – will best serve the interests of both nature and humankind.

Protecting the land, water, and atmospheric resource base of planet Earth is obviously important to our quality of life and, indeed, probably to the long-term survival of humankind. However, in the rich, industrialized western world, the age of pollution is nearly over. Aside from armaments, technology is not growing more dangerous and wasteful but cleaner and more resource-efficient. I predict that almost all of the remaining pollution issues will be solved in the lifetime of most of you. As positive as trends towards clean technology and a better environment are in the developed nations, they are negative and worsening in the developing nations that employ primitive traditional agricultural methods. This is why it is so important for Western Europe, the United States, Canada and Japan to break free from their “doomsday” thinking so that resources can be diverted to ecological protection in the developing world.

In principle, the human population is no enemy of nature. Someday, human population may be several times larger than at present, without serious ecological harm. But the world of the present has more people in some countries and regions than current social institutions and technological knowledge can support with adequate standards of living. Thus, short-term global population stabilization,

especially in densely populated nations, is desperately needed. Intermediate population projections of the United Nations estimate that the earliest we can expect leveling-off of human growth rate is towards the end of the 21st Century, when world population will be around 10 billion people with, unfortunately, 90 percent living in what are classified today as low-income developing nations. All of us must strive to bring human numbers to a satisfactory equilibrium population.

Striving for Social Justice and Political Stability

There has always been inequality in the animal and plant kingdoms. From the early days of prehistoric man, tribal hunters that occupied the best grassland environments with herds of large ungulates had access to an abundant supply of wild meat. Weaker tribes of hunters were pushed into drier or harsher environments where wild meat resources were less and more difficult to harvest. Inequities, in food access and to other amenities for a moralistically decent standard of living have greatly widened in the last 100 years and especially since World War II.

Currently, more than one billion people in the developed industrialized world, primarily because of contributions of science and technology, enjoy a standard of living that was unimaginable – even in the fondest dreams – of their grandfathers and great grandfathers.

Unfortunately, another nearly one billion people in the developing nations remain illiterate, malnourished, hungry, ill, poverty stricken and without hope. Their environments of human misery and hopelessness are fertile seed beds for sowing and cultivating seeds of terrorism that is potentially a serious threat to civilization and the future well-being of humankind everywhere. These inhumane injustices must be ameliorated. Democratic forms of government can not be established and sustained in such environments.

Thus, we Americans should count our blessings. I urge you not to become arrogant and close your eyes and hearts to the less fortunate, especially the nearly one billion people who begin and end each day hungry. By helping the less fortunate, you serve God as well as your country. Remember, compassion is the greatest of all human virtues.

Cultivate a Healthy Body and Mind

Take good care of your body. Remember, you must live in it for a lifetime. Don't destroy it with hard drugs, alcohol, or other excesses. Do we really need such stimulants? Is life so miserable and meaningless? Moreover, look at the disastrous consequences on world society that drug trafficking is bringing, through the violence and corruption that it breeds. Finally, for your own health follow good and authentic nutritional, medical, and exercise recommendations. Avoid fads!

Looking Ahead

Graduation from Texas A&M is a very important moment, not only for each graduate, but also for your families and loved ones. But remember, as the late American historian-philosopher Will Durant so eloquently phrased it, "Education is a life-long discovery of our own ignorance. Sixty years ago, when I was 19, I knew everything and my father knew nothing. By the time I was 29, I was amazed at how much my father had learned. Now at 79, I know nothing."

Will Rogers, the late cowboy, humorist, and philosopher, put it more simply, "We are all ignorant; the difference is that we are ignorant about different subjects." To his comment I might add, as we become more specialized in our knowledge, there is a danger that our ignorance becomes more pervasive, which also appears to be destroying the gene for common sense. Try to read broadly and across several disciplines. Don't be ignorant of history, since it can teach us many lessons of relevance today.

Now, God speed and best wishes as you set out along the road of life!!!!