Providing Enduring Solutions for a Better Tomorrow

Texas A&M AgriLife Advanced Leadership Program

Cohort II, Capstone Project

FALL 2013

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1 A NOTE FROM DR. MARK HUSSEY, VICE CHANCELLOR AND DEAN FOR AGRICULTURE AND LIFE SCIENCES

What is leadership?

At its core, leadership is bringing others together to accomplish a common goal. Across Texas A&M AgriLife, our common goal is to promote education, research, service and extension in local communities and beyond -– that's the land-grant mission this institution was founded on, and the mission we still carry passionately today.

Why lead?

In my eyes, the answer is simple – to have a positive impact on Texas, the nation, and the world. We are all a part of the Texas A&M University System because we want to make a difference. We want to feed the world, improve health, enrich our youth, grow our economy, and protect the environment. Good leaders are essential to keeping that impact vibrant. If we all try to take a back seat, we will inevitably find ourselves on a road to nowhere.

As a participant of the AgriLife Advanced Leadership Program Cohort I, Susan Ballabina of the Texas A&M AgriLife Extension Service took what she learned and initiated a unique partnership for an in-school nutrition and physical activity program called Fuel Up to Play 60. When we use the strengths of our land-grant system, and think big about our opportunities for impact, great things happen!"

A call for Every Leader.

My challenge to each of you is to empower yourselves and others to lead. It is to everyone's benefit to instill interest in leadership in our colleagues and students – to lure the most competent, impassioned and effective leaders into paths that will ensure this institution's impact for many years to come.

Leaders are more than just managers… they are visionaries; they are innovators; they are motivators. Leaders come in many forms and have a variety of styles. We all bring something special to the table. So the question isn't who should lead; it's what type of leader am I? What will your impact be today?

2 ABOUT THE TEXAS A&M AGRILIFE ADVANCED LEADERSHIP PROGRAM AND COHORT II AUTHORS

The Texas A&M AgriLife Advanced Leadership Program develops advanced leaders from across AgriLife who want to enhance their leadership and personal development skills. The Texas A&M AgriLife Advanced Leadership Program is an 18-month cohort initiative that focuses on leadership skills and experience, building upon participants' current and future roles. Aimed at those who are interested in developing a variety of leadership roles, the program also provides a greater understanding of the Texas A&M System and the land-grant mission. Interaction with administrators, leadership professionals, and peers gives participants experiences and tools to enhance their effectiveness as leaders. As a result, knowledge of College of Agriculture and Life Sciences (COALS) and agency-specific issues is deepened, as is knowledge of relevant international, national, and state topics.

The cohort is structured around six formal meetings at Texas A&M AgriLife locations throughout the state. Participants implement personal development plans that add value and enrich both the individual and his or her agency. Through awareness, interaction, and mastery of core competencies, participants develop their leadership, personal, and professional skills, while fostering advocacy and support for each component of Texas A&M AgriLife.

Texas A&M AgriLife Advanced Leadership Core Competencies:

- Building Relationships and Interpersonal Skills
- Developing a Professional and Personal Leadership Plan
- Strategies for Professional Communication
- Establishing Vision, Ethics, and Integrity
- Managing Power and Influence
- Solving Problems Creatively
- Fostering Conflict Resolution and Managing Change
- Valuing Diversity
- Personal and Organizational Branding Using Social Media

A variety of books, articles, assignments, and case studies reinforce the core competencies, and stimulate discussion:

- Skills and Personality Inventories—Participants complete the Myers–Briggs Type Indicator assessment.
- Leadership Plan—According to individual goals and vision, participants develop and implement a professional and personal leadership plan.
- Shadowing Experiences—Opportunity to experience direct exposure to professional positions within Texas A&M University System.

- Advocacy Presentations—Each group presentation includes participants from the same component of AgriLife. Cohort members deliver a presentation illustrating aspects of their profession and component's mission.
- Capstone Leadership Project—Teams are assigned a leadership project allowing individuals opportunities to use knowledge gained through the program.

Cohort II Capstone Assignment

Meeting our Grand Challenges: Major Issues Facing Agriculture and Natural Resources

With changes in the state, federal and international arena, the land-grant system needs to collectively speak out on major issues facing agriculture and natural resources. Beyond simply identifying these "grand challenges," we must show how the land grant university system either can or is providing solutions to remain viable in today's competitive landscape.

Define and discuss what your group feels are the "megatrends" or "grand challenges" facing our society, specifically in the agriculture and life sciences arena (broadly defined). Provide supporting documentation and discussion. Examples could include, water, population, environment, etc.

Delineate which (if any) of these issues is the land-grant system (and specifically Texas A&M AgriLife) best prepared to contribute to and/or solve. How will we define "excellence" in meeting these challenges? Can/will we remain effective and relevant in today's society while addressing these concerns?

Defend what is necessary for Texas A&M AgriLife to meet your defined challenges. What suggestions does your cohort have to ensure that Texas A&M AgriLife is a leader for these trends? For example, do we need to change structure, budgets, support, culture, etc.? How can we communicate our contributions to these issues to the public, stakeholders, legislators, etc.?

Cohort II Participants

- College of Agriculture and Life Sciences
  - Corliss W. Outley
  - Jason E. Sawyer
- Texas A&M AgriLife Research
  - Judith M. Ball
  - David J. Caldwell
  - Jane K. Dever
  - W. Richard Teague
- Texas A&M AgriLife Extension Service
  - Monty C. Dozier
  - Guadalupe Landeros
- Texas A&M Forest Service
  - Joel W. Hambright
  - Karen L. Stafford
- Texas A&M Veterinary Medical Diagnostic Laboratory
  - Jordan W. Brod
  - Hemant K. Naikare

3 PREAMBLE

Texas A&M AgriLife seeks to improve lives by working to maintain a healthy, peaceful, and productive society. AgriLife is a simple word for a diverse organization. With teaching, research, extension, laboratory, and service facilities throughout Texas, the Texas A&M University College of Agriculture and Life Sciences and the four Texas A&M AgriLife agencies serve people of all ages and backgrounds (10). We collaborate with members of The Texas A&M University System statewide to address the critical issues identified by COALS and the agencies as the five Grand Challenges for the 21st century:

1) Feeding our World
2) Protecting our Environment
3) Improving our Health
4) Growing our Economy
5) Enriching our Youth

Texas A&M AgriLife Advanced Leadership Cohort II is tasked with selecting one of these complex, interrelated Grand Challenges to demonstrate how the people of Texas A&M AgriLife can work together as problem solvers for the world's most pressing needs. Though solutions for all the Grand Challenges are important, **Enriching our Youth** is central to our core strategy; it will lead to key outcomes related to feeding our world, improving our health, and growing our economy while addressing resource and environmental constraints. Elements critical to success in meeting the Grand Challenges exist within Texas A&M AgriLife. Effective strategic alignment of our resources and resolution of a few key items will contribute to ensuring that Texas A&M AgriLife is up to the job.

Our world is one of a growing population, ever-changing climate, increasing rates of technology advancement, and unsustainable consumption of resources. A young person born today faces many challenges related to each of these issues that impact not only our nation but the whole world. The Grand Challenges spur us to answer the call of research, education, outreach, and service to ensure that our children and their children inherit an economically and environmentally sustainable planet where people can grow and prosper without the fear of hunger and disease, and where there is hope for a sustainable and productive way of life.

Our cohort recognizes that we need to bring to bear all the resources within the land-grant mission (10) to effectively and efficiently meet the Grand Challenges. Our goal is to transition from the current culture of operating in silos to a future culture of operating in concert with one another via shared intellect and resources. This multidisciplinary team approach would generate:

- An effective environment for developing solutions to address the Grand Challenges.
- Development of technology and its transfer.
- Intellectual property that aids in sustaining our world economically and environmentally.
- A system of reward and advancement that looks more favorably on the accomplishments of integrated teamwork rather than focusing on individual achievement.

It is our sincere desire to develop and implement a system of solution delivery to problems reflected within the five Grand Challenges to a constantly growing and changing world. To this end, we focus our efforts on the Grand Challenge of **Enriching our Youth**.

4 EXECUTIVE SUMMARY

4.1 BACKGROUND

Texas A&M AgriLife recently commemorated the 150th anniversary of the passing of the 1862 Morrill Land-Grant College Act that founded land-grant institutions of higher learning within the United States. Reaffirming the modern relevance of this landmark piece of legislation has been a primary focus for the leadership of the COALS and all Texas A&M AgriLife agencies. The capstone project for Cohort I of the Texas A&M AgriLife Advanced Leadership Program resulted in the development of a video that addressed the importance of the land-grant mission within Texas A&M AgriLife as we strive to find solutions to the many societal challenges we currently face.

During the 2012-2013 academic year, COALS and the agencies began to develop strategic initiatives that focus on these significant societal challenges by developing the Texas A&M AgriLife Grand Challenges:

1) Feeding our World
2) Protecting our Environment
3) Improving our Health
4) Growing our Economy
5) Enriching our Youth

Over the past year, COALS and agency administration have put forth significant effort to bring together leaders within Texas A&M AgriLife to provide guidance for moving forward with research, teaching, and extension programs to address each Grand Challenge. Beginning with the Blue Bell Lecture Series and continuing with the 2013 AgriLife Conference, the Grand Challenges Town Hall, and the 2013 AgriLife Administrative Retreat, a listing of unifying themes was developed. These themes include a principal focus on preserving water and ecosystems, increasing food production, and improving health and prosperity while significantly advancing human capacity.

4.2 TEXAS A&M AGRILIFE ADVANCED LEADERSHIP PROGRAM

The core focus of this program for Texas A&M AgriLife is to strengthen the land-grant mission through integrated leadership. Each cohort or team within the program aspires to set a direction, not a destination. Each cohort should support all agencies of Texas A&M AgriLife by promoting the land-grant mission and by understanding and advocating for the role of each agency. Through a series of workshops and retreats that span an 18-month period, each cohort strives to critically identify obstacles encountered by COALS and the agencies and determine effective solutions. The culmination of the efforts of each cohort is distilled into a program-ending Capstone Project.

4.3 COHORT II CAPSTONE PROJECT ASSIGNMENT

Meeting our Grand Challenges: Major Issues Facing Agriculture and Natural Resources. With this Capstone assignment, Cohort II was charged with 1) discussing and assessing the "Grand Challenges" that face our society; 2) delineating which, if any, of these issues Texas A&M AgriLife is best prepared to address; and 3) defending what is necessary for Texas A&M AgriLife to meet these Grand Challenges.

In short, Cohort II was asked to provide answers to the following questions:

How will we define "excellence" in meeting these challenges?

Can/will we remain effective and relevant in today's society while addressing these concerns?

How can we ensure that Texas A&M AgriLife is a leader for these trends?

Do we need to change Texas A&M AgriLife structure, budgets, support, or culture to address each challenge?

How can we communicate our contributions to these issues to the public, stakeholders, and legislators?

4.4 COHORT II CAPSTONE PROJECT

Through integrated teamwork and networking, the members of the Texas A&M AgriLife Advanced Leadership Program–Cohort II have responded to this charge and address these questions with the present Capstone Project: this white paper entitled ***Providing Enduring Solutions for a Better Tomorrow***.

We chose the Grand Challenge of ***Enriching our Youth*** to identify outcomes that will enable Texas A&M AgriLife to respond to this Challenge as well as to the other equally important Grand Challenges currently facing our society.

5 DEFINE AND DISCUSS

The Grand Challenges defined by the COALS are centered on a global reality that connects us all: a growing world population. The increasing population will have significant impacts on our environment and economy, but often, people we encounter on a daily basis are not aware of these impacts. Many students in our classrooms are similarly uninformed. For most people here in the United States, as long as there is food on the grocery shelves, gas at the gas pump, and money accessible from the ATM, the problems and concerns associated with a growing world population are not on their radar. Such issues may generate "water cooler" talk based on some story on the internet or cable news, but the vast majority of Americans live day by day without a fundamental understanding of the complexity of the issues that will impact their future.

This type of thinking is a threat to our well-being as a nation and to the world as a whole. It is time for all of us to think about the future and the social, economic, environmental, and political impacts of our daily choices. Dr. Norman Borlaug, father of the Green Revolution and proponent of the Blue Revolution, said that "agricultural scientists have a moral obligation to warn the political, education, and religious leaders about the magnitude and seriousness of the arable land, food, population, and environmental problems" (4) that we are facing in the 21st century.

We believe that the greatest contribution we can make is to develop an educational strategy that identifies how the four agencies and COALS can work together to address and begin working toward solutions to these global challenges. We need solutions that feed an ever growing population in a manner that sustains the planet environmentally and economically for those who produce our food. Such a task transcends all generations and impacts every aspect of the human dimension.

Consequently, we will concentrate on *"Enriching our Youth through Research-based Educational Programs"* as the platform to address these multi-faceted, interdisciplinary issues. We must create educational programs that are not limited to traditional campus-based instruction only, but reach out into the communities and groups we serve through local and distance-driven platforms. We must also devise engagement strategies that enable and encourage critical thinking and problem-solving abilities using the scientific and technological information that we create.

6 THE LANDSCAPE

Looking to the future, our global society faces numerous large and complex problems. The major factors posing challenges to the well-being of humans worldwide are the growing human population and the limits on our ability to avoid continued depletion of essential resources and to sustain our environment. Globalization means dealing with these issues across the globe. We need to be cognizant of these constraints when developing solutions and disseminating information for populations worldwide to improve their lives and the environments on which they depend.

6.1 GROWING GLOBAL POPULATION

The current rate of increase in the planet's growing population is much faster than in earlier times. Based on United Nations forecasts, by the year 2050, today's population of 7.1 billion is projected to grow to between 8.3 billion and 10.9 billion, with 9.6 billion as the mid-projection. More than 90% of the increase will occur in the least developed countries, which are projected to double in size from 898 million inhabitants in 2013 to 1.8 billion in 2050 (21). Currently, the population of less developed countries is young, with children under 15 years accounting for 26% of the population, and youth aged 15 to 24 years accounting for a further 17%. This trend poses a major challenge for countries struggling to provide education, good health, and employment to large cohorts of children and youth.

The majority of the projected population growth, 90%, will occur in overpopulated cities. At the beginning of the 21st century, almost half of humanity was living in cities (19). Currently, 52% of the world's population lives in urban areas; by 2025 it will increase to 58% (7). Over the next 50 years, all of the world's population growth is expected to take place in urban areas, which will also draw in some of the rural population through rural-to-urban migration. Finally, eight countries are expected to account for over half of the world's projected population increase: Nigeria, India, Tanzania, the Democratic Republic of Congo, Niger, Uganda, Ethiopia, and the United States of America, listed according to the size of their contribution to global population growth (22).

This growth is unique because it is expected to have a great impact on the global economy, cause higher demand for agricultural land and water, and increase pollution and waste. By 2030, demand for food, clean water, and energy will grow by approximately 35%, 40%, and 50% respectively (14). As a result, many researchers have raised serious concerns about the ability of the world to feed itself adequately over the next quarter century and beyond, and predict that food production must increase 70% by 2050 (17). The overall impact of population growth on the environment is greater than ever before in human history. Indicators of severe environmental stress include the growing loss of biodiversity, increasing greenhouse gas emissions, increasing deforestation worldwide, stratospheric ozone depletion, acid rain, loss of topsoil, and shortages of water, food, and fuel-wood in many parts of the world (8).

The growing burden affects not only our natural resources, but also administrative and social institutions (22). As a result of population growth and increasing affluence among the middle class, improvements in health, education, and living standards have extended life expectancies and reduced infant mortality rates around the globe. Today life expectancy is estimated at 68 years. With advances in scientific and medical research, this age has been projected to rise to 83 years in 2050 and will entail longer and more productive lives, especially in developed nations. But longer life expectancy will also

adversely affect every aspect of economic and social progress in our growing world. Higher levels of expenditures for health, social services, education, and professional training will be required. Few governments in the developing world have the power, resources, or trained personnel to provide their rapidly growing populations with the land, services, and facilities needed for an adequate human life: clean water, food, sanitation, schools, energy, and transportation.

6.2 Resource Constraints

Life on earth is sustained by ecosystem services that include maintaining stable and productive soils, protecting air quality, delivering clean water, and sustaining plants, animals, and other organisms that support ecosystem function (6, 9). For humans to live sustainably, natural resources need to be managed to prevent their depletion and protect their potential for self-replenishment. Globally, the expanding human population and consumption per head have placed enormous demands on essential ecosystems services such as clean water and productive soils; expanding urbanization is reducing the land area available for food production. The most important drivers of ecosystem change include overexploitation, biodiversity loss and invasion of alien species, soil loss and impoverishment, pollution, impairment of watershed function, desertification, and climate change.

While modern capitalism has greatly increased material wealth and has improved human well-being through the supply of more food, fiber, fresh water, timber, and fuel, it has done so by depleting the natural resources upon which human well-being depends, despite acknowledgement of the need to manage those resources sustainably (5). The ability of the environment to maintain ecosystem services essential to human well-being in a particular area exceeds the value of food production in crop and rangeland systems in the same area (23, 5, 15). Thus, a balance must be sought between the provision of environmental goods and services and the output of agricultural products (5, 2).

To maintain human well-being, it is critical to maintain ecosystem resilience: the ability of the ecosystem to return to functional capacity after disturbance or damage to the system (24, 25). The accelerating conversion of remaining natural resources and habitats is resulting in erosion of human welfare for short-term gain, and most countries are not on track to meet goals for human development and poverty eradication by 2015 (12). These goals include such fundamental tasks as reducing poverty, hunger, child and maternal mortality; ensuring education for all; controlling and managing diseases; and tackling gender disparity. Actions that have resulted in positive outcomes include: 1) investments in education and health; 2) reductions in poverty and socioeconomic disparities; 3) active adaptive management to avert environmental problems before their full consequences are experienced; and 4) investments in environmentally compatible technology (11, 26, 13).

6.3 Globalization

Life on earth is interconnected. Economic, socio-political, and ecological disruptions in one region of the world are not isolated. Transference of goods and resources continues to increase in scope and pace. The spread of infectious diseases is no longer isolated to selected groups or areas of the world. Travel to the remotest of areas is now possible. Exotic animal diseases and devastating human infections have spread via air travel. We can no longer ignore the problems of our world neighbors. Communications and networking are the norm, not the exception, even in developing nations. The whole phenomenon

of globalization raises many questions and controversial issues, as there are both positive and negative aspects to consider. On the positive side, globalization gives rise to new industries and jobs in developing countries and, in more developed areas, access to many products that cannot be produced locally. With modern communication and news access, there is an increased awareness of those around us such that humanitarian efforts can now be directed to those most in need. Vaccination protocols have been expanded to include children who previously were not considered in vaccine designs. Research has focused on reducing the cost of vaccines, expanding their use, developing more effective (non-refrigerated) storage of the inoculum, creating a better delivery system, and removing the need for multiple doses. This focus is a direct result of our increasingly interconnected world and our awareness of the suffering of others. On the negative side, globalization causes social disruption in both developed and developing countries. Developed countries see jobs relocating to developing countries, while the presence of multinational companies threatens local cultures and identity and disrupts local food production and fair trade. Unless local environmental protection laws exist and are enforced, there are often negative environmental impacts in addition to social disruptions.

Globalization results in a greater degree of interdependence among systems required to sustain food and medical supplies, economies, and wellness. As such, the need for expanded educational opportunities and increased development and transfer of knowledge is not isolated, but worldwide. The natural systems that sustain life on earth can also be destructive; our interconnected world has also changed the way humans prepare for and respond to natural disasters. Again, education is key to ensuring the best possible outcomes in the worst of situations.

6.4 SUMMARY

This vision of the future indicates daunting challenges. To find solutions, we need to start with the land and the natural resources upon which all life depends. Any solution must ensure maintenance or restoration of our natural resource base. Each challenge in each location in the world is unique and complex; thus, we must consider the following.

- We need to seek solutions that take into account the whole ecosystem and not merely the parts that comprise the system, as there are multiple interconnections that influence how the whole of any ecosystem responds to change.
- Each place is unique and requires us to determine what will work for that situation because there are no “Best Management Practices” that have universal applicability.
- We must consider responses over extended time periods, decades or longer. Land, ecosystems, and the social fabric of all societies respond slowly and often imperceptibly to disturbances.
- Humans must be viewed as key components in any ecosystem because we have such a profound impact on the ecosystems we live in and beyond. Coupled social-ecological systems behave as complex adaptive systems, so it is essential to develop decision frameworks to help people live sustainably within these dynamic ecosystems.
- We must engage society in order to get people to make decisions that allow us to live sustainably in ecological, economic, and social terms.
- We must strive to eradicate diseases that continue to plague developing countries and we must prevent the global spread of new and devastating infections.
- We must train others to spread new knowledge to developing countries in order to aid them in their growth and provide sanitation and clean water for all.

7 THE CHALLENGE

7.1 GROWTH OF POPULATION / INCREASED GLOBAL NETWORK

The growth of the world's population and the increased global network that binds us all together are increasing the demand on the capacities of the planet. However, these key drivers should not be viewed as problems; rather, they are simply the state of nature that currently exists. In many cases, these issues are the direct result of success in historic efforts to improve the human condition. Finding the means to sustain this growth, to continuously improve the quality of people's lives now and into the future, is the true challenge.

7.2 PROBLEM DEFINITION STATEMENT

In order to tackle the challenge of "**Enriching our Youth,**" we must define the problem. Thus, the following question is presented:

How might sustainable and continuous improvements in the human condition be achieved through the physical, cognitive, social, and emotional enrichment of our youth?

8 THE LAND-GRANT SYSTEM AS A SOLUTION

8.1 THE LAND-GRANT SYSTEM

8.1.1 History[1]

The land-grant college concept represents a dynamic educational experience: the body of knowledge constantly changes through research and experimentation and is disseminated to the public through extension education and other outlets. New knowledge brings new ideas and expanded opportunities, often followed by new milestones and advancements in the land-grant university experience. In the late 1850s, Congressman Justin Smith Morrill envisioned universities that were accessible to all, including the working class. Unlike the higher-education institutions of his time, these universities would reach out to improve communities and make their research widely available. The Morrill Act has provided a broad segment of the population with a practical education that has direct relevance to their daily lives. Signed into law in 1862, the Morrill Act fostered the land-grant mission, which has evolved to serve not only our nation but also the global population.

The Morrill Act donated public lands to the states and territories to provide colleges for teaching agriculture, "the mechanic arts," and military tactics, as well as science and classical studies, to the nation's working-class citizens. The land-grant mission was expanded beyond teaching to research with the approval of the Hatch Act in 1887, providing federal support for the establishment of agricultural experiment stations and resources to solve critical problems confronting agriculture.

The Agricultural and Mechanical College of Texas–now Texas A&M University--was the state's first public institution of higher education (10). It was organized by the state legislature in 1871 under the provisions of the Morrill Land-Grant College Act of 1862. The first students were enrolled in 1876. By 1911, the A & M College of Texas had helped scientific agriculture expand throughout the state. The department of agriculture and science was designated the School of Agriculture, later to become the College of Agriculture, and in 1989, the College of Agriculture and Life Sciences.

Congress approved the Smith-Lever Act in 1914, providing for the establishment of the state-based agricultural extension services and further expanding the land-grant mission. In 1915, the Texas legislature organized the Texas Agricultural Extension Service (now the Texas A&M AgriLife Extension Service), which would make available scientific information from the Texas Agricultural Experiment Station (now Texas A&M AgriLife Research) to every farm and community. Also in 1915, the Texas legislature established the Texas A&M Forest Service, which is mandated by law to "assume direction of all forest interests and all matters pertaining to forestry within the jurisdiction of the state." The Texas A&M Forest Service was the first state forestry agency to be placed within a land-grant university system.

In 1967, the legislature approved the creation of the Texas A&M Veterinary Medical Diagnostic Laboratory as a state agency administered by The Texas A&M University System (10). Its mission is to

[1] Most information in this section obtained from (12).

protect and support animal industries and to protect human health through detection and prevention of zoonotic diseases.

8.1.2 Current State

Within challenges relevant to the land-grant mission, problem sets associated with improving the human condition have key components:

- How might we **Feed the World** through *improving food security, safety, and value*?
- How might we **Protect our Environment** through *increasing and improving natural resources stewardship now and into the future*?
- How might we **Improve our Health** through *promoting wellness, reducing disease, and addressing issues of hunger and resource distribution that lead to conflict and security disparity*?
- How might we **Grow our Economy** through *increasing the standard of living while finding the proper balance between consumption and conservation*?

These are all desired outcomes, areas to be addressed and enhanced to successfully fulfill the mission of improving the human condition. Each must be addressed in the face of scarcity. Resource availability, distribution, allocation, and utilization are real constraints. It is not just current resource inventories that must be considered, but the rate of drawdown, impairment, and development of future resources.

The goals are straightforward; however, solutions are complex. For many organizations, sustaining, enduring, and durable solutions are elusive. In dynamic environments, the only permanent condition is *change*. There are no silver bullets, no technology that will solve all problems for all time. Rather, the true enduring solution is ***Enriching our Youth*** through a system of knowledge creation, dissemination, and deployment through strategic partnerships in order to create dynamic solutions to challenges as they emerge over time.

New knowledge must be developed. In order to develop innovative solutions, it is imperative that we continue to increase understanding of the processes and systems that underpin, drive, and affect human lives. Ultimately, a biological system (humanity) rests on climatic, abiotic, and biotic factors and systems and is influenced by socio-economic feedback loops. Many of these systems operate at divergent physical scales (atoms to galaxies) and time scales (nanoseconds to eons). Regardless, scientific research has been a primary vehicle to achieve advances to date that have supported the sustained growth in population and standard of living. Continued knowledge gains are necessary to address the increasing complexity of solution development.

Knowledge gains must be communicated and disseminated. Knowledge generation is a necessary element, but alone, it is insufficient to effect positive change. Instead, knowledge gains at fundamental levels must be communicated so that applied technologies can be developed and shared. The communication and transfer of knowledge and technology along with the skillsets required for their implementation are necessary elements for successful solution development. Either element in isolation is insufficient. The more complementary the integration of these functions, the more likely effective solutions will be developed, delivered, and deployed toward achievement of highest order objectives.

Public service systems are needed to deploy knowledge as a public good. As globalization increases, disruptions in one sector or one component of industry or geography have more rapid and often more severe impacts on other regions or economies. In particular, public health, education, food safety, and ecosystem services are "public goods" and though not "owned" by any entity, greatly impact all citizens. In these cases, public services must be able to capitalize upon knowledge gains and provide services that support these public goods to the benefit of all.

In order to effectively provide solutions that enable sustained improvements in the human condition, a system that can capitalize on partnerships to effectively bind these functions together offers the greatest opportunity to succeed. Clearly, the land-grant system is poised to serve as that system.

8.2 Sustaining Solutions

Because these actions are driven by people, the system must be focused on developing people who are critical thinkers and problem solvers, people who question the status quo and can take needed actions. It is people who develop knowledge; people who disseminate, distribute, and deploy knowledge and information; and people who use and implement new technologies. The structure of the land-grant system is designed for this purpose.

8.3 Texas A&M AgriLife Structure

The current structure of Texas A&M AgriLife is designed to support our proposed strategy.

8.3.1 College of Agriculture and Life Sciences

The COALS fosters a stimulating educational environment that expands knowledge through discovery research and engages students in innovative learning experiences that empower them to serve and lead in our increasingly global society. COALS prepares future leaders in 14 academic departments offering 31 undergraduate degree programs, and 37 master's, 24 doctoral, and 6 online graduate degree programs. In addition, COALS has the only undergraduate certificate program in youth development; it also has a graduate program with youth development as a primary focus. The Sequor Youth Development Initiative is also housed in COALS. Around 170,000 young people are taught every day in Texas agricultural classes and FFA by Texas A&M-educated teachers who instill the latest knowledge and show students how to stay up-to-date on the latest science and technology. Instructional Materials Services (IMS), administered by the Department of Agricultural Leadership, Education, and Communication within COALS, disseminates knowledge by providing agricultural educators with quality, timely, customizable materials for use in both public and private schools.

COALS has a vision to be a world leader in agriculture, life sciences, and natural resource sciences as well as the many related disciplines they contain. In achieving this vision, COALS will:

- Provide preeminent programs and people who are responsive to a diverse and growing clientele and fulfill the land-grant mission of teaching, research, and engagement.
- Engage outstanding faculty, staff, and students from a multitude of backgrounds and cultures in a positive and stimulating work environment.
- Create inspired teaching programs that motivate, excite, and reward students and prepare them to contribute to an ever-changing and increasingly global society.

- Foster research efforts that will draw on faculty excellence and involve student training to encourage critical thinking and problem solving, increase basic knowledge, and apply discoveries to meet the needs of society.

8.3.2 Research

The mission of Texas A&M AgriLife Research is to develop new knowledge and tools through basic and translational research to benefit consumers and expand agricultural sustainability, profitability, and environmental stewardship in conjunction with other entities and agencies in the Texas A&M System. Texas A&M AgriLife Research supports the land-grant mission in Texas with 13 research centers located in communities around the state. Cutting-edge agricultural and environmental research in the back yards of urban and rural communities gives first-hand visibility to primary stakeholders as well as educators, mentors, and community leaders who influence our youth. The five imperatives of the agency are to:

- Sustain healthy ecosystems and conserve our natural resources.
- Enhance competitiveness, prosperity, and sustainability of urban and rural agricultural industries.
- Improve public health and well-being.
- Mitigate negative effects of global climate change.
- Create and utilize fundamental information (genomic, proteomic, metabolomic) to optimize plant and animal production as well as human health.

8.3.3 Extension

The mission of Texas A&M AgriLife Extension is a seemingly simple one: Improve the lives of people, businesses, and communities across Texas and beyond through high-quality, relevant education. Extension is one of the "human touches" of the land-grant system and one of the mechanisms by which new discoveries are extended to people. This includes our youth and their families. Working with the youth of Texas, Agrilife Extension's mission is further focused on preparing youth to meet the challenges of childhood, adolescence, and adulthood through a coordinated, long-term, progressive series of educational experiences that enhance life skills and foster development of social, emotional, physical, and cognitive competencies.

The bulk of Extension youth work is directed through the 4-H program. 4-H is a national youth development organization administered through the National Institute of Food and Agriculture of the United States Department of Agriculture. As a component of the land-grant institution of Texas, AgriLife Extension leads the 4-H program in Texas. At the core of 4-H is experiential learning, which runs the gamut of possibilities from computers to cows and robotics to roosters. The beauty of the 4-H learning experience lies in the ability of young people to pursue their own interests through structured individual and group instructional opportunities involving adult mentoring. The 4-H Study of Positive Youth Development (27), a longitudinal study conducted by the Institute of Applied Research in Youth Development at Tufts University, shows that, when compared to other youth, young people involved in 4-H are:

- Nearly two times more likely to plan to go to college.
- More likely to pursue future courses or a career in science, engineering, or computer technology.

- More civically active and make more civic contributions to their communities.
- 41% less likely to engage in risky behaviors.
- 25% more likely to positively contribute to their families and communities.

8.3.4 Forest Service

Texas A&M Forest Service provides statewide leadership to assure the state's trees, forests, and related natural resources are protected and sustained for the benefit of all. Texas A&M Forest Service, through the Rural Forestry Assistance and Forest Stewardship Program, educates, assists, and engages landowners about forests, related natural resources, and threats to those resources while encouraging active, sustainable land management throughout Texas. Agency personnel implement strategies that fulfill the following objectives:

- **Manage for Multiple Resources** – encourage the active management of forests and woodlands for multiple resources and a variety of values.
- **Sustain Timber Markets** – encourage the active management of forests and woodlands to provide sustainable products and sustained economic value.
- **Provide Habitat Diversity** – encourage the active management of forests and woodlands to provide habitat for fish and wildlife species throughout their life cycle.
- **Reduce Forest Health Risks** – identify, monitor, and reduce potential risks of tree health and promote management practices that enhance the health of forests and woodlands.
- **Mitigate Wildfire** – mitigate and restore fire-adapted forestlands and woodlands to reduce the risk of catastrophic wildfire and promote the values of fire-maintained land.
- **Conserve Unique Landscapes** – identify and conserve unique and ecologically important landscapes and promote the values of those landscapes.
- **Keep Forests as Forests** – promote the conservation of forests and woodlands from land conversion practices to provide public benefits such as clean air, clean water, carbon sequestration, and climate adaptation.
- **Create Forestry Ambassadors** – engage landowners regarding forest and woodland issues by utilizing leadership positions, partnership opportunities, communication, and peer-to-peer education networks.

Texas A&M Forest Service is visible in our communities, protecting our environment and influencing our youth, as active and real-time support to monitor the state of forests, recommend and implement plans for the future of forestry, prevent and suppress wildfires, and manage incidents of state emergencies.

8.3.5 Veterinary Medical Diagnostic Laboratory

By testing hundreds of specimens from around the world every business day, the Texas A&M Veterinary Medical Diagnostic Laboratory (TVMDL) contributes significantly to protecting the health of livestock, poultry, companion animals, exotic animals, racing animals, and wildlife. TVMDL offers a wide range of state-of-the-art diagnostic tests that deliver accurate results promptly and affordably. Veterinarians, owners, industries, and government agencies depend on TVMDL's globally recognized expertise to help preserve animal and public health. TVMDL is among 12 core laboratories in the National Animal Health Laboratory Network, a group of state and regional laboratories designed to provide nationwide surge-testing, response, and recovery capacity in the event of an animal disease outbreak.

TVMDL is composed of two full-service laboratories (in College Station and Amarillo) and two poultry laboratories (in Center and Gonzales). Accredited by the American Association of Veterinary Laboratory Diagnosticians, TVMDL delivers timely, pertinent, and accurate diagnostic test results that are essential for early detection and control of disease.

TVMDL's primary customers are animal owners, veterinarians, and state and federal agencies, including the Texas Racing Commission, the Texas Animal Health Commission, Texas Parks and Wildlife Department, Texas Department of Criminal Justice, and the United States Department of Agriculture.

TVMDL is committed to developing the next generation of veterinary professionals and veterinary diagnosticians, statewide and nationally. Large gaps exist in today's workforce, specifically in large animal and veterinary diagnostic medicine. Partnerships throughout AgriLife develop training programs and externships. TVMDL is involved in providing school-age children an introduction to diagnostic medicine through a Veterinary Science Certificate Program facilitated by The National Center for Foreign Animal and Zoonotic Disease Defense. The program is open to students at participating high schools and 4-H programs, and also as an independent self-study program.

8.4 Prepare Future Generations: Core Strategy to Address Grand Challenges

Texas A&M AgriLife should actively engage in addressing the current state of these challenges. The direct and indirect contribution of each agency to Grand Challenges varies at present. Although youth enrichment is the central theme of the Cohort II capstone project, Texas A&M AgriLife has relevant activities associated with other identified Grand Challenges. Understanding key competencies and resources of each agency is a critical step to strategically position Texas A&M AgriLife for the future. Through our direct engagement with other challenges of the world via teaching, research, extension, and service, our central theme, ***Enriching our Youth,*** is leveraged in various endeavors.

8.4.1 Teaching

The five Grand Challenges were originally identified within the COALS. While it is the most visible pillar within the Texas A&M AgriLife system that is dedicated to teaching, COALS encompasses significant elements of all the Grand Challenges.

8.4.2 Research

Working for knowledge-based solutions in food and fiber production, environmental protection, management, conservation, human health enhancements, food safety, nutrition, and biotechnology, AgriLife Research is actively engaged in improving the efficiency and productivity of agriculture while conserving natural resources and protecting the environment. In collaboration with Extension and social scientists, Research must analyze and evaluate economic and social impacts of implementation, play a role in policy development, and deliver knowledge and knowledge products to the marketplace.

8.4.3 Extension

Working through a locally led framework to identify issues of local concern across Texas, AgriLife Extension leads a grassroots effort to plan, design, implement, and evaluate educational strategies to address these issues. Core to the Extension mission is the empowerment of local change agents to partner with Extension to develop and deliver timely, research-based, unbiased solutions to issues

important to the local citizenry. Each county Extension office serves to extend the discoveries of the institutional staff of COALS and those of AgriLife Research. This partnership ensures that discoveries that promise to positively impact the lives and livelihoods of fellow Texans reach them where they live, work, and raise their families.

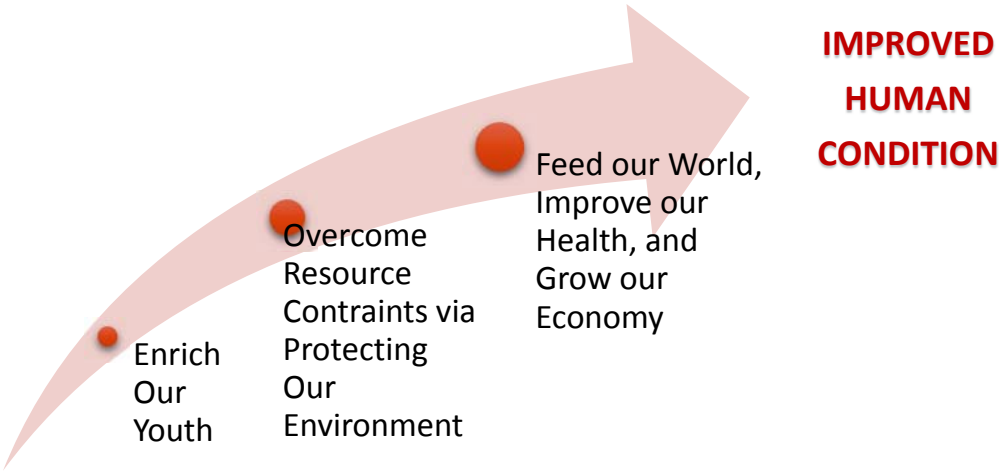
8.4.4 Public Service

Wildfire prevention and property protection; veterinary diagnostic, prevention, and disease management; resource conservation and management; and engaged scholarship are all vital elements to the land-grant system.

8.5 Justification of Core Strategy

Attaining food security **(Feeding the World**), improving health and well-being **(Improving Our Health),** and achieving stable and sustainable economic growth (**Growing our Economy**) are desired outcomes. These objectives must be achieved under the overarching constraint of protecting and managing the environment and renewable resource base that underpins these systems; thus, **Protecting our Environment** is an enabling action to address and overcome this constraint in solution development. Of the five Grand Challenges, **Enriching our Youth** embodies a core strategy by which constraints will ultimately be managed and the successful outcomes of each of the Grand Challenges will be achieved.

Within the framework of the land-grant system, and by acting on this core strategy, we can address these challenges. The components of our system can function in an integrated manner, each fulfilling its role, if this core strategy can be embodied and interpreted across all of our platforms. By doing so, we prepare the foundation for success in other areas, and ultimately, in improving the human condition.



8.6 Summary

Development of people is the solution—developing capacities to learn, to create and apply knowledge, to broaden context, to comprehend the systemic nature of our growing world, and to spur people to take action. The durable solution is ***Enriching our Youth*** to become the intellectual leaders, the action takers, and the problem solvers the world will need for an enduring future.

9 ENRICHING OUR YOUTH APPROACH: A NEW LAND-GRANT SYSTEM WITH STRONG STATEWIDE LEADERSHIP

We have all heard the proverb "*Give a man a fish and feed him for a day; teach a man to fish and feed him for life."* We seek to expand on this adage by teaching people to fish in a manner that sustains the environment of not only their families, but also that of the fish. In doing so, we feed not only men and women but also their children and their children's children. Empowering future generations with knowledge of complex and interdependent issues encompassed within the Grand Challenges helps develop a mindset of self-fulfillment and global responsibility to seek solutions to lead our world. To meet the challenge set out in earlier sections, we recommend the creation of a new system that addresses the global challenges by enriching the needs of youth.

For the first time in land-grant history, each agency will be given the responsibility, backed by budgets, organizational structures, policies, and new freedoms, to make a major impact on enriching the youth throughout the state of Texas. Leaders in each agency will lead these efforts, building upon the important existing role of FFA, Texas 4H and its Youth Development Office, and the Sequor Youth Development Initiative. This strategy will be backed up by a new, dedicated, professional youth worker system. In this way, a fragmented system will coalesce to support local action through funding and the provision of evidence-based programs, data, and professional youth development leadership. This new system will enhance the land-grant system's ability to develop leaders who will design and lead the efforts of **Feeding our World, Protecting our Environment, Improving our Health,** and **Growing our Economy** to improve current and future world conditions. Successfully executing this strategy will result in continued advances in both knowledge development and deployment over time, and will result in the ongoing implementation of ever more innovative methods to improve human lives.

This white paper conceives this new ***Enriching our Youth Approach*** based on principles of empowering people, using transparency to drive accountability, and ensuring that each agency works unhindered to lead efforts throughout the state to enrich the lives of youth wherever and whenever possible.

9.1 THE CHALLENGE

Opportunities for the ***Enriching our Youth Approach*** are legion, but there are also needs for action within the Texas A&M System and throughout Texas communities, including the following.

9.1.1 Texas A&M AgriLife Structure and Policies

- More focus and emphasis on minority outreach throughout the state.
- Identify new efficient delivery processes, travel resources, and income generation strategies to continue to effectively serve the youth of Texas.
- Development of a system that rewards people based on the success of the team rather than the current promotion model that focuses on individual endeavors.
- Increased awareness and understanding of the role and impact that changing demographics will have on the Grand Challenges focus areas.
- Changing Texas demographics should be reflected in agency resources, staffing, and programs in urban areas.

- Policies of promotion and tenure that recognize individual achievement over integrated team success and continued scholarly engagement need to change. The traditional mindset that one must "publish or perish" regardless of job title in order to advance in one's career impacts the level of commitment to engaged scholarship.
- Contributions of the whole team (rather than just individual contributions) in developing partnerships and securing grant funds should be recognized.
- Faculty who participate in 4-H Roundup, on-campus FFA events, summer youth events, and the like should be acknowledged, rewarded, and highlighted.
- A more comprehensive vision of outreach (including Extension, 4-H, FFA, IMS, Texas A&M Forest Service) is needed.

9.1.2 Texas Communities

- Identify and highlight a diverse group of Texans who can serve as role models for all our young people.
- Safe and engaging facilities are needed in communities to engage, equip, and empower youth to become resilient to negative and nonproductive behaviors.
- Increase the extremely low staff-to-youth ratio in urban Extension offices to improve youth program effectiveness in these areas.
- Staff need training in the management and empowerment of volunteers as educators.
- New and continued partnerships are needed with the Texas Education Agency, Texas Workforce Commission, and Raise Your Hand Texas to improve the quality of education by adding multiple pathways to graduation—academic pathways emphasizing math and science or the humanities, or a focus on career and technical education.
- Continued collaboration with the Texas Workforce Commission is needed to fund a skills development grant to work with business consortia and train workers in order to improve their productivity and their knowledge of manufacturing processes.
- Partnerships should be established with charter, parochial, and public schools to demonstrate how the 4-H program can enrich their curriculum and educational experiences and to promote the developmental benefits of a science-based, experiential education.
- The strong association between the Texas A&M System and Texas high school agricultural education and FFA chapters should be emphasized.

9.1.3 Texas Youth

- Expand and Enhance career counseling for low-income and ethnic minority youth. Young people today are constantly surrounded by myriad channels of mass media, but that does not mean they are getting the information they need to make good choices about their future.
- Improve and increase vocational education opportunities. During the last 30 years a shortage of new skilled workers coupled with the graying of those in the field has led to a deficit of skilled workers such as electricians, HVAC techs, carpenters, plumbers, etc.
- Educate youth on the ramifications of leaving high school early in order to enter the oil boom workforce.
- Enhance the science, technology, engineering, and math (STEM) career focus among U.S. youth. This will reduce the reliance on the talent of youth from abroad to pursue graduate and post-graduate levels of research.

- Support underrepresented student recruitment and retention programs.
- Create programs to negate unhealthy lifestyles that include lack of physical exercise, excessive screen time, and poor eating and sleeping habits that can prevent health problems such as obesity, diabetes, and other ailments. Inhibiting these habits lead to improved academic performance and overall physical and mental health of youth.
- Provide inexpensive youth extracurricular opportunities to counter the economic instability and increases in the cost of living that negatively impact the participation of young people in those activities that enrich their lives.
- Work with school counselors to provide positive youth opportunities that compete favorably with the surfeit of competing out-of-school-time distractions.
- Support programs such as Abriendo Puertas, that help families who face the rising cost of higher education, financial insecurity, and lack of stability in the job market. These situaitons negatively affect opportunities for youth from lower-income and middle-income families.

Based on the guiding principles of empowerment, transparency, and unhindered efforts, the new system will promote information-led, knowledge-driven youth development interventions that support national, state, and local youth development efforts. Texas A&M AgriLife, along with 4H and its Youth Development Office and Sequor Youth Development Initiative, may assist in the development of new approaches, such as those offered in public health, that provide clear, practical evidence on how to influence the wider youth development outcomes. These approaches will ensure that the AgriLife system is responsive to local needs and accessible to youth throughout the state. Each of the AgriLife agencies will benefit from this approach. By ensuring a strong central information and dissemination function within the above-mentioned offices, AgriLife will be able to support each agency's workforce effectively and efficiently. AgriLife employees will be critical in developing innovative, structured approaches and in disseminating the services that will impact the lives of Texas citizens.

9.2 Measures of Success

Success of the ***Enriching our Youth Approach*** will be measured by several outcomes. We will know that we are having a positive impact when Texas youth:

- Earn a high school diploma by completing a college preparatory or career and technical education (CTE) course of study requiring the demonstration of college-ready CTE work across the curriculum, with an emphasis on career development, particularly in STEM.
- Achieve expertise by researching, understanding, and developing new knowledge about relevant issues that impact local communities, the state of Texas, the U.S., and the world.
- Learn how to manage their positive development by identifying options, evaluating opportunities, and participating in empowering experiences that will enable them to work and live in a global society.
- Have positive contacts with adult youth workers and youth organizations that have been adequately trained in intergenerational issues, cultural competency, global grand challenges, and intentional youth program development.
- Graduate prepared through the acquisition of knowledge and skills for postsecondary education, work, and service.

- Demonstrate creative and complex thinking and problem-solving skills by analyzing and producing viable solutions to problems with no known or single right answer.
- Make decisions that enhance their physical, mental, social, and emotional well-being.
- Have opportunities to increase and improve positive social relationships.
- Understand how the world's people and institutions are interconnected and how critical international economic, political, technological, environmental, and social systems operate interdependently across nations and regions.
- Accept responsibilities of global citizenship and make ethical decisions and responsible choices that contribute to the development of a more just, peaceful, and sustainable world.

9.3 SUMMARY

This white paper provides a foundation on how Texas A&M AgriLife within the land-grant system, can seize on these opportunities to improve the developmental outcomes of youth throughout the state of Texas and equip each young person with the knowledge and skills necessary to be successful in solving the world's Grand Challenges. The new proposed land-grant system will:

- Have a strategic focus on information-led, knowledge-driven youth development interventions.
- Focus on practical evidence on how to influence youth development outcomes.
- Be responsive to local needs and accessible to youth throughout the state.
- Develop a strong central information and dissemination function.
- Work effectively and efficiently across society through individuals, families, local communities, and public, private, volunteer, and community sectors to address youth risks statewide.
- Provide AgriLife employees with critical oversight and independence to develop and implement youth-based services and programs.

10 ENRICHING OUR YOUTH APPROACH: MAKING IT HAPPEN

Enriching our Youth secures a safe, healthy, and prosperous future by equipping those entrusted with the development of Texas youth to address complex, interrelated challenges. The land-grant system organization is uniquely qualified to immediately and directly influence our youth in a positive direction, while indirectly generating knowledge, resources, and capacity to ensure they thrive. Programs affecting our youth will have less impact if we do not also acknowledge potential existing barriers to success in achieving Grand Challenges that are not necessarily specific to youth. Barriers may be external or internal to the land-grant system. We need to consider how to secure a brighter future by identifying key obstacles that can be addressed through strategic alignment of our own resources, and by directing efforts to influence potential external barriers related to agriculture and life sciences. While our focus is on ***Enriching our Youth***, it is necessary to identify key organizational barriers that will need to be overcome for the youth to address the Grand Challenges they will face. Finding solutions will require an integrated effort, vision, passion, the expertise of all the elements within Texas A&M AgriLife, and a commitment to the cause.

10.1 BARRIERS

A few key existing potential organizational barriers in Texas A&M AgriLife, whether structural, cultural, or financial, have been identified so that possible solutions can be addressed.

10.1.1 Structural

- The clients of Texas A&M AgriLife, especially the youth, increasingly communicate using rapidly evolving technology-based methods. Program delivery methods and materials should be designed and updated to reflect predominant systems of information exchange and should be flexible to technology dynamics.
- A lack of coordination between departments, COALS, and the agencies can lead to duplication of services. Reward those units that exhibit exemplary synergism because they work together.
- Research, extension, and service activities benefiting humans, animals, plants, and the environment do not always operate within a systems approach; instead, they often emphasize individual accomplishments instead of fostering interdisciplinary approaches and a broader approach to problems. Acknowledge those groups that exemplify effective teamwork.
- System policy is not always conducive to evolving and creative initiatives. Encourage faculty, staff, and administrators to identify policies that prevent or hinder futuristic efforts.

10.1.2 Cultural

- Some current agricultural practices deplete essential ecosystem services, cause overconsumption of natural resources, contribute to negative environmental impact, and decrease biodiversity and ecosystem resilience. Changing management practices can yield significant improvement in delivery of ecosystem services, but to adequately meet future challenges, ecosystem restoration initiatives need to be implemented on a far larger scale than has historically been considered.
- Development and use of integrated teams across agencies to enhance program delivery in a more efficient manner can be improved, resulting in far-reaching solutions.

- Most environmental research is focused on understanding aspects of ecosystem function and conservation without considering humans as part of the environment. Industrial agriculture have increased food production capacity but does not always adequately account for compromises in human health impacts. The connection between soil and environmental health and human health is poorly understood. Understanding social inclusion should be a research priority.
- Current organizational culture rewards reductionist, small-scale investigations under fixed conditions instead of multi-disciplinary team approaches that consider complex interactions, systems in unique landscapes, and ever-changing environments. Reward interdisciplinary teams.
- Despite all of the evidence of safety, genetically modified plants that resist pests and common diseases or grow in harsh conditions such as extreme temperatures and with limited water are still feared by the general public. To meet future food demands, industry must educate consumers, including youth, as well as the media, in order to counter unfounded fears.

10.1.3 Financial

- There is a chronic shortage of cross-disciplinary technical knowledge and tools to provide support for agricultural managers to achieve land use that improves human livelihood, human well-being, and the environment. Hiring these types of cross-disciplinary experts within AgriLife will position it to solve complicated problems in the future.
- Current mainstream economic calculations (in the U.S. and especially abroad) do not include the full costs to society and to the environment of land management practices and inputs; such calculations hide what is actually sustainable and decrease future earning capacity. Expanding research initiatives, especially value chain modeling that encompasses the environmental and human dimensions, are essential in solving global problems.
- International trade has occurred for centuries, and political boundaries have little economic significance. If globalization has the capacity to increase material wealth, protectionism can be a barrier to progress. Clearly understanding the effects of protectionism and disseminating the results is a key to continued economic growth.
- Oil booms (in Texas and nationally) may lure young people, especially those just deciding on educational and career opportunities, away from Texas A&M AgriLife. If our agencies cannot offer competitive salaries, they will have difficulty recruiting and retaining employees.
- Reduction in federal, state, and local funds has negatively impacted the ability of AgriLife personnel to travel across Texas to support educational programs and conduct research. Creative and efficient strategies are needed to curb the negative financial effects.
- The increasing burden of institutional compliance policies takes valuable time to address and reduces time available to devote to solving problems. Encourage faculty, staff, and administrators to identify policies that prevent or hinder futuristic efforts. Making the process efficient will be an upper administration decision.

10.2 Enriching Our Youth Approach: Vital Elements

We strongly encourage coordinating expertise toward interdisciplinary systems approaches, team-based activities, and investing in innovative people and technology. We envision that the ***Enriching our Youth Approach*** will be known for its:

Integrated Effort — All Texas A&M AgriLife units can make meaningful contributions. To be successful, integrated efforts and strategic alignment of resources are required and should be the foundation for rewarding success.

Vision and Passion — The AgriLife Advanced Leadership Program is an excellent effort to educate personnel across COALS and the agencies on the resources and possibilities existing within the organization and to spread the news both internally and externally on the contributions of the land-grant system within Texas.

Expertise — AgriLife employees, whatever their discipline and wherever they work, will be well trained and will utilize their expertise to assist in the development and implementation of evidence-based programs and services for youth.

Commitment to the Cause — Success in any challenging endeavor is contingent upon focused and continued effort. Consistent communication of vision, recognition of participants, and emphasis on progress are important. Equally important are the avoidance of distracting alternatives and the loss of focus on purpose and objective, which can create the illusion of success in some areas but will likely lead to long-term failure to accomplish the mission.

10.2.1 Integrated Effort

- Increase K-12 and higher education student development support, leadership, and professional development opportunities.
- Evaluate youth development-focused programs offered across COALS, the agencies, system members, and institutions and look for potential areas of collaboration.
- Dedicate resources to the development of technology-driven outreach methods. Encourage, through credible scientific research, demonstration, and service projects, the development and adoption of more programs that address youth issues.
- Design a process to identify and create thematic and emerging areas of integrated programs. Translate and disseminate knowledge through strategic collaboration across disciplines through education and outreach.
- Engage the community through access to educational programs, out-of-school-time experiences, parks, and recreational activities. Inculcating awareness of healthy lifestyles and good social habits can result in disease prevention and better quality of life. Formal and informal education, degree programs, certificates, and continuing education efforts focusing on healthy food and lifestyle choices can contribute to improvement in overall health.

10.2.2 Vision and Passion

- Position Texas A&M to be the go-to institution for the training and education of stakeholders for youth-based programs and services through development of the Sequor Youth Development Initiative and youth development higher-education programs.
- Implement third-party evaluation of management practices and research results aimed at eliminating the agricultural industry's negative impacts on the environment in order to improve future processes for today's youth to handle tomorrow's challenges.
- Through teaching, research, extension, and service, encourage change that minimizes negative impacts on our resources while addressing future global needs.

- Invest considerable effort into developing problem-solving aids that take into account the multiple facets involved in making decisions and that integrate current knowledge and technology that impact environmental and human health.
- Ensure that research and outreach are issue-based and involve multidisciplinary teams where it makes sense. Encourage a balanced combination of reductionist research with systems investigation to more fully address the complex, multi-faceted issues our youth will manage in the future.
- Organize cross-disciplinary teams that are financially and programmatically supported to deal with the many complex systems interactions.
- Support the development and use of increasingly effective and efficient technology in order to meet future challenges. In particular, research dedicated to regenerative agricultural systems (19) will help ensure that resources are used more sustainably. Such regenerative systems need to include: 1) more efficient use of energy and other inputs; 2) routine life-cycle analysis and costing; 3) calculation of the full costs to society of farm practices and inputs such as fertilizers and pesticides as well as the full costs of food processing and manufacturing; 4) high levels of management expertise; and 5) high ecosystem biodiversity, function, and resilience.
- Recruit and hire a more diverse workforce and provide training to faculty and staff on relating to diverse cultures.

10.2.3 Expertise

- Utilize existing extension and college programs and experts that are specific for youth development to meet future challenges.
- Capitalize on research programs at the college and agency level that have existing expertise on separate portions of system components dealing with health, education, social issues, and the environment.
- Share the existing expertise that service and diagnostic agencies have in the latest communication and technological delivery systems with other system components.
- Encourage the continuation of the strong interface between college and agency research; between research, extension, and diagnostic laboratories; and between extension and service agencies.
- Continue to explore mechanisms to strategically align expertise within all of AgriLife.

10.2.4 Commitment to the Cause

10.2.4.1 Financial

- Provide professional development opportunities to faculty and staff to enhance their abilities to address youth-related issues.
- Offer incentives and rewards for faculty and staff who participate in youth-based initiatives.
- Provide seed funding for internal grant programs to support teams that design and deliver youth-based educational, service, and social action programs.
- Modify our current metrics system so that instead of rewarding individuals (leading to maximization for self), multidisciplinary teams are rewarded for developing integrated solutions for our major issues.

- Develop products, resources, and knowledge that contribute to desirable outcomes, and develop solutions with the end user in mind.
- Where goals are aligned, provide opportunities to partner with private foundations and companies to deliver common programs.

10.2.4.2 Policy

- Develop policies and procedures, including financial support, that encourage interstate and intrastate collaborations.
- Develop additional opportunities for interdisciplinary and inter-institutional agreements to solve state and global challenges.
- Dedicate resources to address the advantages and challenges of free trade as one of the keys to globalization and to counteract misperceptions of anti-globalist protectionists.
- Position Texas A&M AgriLife as an expert on institutions that are important for promoting freer international trade.
- Incorporate the health of our youth into current farm policies that currently promote only efficiency at the expense of health and environment.
- Support the High Impact Experiences program (in the Department of Agricultural Leadership, Education, and Communications), especially its global efforts.

10.3 Achieving Excellence

Texas is changing, and so is the world. One overarching theme among agricultural and life science professionals is managing a growing population with finite resources. Our numbers are not just growing, they are changing. The Grand Challenge of **Enriching our Youth** means reaching and engaging more of our youth, as demographics have changed from rural to urban, with increasing diversity. To that end, *how will we achieve excellence within the measures of success?*

- *To win and overcome cost of higher education barrier:* Maintain an affordable cost and reasonable access for higher education institutions; subsidize tuition to make education accessible for all. This will result in reduced debt on youth when they graduate and increase the percentage of youth earning undergraduate degrees and pursuing post-graduate and advanced training in their respective careers.
- *To win and mitigate health risks barrier:* Promote health and wellness of youth through educational campaigns that disseminate information via integrated efforts by schools, colleges, universities, and communities. Implement and monitor these educational programs on the local, state, and national levels.
- Focus on efforts to reach underserved young people in urban and rural environments.
- Strengthen collaboration, interaction, and visibility with Historically Black Colleges and Universities (Prairie View A&M) and Hispanic-Serving Institutions (Texas A&M International, Texas A&M Corpus Christi, Texas A&M Kingsville, and Texas A&M San Antonio).
- Collaborate among agencies to identify key initiatives related to youth enrichment and develop a systems approach to secure funding from both public and private sources to address these initiatives; reward agencies that collaborate on these efforts.

- Create a team representing each agency and COALS to partner with the Texas Education Agency to design, develop, and deliver a coordinated STEM program in Texas public schools.
- Offer career guidance at early stages in life through appropriate channels and thus equip youth to make proper and well-informed career decisions and create a sense of academic achievement and college readiness.

10.4 Delivering the Message as Well as the Promise

While each individual agency within Texas A&M AgriLife may feel more or less invested in each of the Grand Challenges, we are all invested in the success of our youth to equip them with the tools necessary to face future challenges. This message is likely to appeal to a broader audience than the traditional agriculture base. Effectively communicating Texas A&M AgriLife contributions to society should reach to all stakeholders.

- *To policy makers/legislators:* We must quit relying on someone else to tell our story. We need to release the creative power of each and every employee of the land-grant system to tell our story. It is imperative that each agency of Texas A&M AgriLife systematically develop a mechanism to ensure that the positive things we are doing do not go unnoticed by federal, state, and local elected officials. We must quit worrying about being seen as lobbyists and be more concerned that what we do for the good of the state, country, and world is showcased whenever possible.
- *To public/taxpayers:* We need to highlight clear examples of how we are addressing real problems through integrated teams with effective solutions in a manner that uses taxpayer funds very wisely. For every dollar invested by taxpayers, we are returning approximately $5 in research, education, and service benefits. We also need to cite examples of the "public good" benefit of our efforts, such as reducing off-target losses of pesticides through the introduction of Integrated Pest Management, controlling soil erosion through grazing lands management, reducing childhood obesity through exercise and nutritional learning, and so forth.
- *To end users:* We also need to think how we directly and positively impact those we serve. For example, we provide a cost-effective method for agricultural producers to secure a private pesticide license and maintain the required continuing education requirements of the Texas Department of Agriculture. This, in turn, benefits the public good in that agricultural producers are continually trained in the latest application techniques and technologies that reduce risks associated with the use of crop protection chemicals.

It is important that we appropriately define our core strategy in an inclusive manner, with respect instead of contempt, for various viewpoints.

- Succinctly define our mission instead of letting others define our mission for us.
- Clearly communicate our value proposition to all of society, not just the agriculture sector.
- Formulate a message that emphasizes how agriculture and life sciences directly impact all sectors of our society.

10.5 SUMMARY

The ***Enriching our Youth Approach*** will need substantial support from the AgriLife system programs. Currently, AgriLife has many internal and external barriers that must be addressed in order for this approach to achieve success. The ***Enriching our Youth Approach*** has identified these barriers and has provided key elements to serve as guiding principles for overcoming them. The success of the ***Enriching our Youth Approach*** will require an integrated effort, vision and passion, expertise, and a commitment to the cause by all within the AgriLife system.

11 CONCLUSION

Our goal is to draw attention to the serious issues facing our youth now and in the future. Meeting the Grand Challenge of **Enriching our Youth** is not simply a youth development issue. This Grand Challenge is intertwined with *all* the Grand Challenges facing society. These Grand Challenges are complex and at times overwhelming. The Grand Challenges run the risk of overwhelming our human capital and current available resources. But failure to meet these Grand Challenges will be catastrophic on a system level and for the global community as a whole. It is, therefore, the mission of the land-grant system to more clearly understand, define, and address each Grand Challenge. We seek solutions rather than answers—solutions formulated and delivered by integrated teams representing all agencies and units of Texas A&M AgriLife. Such a quest will require each of us in the land-grant system to rethink how we do business and to reallocate human capital and other system resources. We have to break out of our individual silos and build internal relationships and external partnerships to harness the creative capacity of Texas A&M AgriLife and our stakeholders to ensure we are around for another 150 years and that the global community not only survives but thrives in a manner that is environmentally and economically sustainable.

The land-grant system in general, and the Texas A&M University System in particular, is designed to generate enduring solutions to the complex problems of the world. The true solution is the sustained creation of knowledge and its application to the complex and dynamic challenges that will continue to emerge. **Enriching our Youth** and developing them as adults through continued training and knowledge acquisition is the critical path to success in achieving the desired outcomes. Through a sustained strategy of experiential learning, delivered at the local level, the land-grant system is well positioned to achieve the desired outcomes that **Enrich our Youth** today to be leaders tomorrow.

12 SOURCES

1. Accelerating achievement of the MDGs by lowering fertility: Overcoming the challenges of high population growth in the least developed countries. *Population Facts* No. 2010/5. United Nations Department of Economic and Social Affairs, Population Division.
2. Balmford, A., Bruner, A., Cooper, P., Costanza, R., Farber, S., Green, R. E., Jenkins, M., Jefferiss, P., Jessamy, V., Madden, J., Munro, K., Myers, N., Naeem, S., Paavola, J., Rayment, M., Rosendo, S., Roughgarden, J., Trumper, K., and Turner, R. K. 2002. Economic reasons for conserving wild nature. *Science* 297(5583):950-953.
3. Bloom, David E. 2011. 7 billion and counting. *Science* 333(6042):562-569. (Author affiliation: Department of Global Health and Population, Harvard School of Public Health.)
4. Borlaug, Norman E. 2000. "The Green Revolution Revisited and the Road Ahead." Special 30th Anniversary Lecture, The Norwegian Nobel Institute, Oslo, September 8.
5. Costanza, R., d'Arge, R., de Groot, R., Farber, S., Grasso, M., Hannon, B., Limburg, K., Naeem, S., O'Neill, R., Paruelo, J., Raskin, R.G., Sutton, P., and van den Belt, M. 1997. The value of the world's ecosystem services and natural capital. *Nature* 387:253-260.
6. Daily, G.C. 1997. *Nature's Services: Societal Dependence on Natural Ecosystems*. Washington, DC: Island Press.
7. Emerging-market cities. 2012. *The Economist Online* (April 24). http://www.economist.com/blogs/graphicdetail/2012/04/focus-4
8. Erlich, P. and Erlich, A.. 1996. *Betrayal of Science and Reason: How Anti-Environmental Rhetoric Threatens Our Future.* Washington, DC: Island Press.
9. Grice, A.C. and Hodgkinson, K.C. 2002. Challenges for rangeland people. *In: Global Rangelands: Progress and Prospects,* Grice, A.C. and Hodgkinson, K.C. (Eds.). New York: CABI Publishing.
10. History of Texas A&M AgriLife. n.d. Texas A&M AgriLife. http://agrilife.org/about/history/. Accessed November 23, 2013.
11. Kreuter, U.P., Harris, H.G. Matlock, M.D., and Lacey, R.E. 2001. Change in ecosystem service values in the San Antonio area, Texas. *Ecological Economics*, 39(3):333-346.
12. Land-Grant Mission, The. n.d. Texas A&M AgriLife. http://agrilife.org/about/land-grant-mission/. Accessed November 23, 2013.
13. Millennium Ecosystem Assessment. 2005. *Ecosystems and Human Well-being: Synthesis*. Washington, DC: Island Press.
14. National Intelligence Council. 2012. *Global Trends 2030: Alternative Worlds.* NIC 2012-001. Office of the Director of National Intelligence. http://www.dni.gov/nic/globaltrends
15. Olewiler, N. 2004. The value of natural capital in settled areas of Canada. Published by Ducks Unlimited and the Nature Conservancy of Canada. 36 pp.
16. Pearson, C.J. 2007. Regenerative, semiclosed systems: a priority for twenty-first-century agriculture. *Bioscience* 57(5):409-418.
17. Searchinger, T., et al. 2014. *Creating a Sustainable Food Future.* World Resources Institute Report 2013-2014: Interim Findings. World Resources Institute and partners.
18. Texas A&M AgriLife. 2013. http://agrilife.org/. Accessed November 2, 2013.

19. United Nations. 1987. *Report of the World Commission on Environment and Development: Our Common Future.* Annex to document A/42/427—Development and International Co-operation: Environment. http://www.un-documents.net/ocf-ov.htm
20. United Nations, Department of Economic and Social Affairs, Population Division. 2011. *World Population Prospects: The 2010 Revision, Volume I: Comprehensive Tables* ST/ESA/SER.A.313.
21. United Nations, Department of Economic and Social Affairs, Population Division. 2013. *World Population Prospects: The 2012 Revision, Volume I: Comprehensive Tables* ST/ESA/SER.A.336.
22. United Nations, Department of Economic and Social Affairs, Population Division. 2013. *World Population Prospects: The 2012 Revision, Key Findings and Advance Tables.* Working Paper No. ESA/P/WP.227.
23. Wackemagel, M. and Rees, W.E. 1996. *Our Ecological Footprint: Reducing Human Impact on the Earth*. Gabriola Island, BC, Canada: New Society.
24. Walker, B.H., Holling, C.S., Carpenter, S.R., and Kinzig, A.P. 2004. Resilience, adaptability and transformability in social–ecological systems. *Ecology and Society* 9(2):5. http://ecologyandsociety.org/vol9/iss2/art5.
25. Walker, B.H., Abel, N., Anderies, J.M., and Ryan, P. 2009. Resilience, adaptability and transformability in the Goulburn-Broken catchment, Australia. *Ecology and Society* 14(1):12. http://ecologyandsociety.org/vol14/iss1/art12.
26. Zhao, B., Kreuter, U., Li, B., Ma, Z., Chen, J., and Nakagoshi, N. 2004. An ecosystem service value assessment of land-use change on Chongming Island, China. *Land Use Policy* 21(2):139-148.
27. 4-H Study of Positive Youth Development. n.d. Institute for Applied Research in Youth Development, Tufts University. http://ase.tufts.edu/iaryd/researchPositive4H.htm.

13 AGRILIFE ADVANCED LEADERSHIP EXECUTIVE COMMITTEE

The AgriLife Advanced Leadership Program executive committee provides the oversight and implementation of all facets involved in the operations of the program including the curriculum, activities, and assignments. The contributions of the committee members make it possible for advanced leaders from across AgriLife to participate in a rewarding program designed to enhance their leadership and personal development skills.

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