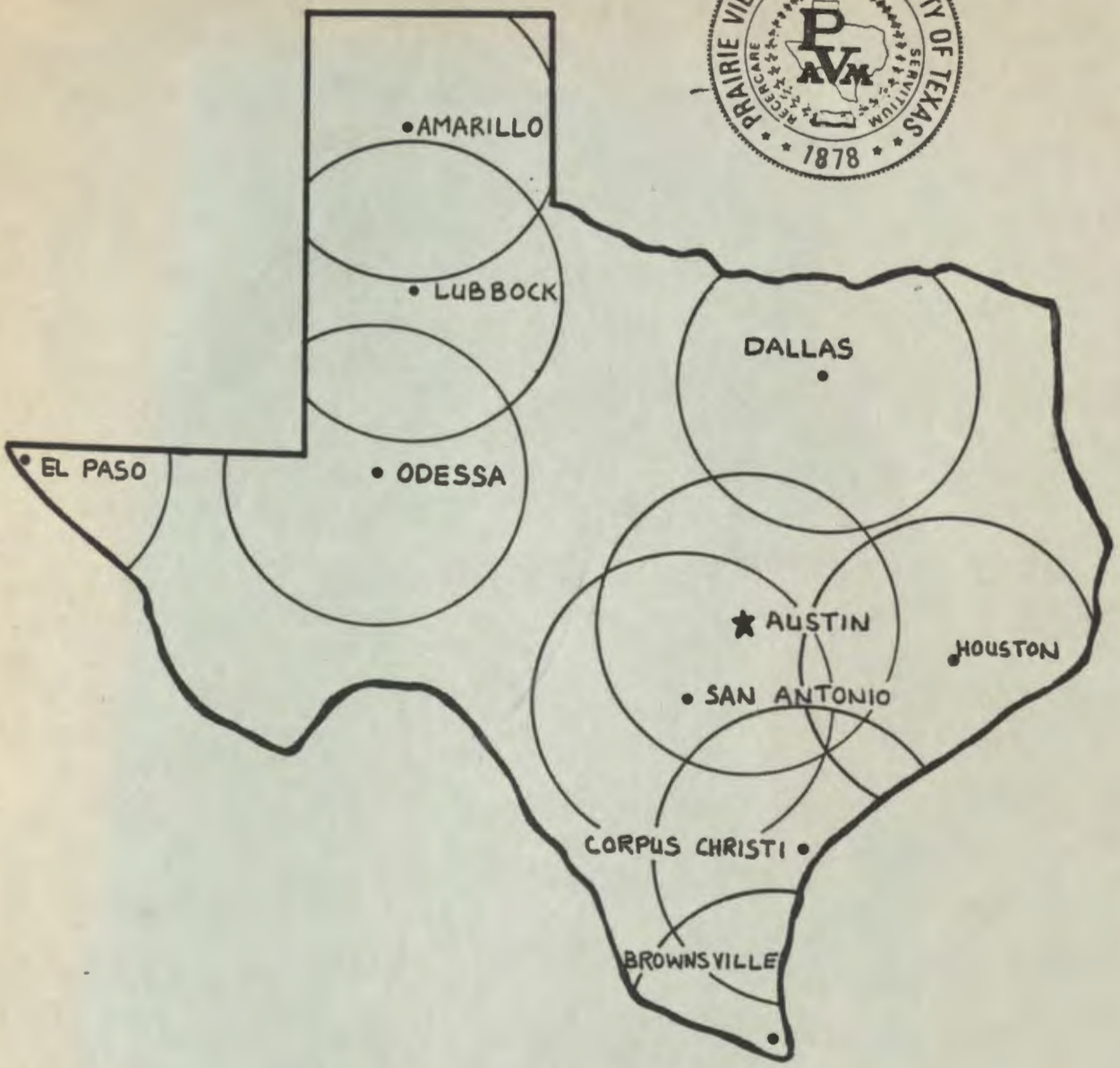
1984

PVAMU Agriculture Rural / Urban Interface - 1984

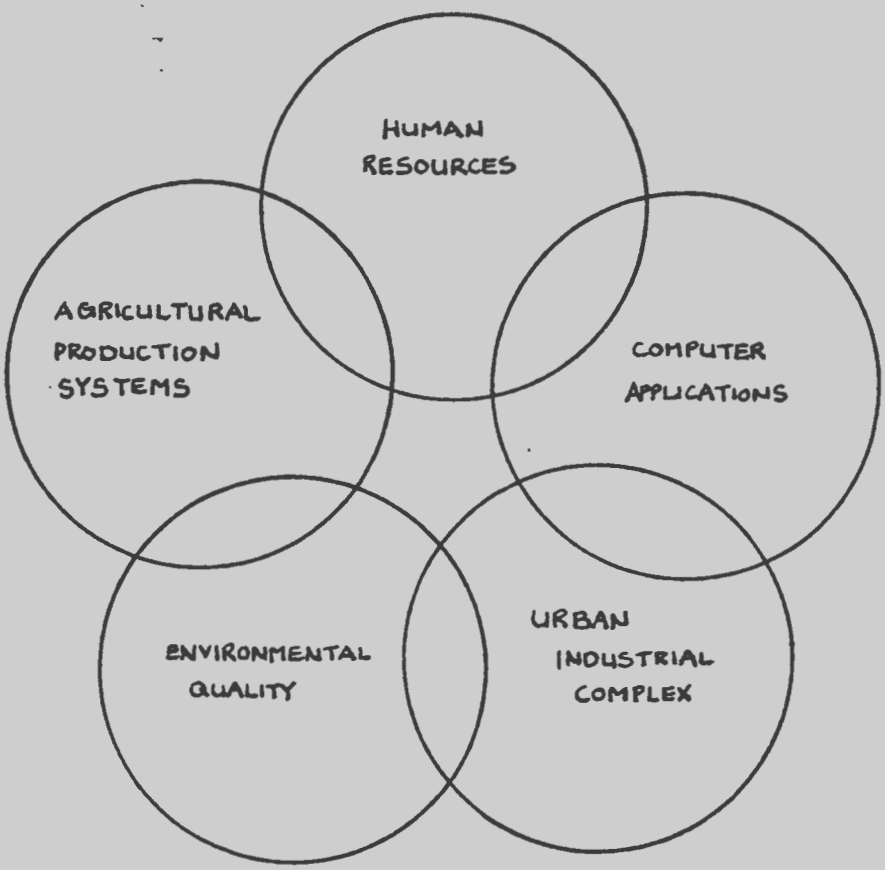
Prairie View A&M University



AGRICULTURAL RESEARCH MODEL

Rural/Urban Interface

Agricultural Research Model



1:1 Rural/Urban Interface

PRAIRIE VIEW A&M UNIVERSITY
COLLEGE OF AGRICULTURE

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AGRICULTURAL RESEARCH MODEL

RURAL-URBAN INTERFACE

Spurred by fast-paced technological advances, the agricultural industry once again finds itself on the threshold of another technological revolution. The industrial revolution of the 1930's ushered in a new era in which the agricultural industry flourished for more than fifty years. However, recent developments in communication and transportation associated with the "computer age" have, for the most part, rendered traditional agricultural systems obsolete. At the same time, some areas of the U.S. are experiencing dramatic population growth.

Changing Scene

Population pressure could very well be one of the primary problems facing Texas agriculture in the years ahead. The population of the state is growing at a rapid rate, while the state's capacity to safely supply food and fiber for this growing population is being eroded. Nearly all of the population growth is occurring in the urban areas, and the resultant urban sprawl creates serious implications in how the farm sector reacts to the economic and social dynamics of the cities and vice versa.

Texas Metropolitan Areas
Population

City	*1970*	*1980*
	thousands	
Houston	*1,233*	*2,904*
Dallas/Fort Worth	*1,237*	*2,974*
San Antonio	*654*	*1,071*
Austin	*252*	*536*
El Paso	*322*	*479*
Beaumont/Orange	*197*	*375*
Corpus Christi	*204*	*326*
McAllen/Edinburg	*70*	*283*

Since the influence of highly dynamic metropolitan areas extends well beyond their geographical boundaries, and whereas the state has several urban population centers, all sectors of the state are being impacted by urban population growth. The radius of influence of

current cities is likely to expand in the future and new population centers are likely to emerge as well.

As commercial and industrial activities increase and expand in the urban centers, farming activities will change in the surrounding areas and these factors could result in a modernization of the agricultural environment. Thus, it is predictable that most of the farming activity near urban centers could be very favorably impacted in rather significant ways during the years ahead as the population of the urban areas of the state doubles over the next 20 or 30 years. At the same time, the increased output in foodstuffs to meet the needs of the growing population will have to be accomplished in a more modern, more highly technological environment than that which has existed in the past.

Further, as urban and rural areas became more closely interrelated, it will became increasingly difficult to prevent adulteration of the food chain. Therefore, it will became necessary to shift to more controlled, intensive operations to sustain a viable agricultural industry and protect consumers from harmful chemicals. Also, it will be more economical and efficient to produce foodstuffs in nearby centers of consumption. It certainly will be unwise to continue to transport food supplies over long distances in view of the rising cost of energy.

Technological Development

The risk of contamination of the environment, particularly the food chain, increases as the urban-industrial complex encroaches upon the countryside. The agricultural research program at Prairie View A&M University focuses on the relationship between agricultural production and processing systems and the urban-industrial complex. The effect of this interaction on the quality of the environment and human resources, and how computer technology can be used to manage information attendant to these concerns will be evaluated. In this context, the interactions between human and natural resources, and between cities and the countryside, are the primary areas of concern for agricultrual researchers at Prairie View A&M University.

In recognition of the dramatic social and economic changes, the College of Agriculture is committed to "Facilitating the development and application of new agro-industrial technologies that foster safe and efficient production and distribution systems for food supplies while minimizing contamination in the food chain."

The agricultural research program is designed to investigate selected factors associated with the relationships between the expanding urban and shrinking rural environments. The program is organized into five interrelated program areas:

1. *Crop Sciences - Research efforts in Plant and Soil Science are directed towards developing techniques for enhancing the productive capability of natural resources in urban-fringed areas.*

2. *Animal Sciences - The research program focuses on small ruminants, swine and poultry, and examines issues with respect to improving the quality and wholesomeness of animal products as they are produced and moved through marketing channels.*

3. *Environmental Quality - Research projects in environmental quality seek to determine the extent of pollution occurring in the rural environment caused by urban - industrial activity, and to assess the magnitude of toxic chemicals moving in the agricultural food chain and develop procedures to lessen the impact on human health.*

4. *Human Resources - Social problems associated with urban sprawl manifest themselves both positively and negatively on residents living in close proximity to urban centers. The research program investigates the extent of the impact of urban encroachment on rural life and develops methods for improving the educational level, nutrition level, and management capability of residents living in urban-fringe areas.*

5. *Computer Technology - Research is being conducted to determine appropriate computer application to all program areas (crops, livestock, environmental quality and human resources) and the use of computers to manage information relative to these programs.*

AGRICULTURAL RESEARCH OBJECTIVES

1. Develop and implement systems for appraisal and characterization of Texas soil resources, and develop guidelines for use and management of soil for non-agricultural purposes. (1.01)

2. Design models for assessing pollutants in the pathways of the agricultural food chain, and determine the impact of environmental degradation on the quality and safety of food products. (1.04, 8.00)

3. Develop techniques for assessing the energy requirements and devise energy management systems for food processing enterprises. (1.08)

4. Develop techniques for improving the quality of vegetables, determine the impact of environmen- tal stress on yield and quality, and design alternate production and marketing systems. (3.14)

5. Improve post-production care and handling techniques to enhance the quality and shelf-life of ornamental plants. (3.15)

6. Develop methods for determining the effects of selected diets on the quality of pork and poultry meat in relation to palatability, tenderness, fat content and caloric value; and evaluate the side-effects of antibiotics and hormones on the quality and safety of pork and poultry products. (4.03, 4.05)

7. Develop methods to improve the reproductive and production efficiency of dairy goats through improved nutrition management and health care. (4.04)

8. Design agricultural information models to reflect the needs of changing clientele characteristics and develop techniques for determining the impact of urban expansion on rural societies. (5.03)

9. Develop management strategies for control of food, fiber and structural pests. (5.04)

Rationale

RP 1.01 Soil and Land

Soil is our most important natural resource. A fundamental understanding of soil - its pattern of occurrence, processes and reactions is basic to the extension of our present knowledge and future breakthroughs for enhanced food, feed and fiber production. This resource is intimately interwoven into current state, regional, and national policies and deliberations on energy, food production, surface mining, biological nitrogen fixation, environmental quality, land use, erosion, taxation and economy.

Millions of dollars in income are unrealized by Texas clientele each year because soil, our basic resource which sustains us, is imperfectly understood, poorly utilized, or disregarded. While climate, energy, nutrients, water, chemical and plants are necessary ingredients for a food, feed, and fiber industry, none are viable without soil. Over 300 million dollars worth of fertilizer are applied for crop production each year but only 50 to 70% of the nitrogen and 15 to 20 % of the phosphorus are utilized by the crop in the year of application. Fertilizer is the single most expensive input to the production system. The utilization efficiency of fertilizer, moisture and energy could be doubled with the development of more effective irrigation methods, soil management practices and cropping systems. Production systems that rely on poor quality irrigation water and saline soil conditions must be developed for expanding sectors of the state. Substantial amounts of money could be saved if soil potentials were developed and fully considered in the construction and maintenance of roads, residential buildings, subsurface utilities, drainage systems, waste disposal systems, landscaping and surface mine reclamation.

Catastrophic consequences have beset prior civilizations who neglected their soil resource. Soil undergirds and transcends all commodities of urban and agricultural interests. It behooves Texans to use wisely their declining soil resource which serves as the foundation and essence of human welfare, the home of natural resources and the repository for waste products.

To successfully accomplish the above goals, a complete understanding of the chemical and physical properties of soil which determine utilization of water and nutrients and controls the soil biological population must be actively pursued.

RP 1.04 Environmental Quality

Environmental quality issues such as water pollution, air pollution, soil degradation and chemical residues impact agricultural productivity in a variety of ways. These include environmental regulations, reduced natural resources, and health hazards. The long range goal of agricultural research in Texas is to maximize the economic return to the state using the renewable natural resources available. Implied in this goal is the need to preserve the rich natural resources for future agricultural productivity and to prevent or minimize environmental quality degradation. These will impact on

nearly every research objective or goal.

Environmental regulations tend to increase the cost of producing, processing and marketing agricultural products. It is likely that agriculture will be faced with more environmental regulations in the future with justifications based on preventing health and safety hazards and preserving our natural resources. The merit of these regulations will be the subject of much debate with one side citing the need for a quality environment and preservation of natural resources and the other emphasizing how the cost of compliance reduces productivity and increases the cost of production. The long range goal of a sustained agricultural productivity cannot ignore environmental quality issues.

The future of agriculture in Texas cannot be independent of the urban population in our state. Water runoff from agricultural operations can eventually be used as drinking water in Houston and other cities. Particulate emissions from agricultural processing facilities can impact the air quality of the public in the surrounding community. Pesticide residues in grain and citrus could result in problems for the public. Agricultural research efforts directed at improving future profitability and productivity cannot ignore the pervasive environmental quality issues.

RP 1.08 Energy

Energy is essential for producing all agricultural commodities and changes in prices and availability of fuels impact directly on agriculture. Recently, energy prices have tended to stabilize for most fuels, but most analyses indicate that this is only temporary. The present surplus of crude oils is only temporary and projections indicate future shortages. Instability of governments in many of the oil producing areas keeps energy supplies unpredictable.

Texas agriculture possesses unique energy-related characteristics. It does not use a large percentage of the state's total energy use, but it is vital that this energy continue to be available when it is needed. Farmers spend about $925 million annually for energy to produce crops. About half of this is for diesel and gasoline used for field machinery and transportation. Most of the rest is used for natural gas and electricity used in pumping irrigation water. Emergency sources as well as cheaper sources of these fuels are needed to maintain low prices on agricultural commodities.

Significant accomplishments have been made in conservation which are directly attributed to TAES research. Energy conservation through improved irrigation, machinery, and management are examples. Other research such as agriculturally derived fuels, has provided basic information for developing alternate sources if needed. There remains a need for sustained research to assure transfer of the technology.

Long range problems of energy availability have not vanished and must continue to be addressed. Research identified as energy with its goal has decreased in TAES in terms of Science Years. More

importantly, there appears to be significant needs which are being addressed, such as, The Need to Develop Information Systems for Energy Management in Agriculture. With increased reliance on computer technology, research needs to be identified and initiated in this area.

RP 3.14 Vegetables

Texas ranks third nationally in the annual production of 24 vegetable crops. These crops are produced on 300,000 acres and have an estimated $1 billion dollar economic impact on the state's economy. The vegetable industry in Texas is expanding and has experienced a 10 percent increase in acreage since 1981. Ninety percent of the vegetable acreage is allocated to fresh market vegetable production.

Although geographic and climatic factors encourage year round production of many vegetables, these same environmental variables impose problems on the economics of production and yields of vegetable crops. To offset the chronically low yields of all but two vegetable crops grown in Texas, intensified research programs need to be implemented to improve mechanization and all other aspects of production, harvesting and handling. Developing new pest and stress-tolerant cultivars and integrating disease, insect and weed control management will have a large impact on yield and quality. Effective marketing strategies need to be developed if the industry is to continue to expand. The improvement of quality and nutritional value both in the fresh and processed product through appropriate research efforts will result in an increased demand for and production of vegetables in Texas.

RP 3.15 Ornamental Plants

The ornamental plant industry in Texas is one of the largest and fastest growing industries of this type in the U.S. with a wholesale value of nearly $400 million and a related retail value of more than $2 billion annually. Ornamentals encompass nursery and field producers of landscape plant material, greenhouse and nursery producers of trees, shrubs, vines, foliage, flowering and bedding plants and cut flowers as well as groups involved in the distribution, marketing and use of these commodities. In addition to its economic importance, the ornamental industry is valued for its aesthetic benefits to the human living environment at the home, in social, recreational, and business settings, both urban and rural.

The basic pool of knowledge generated through research on ornamental plant culture is very small. Improvements must be made in ornamental plants to allow a lower intensity of culture, particularly in terms of water and energy resources. If restrictions are imposed because of demands for these resources, the use of ornamentals will be drastically impaired, thus creating a decline in the quality of life.

Another concern is the expected concentration of people in urban centers, directing more of their time to home and local recreational

facilities. The result will be an even greater intensity of use of parks and related greenbelt areas near urban centers. Research is needed to develop improved species and cultural practices enabling plants to satisfy the functional, recreational, and aesthetic needs of people living in these urban settings. It is imperative that ornamental plants be developed for tolerance to environmental stresses, resistance to disease and pests, and for simple, low cost maintenance.

RP 4.03 Poultry

The poultry industry often is used as an example of the ultimate in scientific animal production for its ability to rapidly use the latest in agricultural technology to accomplish maximum efficiency in the production of high quality and acceptable food. It is predicted that per capita poultry meat consumption will continue to climb dramatically as we move toward the year 2000. We presently consume approximately 64 pounds of poultry meat per capita. It is predicted that this figure will increase to between 80 and 90 pounds per capita in the next 18 years. Egg consumption and usage should also increase. Chickens and turkeys are excellent converters of feed to high quality animal protein for human consumption. Continued reports from the National Science Foundation request that the American public should reduce their caloric intake from fat by at least 10%. Poultry and fish, because of their low muscle fat content, are likely candidates to fill the gap from declining red meat consumption. It is a ravenous appetite and pressure for new poultry technology and new products from the poultry industry that places a large burden of responsibility on the Texas Agricultural Experiment Station and other research organizations to provide the technology of the future for such a dynamic industry. Poultry also offers one of the best potentials for production of food for the world's expanding population.

The turkey industry has realized for some time that the market place is saturated with fresh and frozen whole turkey. This industry has now turned to further processing of the turkey in order to expand the market for their product. At the present time, more than 85% of our turkeys are subjected to some form of further processing. Turkey research has provided the turkey producer with a turkey that is a superior animal in growth rate and feed conversion to 20-24 weeks of age. Now, the turkey market demands a large bird for further processing. This trend to larger birds is expected to continue. Larger birds simply yield more meat when it comes to the de-boning process. Poultry researchers have little knowledge of the nutrient requirements, or how to feed these larger birds from 24-32 weeks of age. One concern with growing birds to their weights (25-40 pounds) is leg problems. For this reason the poultry researcher must now develop birds and feeding regimes to overcome this problem. The broiler industry is rapidly following the same trend.

The Commercial poultry industry in Texas has many small poultry flocks such as farm flocks, exhibition poultry, game fowl, game birds and produces 50% of the parakeets grown in the U.S.A. These types of

flocks are owned by literally thousands of Texans citizens. This segment of the avian industry is growing and is of no small value to the economy of Texas. It is psychologically, as well as economically, important to a large number of Texas Residents.

Another economic factor that is often overlooked is that poultry consumes millions of pounds of cereal grains and proetein, seed and by-products providing the crop farmers with a large dependable market.

The Texas poultry industry has advantages in climate, feed supplies, land labor, population growth and markets that can contribute significantly to this growth. For this growth to occur, there must be a continuing influx of new research technology. The basic research technology must originate with the Agricultural Experiment Station.

RP 4.04 Sheep and Goats

The sheep and goat industries of Texas produce approximately $150 million income per year for producers and provides employment for workers in several associated professions. The diversify income to ranchers and stock farmers and contribute to a more efficient utilization of rangelnd and feed resources. The ecological benefits of mixed species grazing (cattle, sheep, and goats, along with wildlife) are of particular long range importance to the unique rangeland resources in Texas. Sheep and goat production requires low inputs of fossil fuel and cereal grains. This, along with the unique opportunity they provide for utilizing feed resources, their relatively high reproduction potential, and a stable consumer demand for meat and fiber, indicate their continued contribution to Texas Agriculture.

The greatest opportunity for improving production efficiency and income is by increasing reproductive efficiency. It is believed that reproduction can be improved through the development of new technology in the areas of nutrition, genetic selection, management and herd health. Major limitations for the industry that can be assisted through research include predation, toxic plants, infectous diseases and parasites. It is believed that research can develop improved production and marketing technology for meat, wool and mohair. Computers offer a means for developing programs for aiding producers in making important management decisions. An effective research program for sheep and goats will include cooperative interaction of scientists from several disciplines, including Animal Science, Veterinary Science, Range Science and Wildlife.

The nature of the available resources and production parameters are largely unique to Texas, thus much of the research supporting sheep and goats must be conducted locally. The Angora goat industry is almost totally restricted to Texas. These industries are currently centered in the Edwards Plateau, but in the past have extended to adjacent resource areas, and the potential exists to reestablish significant sheep and goat production over much of the states.

RP 4.05 Swine

The primary thrust of TAES swine research should be focused toward solving the major problems that have been identified by producers. Major effort should be directed toward improving production efficiency through development of nutrition and management strategies that optimize performance and profitability, through improved reproduction efficiency, and prevention and control of diseases. An equally strong effort should be directed toward an improved marketing system and in improving the market demand and consumer acceptability of pork and pork products. The present live hog marketing situation in Texas is extremely fragile. Alternative marketing strategies must be developed for the survival and growth of the industry. Improving consumer acceptability of pork is a major challenge facing the industry because of the increasing lean conscious society and medical reports that correlate red meat consumption and heart problems There were several other need areas identified that are very important, but these have the greatest potential for improving the economic position of the Texas swine industry.

In general, swine research in Texas should complement the major efforts of the U.S.D.A. and other states. Special attention should be given to solving problems unique to Texas and the Southwest. Participation in regional projects should be encouraged as manpower and financial support permit. Although excellent cooperation is maintained among individual researchers, it appears that the overall swine effort would be strengthened in terms of staff, facilities, equipment, and cost through a formalized planning effort between researchers at Texas A&M, Prairie View A&M, Texas Tech Universities, and among the Departments and Colleges at Texas A&M University.

RP 5.03 Rural Development

Rural development is an increasingly critical area of concern in Texas. Rural Texas is experiencing its most rapid population growth in this century. In addition, rapid suburbanization, rural industrialization, energy developments and recreational developments are impacting the land, forest, water, wildlife, recreational, and other resources of Texas. As a result of such factors, agriculture and other rural industries are experiencing rapid changes and rural areas must face a number of both old and new problems. Thus, traditional problems such as the need to increase employment opportunities and rural income, to expand and enhance rural services, and to retain a viable agricultural base through enhanced production and marketing systems are being combined with such needs as those of providing new services for urban-to-rural immigrants, the need to address the structures and the needs of an increasingly diverse clientele of producers and other rural residents. Finally, an increasing range of technological changes in agriculture and in rural areas is altering both the nature of agricultural production and rural life.

The Rural Development Five-Year Plan addressed both the causes and consequences of such changes in rural Texas, delineating a set of research programs that will help resolve the increasingly complex problems and increase opportunities for residents in rural Texas. The

programs outlined will serve a variety of clientele groups, including agricultural producers, public and private decision makers; public and corporate program administrators, and the rural residents of Texas.

RP 5.04 Pests Affecting Humans and Their Possessions

Texas is one of the fastest growing human population centers in the United States. Statistics provided by the 1980 census indicate that human population has increased 26% since 1970, with the bulk of this growth occurring in the state's urban and suburban areas. It is projected, that by 1990, about 88% of the total human population residing in Texas will be urban.

Rapid expansions of human populations in the state have amplified problems associated with plant and animal pests affecting humans and their possessions. These problems are being further compounded by encroachment of urban areas into agricultural lands that frequently support large numbers of organisms which can become serious pests of man when they are thrown into close association with large concentrations of humans. Consequently, conflicting interests regarding these pests and their control will ultimately result between agriculturists and urban dwellers unless control methods are developed which are effective and, at the same time, compatible with both interests.

Control of plant and animal pests affecting humans and their possessions presently relies heavily upon the use of pesticides. Increased concern about chemical damage to the environment and rapid immunity responses on the part of certain target pests to chemicals necessitates the development of integrated pest management systems for pests affecting man and his possessions. These systems should stress the more limited and strategic use of pesticides and the incorporation of various non-chemical approaches to pest control. Not only must the efficacy and environmental soundness of these systems be determined so as to insure that the cost of the system will not exceed the benefit realized, but, in addition, basic research on several aspects of these systems will have to be accomplished before they can be effectively implemented.

RP 8.00 Food Safety, Food Processing and Nutrition

The food processing industry is of great economic significance to the State of Texas. It is large and diverse with a total value for shipments exceeding $11 billion. Meats, beverages, grain-milled products, fats and oils, fruits and vegetables, dairy, bakery products and seafoods represent a major portion of the total industry. Over $3 billion is added to the value of food products by processing. The food processing industry employs over 100,000 people. This does not include wholesale firms or retail stores. This segment employs about 400,000. The wages paid for all three areas is well over $3 billion.

The research plan of the panel of Food Safety, Food Processing and Nutrition is an integral part and a logical extension of the various commodity plans which relate to the production of high quality food or

feed. With respect to food safety, the plan focuses on the identification and control of biological, chemical and physical agents which during production, processing and distribution may affect the nutritional properties and/or cause potential public health hazards. This involves research in areas such as control of microbial pathogens and viruses, the presence of heavy metals, mycotoxins, insect pests, and foreign substances which may be injurious to health.

With respect to food processing, one major effort focuses on the application of processing, preservation and distribution methods to maintain or improve the nutritional and sensory properties (flavor, color, texture) of foods. This involves a broad range of plans such as the preservation of foods in controlled gaseous atmospheres and the utilization of underutilized fin fish species of the Gulf of Mexico.

Another major part of this plan deals with development of new and improved processing, storage and distribution techniques for more efficient use of energy and water and reduction of losses of conventional food materials. This effort includes the development of new food preservation methods which demand less energy, the reduction of waste water effluents and the recovery of proteins from a variety of food or feed materials such as blood whey.

The research plan on nutrition will focus on the evaluation of the nutrient composition of those foods for which current data are not available. In addition, considerable effort will be directed toward the investigation of the biochemical and physiological roles of nutrients. This information will be correlated with known impairments and pathological conditions which occur in the absence or excess of nutrients.

Texas Agriculture

AGRICULTURAL EDUCATION

Agricultural Education programs are offered in nine approved institutions for teacher preparation in the state under the auspices of the Texas Education Agency - State Board of Education; State Board for Vocational Education; Division of Occupational Education and Technology. Programs are primarily designed to offer pre-service and/or inservice professional preparation to those individuals desiring to become teachers of vocational agriculture in secondary and post secondary institutions.

The state's program in vocational agriculture consists of Production Agriculture (regular), Agri-Business (Cooperative Part-Time Training), and Coordinated Vocational Academic Education for the Handicapped (Pre-employment Laboratory Training).

The state is divided into ten areas with 1520 teachers of regular programs, 73 teachers of CVAE programs, and 47 teachers of VEH programs in 881 school districts. Each area is coordinated by an occupational Educational Specialist employed by the state office.

Nationally, the predicted supply of vocational educators far exceeds the demand, however, this is not the case for the State of Texas.

AGRICULTURAL RESEARCH

In addition to the main state Experiment Station at College Station, research is conducted from 15 research centers and 16 stations strategically located in the major agricultural regions of the state. Research is focused on five general areas. These are as follows: Crops and Crop Products, Livestock and Livestock Products, Manmade and Human Resources, Natural Resources and Research Related Activities. Activities within the areas are as follows: (1) Crops and Crop Products - Cotton and cottonseed productions, grain sorghum, corn, wheat and small grains, rice, peanuts, soybeans and oilseed crops, pasture and forages, vegetables, ornamentals, turf, citrus and subtropical crops, sugar crops and fruit, and pecans. (2) Livestock and Livestock Products - Beef, dairy, poultry diagnostic laboratory, sheep and goats, swine, horses and animal waste utilization. (3) Manmade and Human Resources - Food Science, urban living, economics, and fundamental research for the future. (4) Natural Resources - Soil, land, water, range, forestry, fisheries and wildlife management. (5) Research Related Activities - The Feed and Fertilizer Control Service, The State Chemist, The State Entomologist, Poultry Diagnostic Laboratories and Foundation Seed Production.

AGRICULTURAL PRODUCTION

Total agricultural cash receipts for the state of Texas reached $10.1 billion dollars in 1981, making Texas the third leading agricultural state in cash receipts, behind California and Iowa. Texas ranks number one in cattle and calves, cotton, and grain sorghum; number two in all livestock and hay; number three in wheat, greenhouse and nursery, rice and oranges. Overall, Texas ranks in the top ten for nineteen of the top twenty-five commodities in the United States.

The 1978 Agriculture Census reported 194,253 farms in Texas, on 137,547,468 acres with an average size of 708 acres. A breakdown of these farms by size, places 21.2 % in the 1-49 acres category; 32.3 % in the 50-179 acre category; 23.2 % in the 180-499 acre category; 11.3 % in the 500-999 acre category; 6.7 % in the 1000-1999 acre or more category.

By tenure of operator, 12.5 % of the farm operators are under 35 years of age; 17.2 % are between 35-44; 24.4 % are between 45-54; 25.1 % are between 55-64; and 20.8 % are over 65. By tenure classification, 56.5 % of the operators are full owners; 29.2 % are part owners; and 14.2 % are tenants. An overwhelming majority (89%) of the farms are organized as family farms, with approximately 9 % organized as partnerships and 1.4 % as corporations. The family farms operate 68.4 % of the land in farms, followed by partnerships at 20.1 %, corporations with 9 % and others with 2.5 %.

A large number of Texas farms have sales less than what is normally considered sufficient to maintain a decent standard of living. For instance, 30.9 % of the farms report sales less than $2500; 18 % report sales between $2500 and $4999; 15.6 % report sales between $5000-9999; 11.5 % report sales between 10,000-19,000; 8.7 % report sales between $20,000-39,999; 8.6 % report sales between $40,000-99,999; and 6.7 % report sales of $100,000 or more.

Very few counties in Texas remain as predominant farming counties as measured by land in farms. The majority of these counties that remain as predominantly agricultural counties are concentrated in the North Central and Panhandle sections of the state. East Texas, where the majority of the black population of the state is concentrated, is characterized by a large number of small farms.

National Significance of Texas Agriculture
(1981)

Commodity	National Ranking
All	3
Beef Cattle	1
Cotton	1
Sorghum	1
Ornamentals	3
Citrus	3
Rice	4
Peanuts	4
Poultry	5
Vegetables	5
Wheat	6
Hay	7
Corn	8
Dairy	8

Total Farm and Ranch Assets - $84.2 Billion; 3/4 all assets of state and national banks. Second largest Texas Industry Renewable Wealth Complex Total Industry

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Occupation of Landowners

Percent of Owners		Percent of Acreage Owned
14.1	Farmers	46.8
29.7	Retired	13.3
25.0	White Collar	19.4
18.1	Blue Collar	5.6
1.9	Other	3.8
11.1	NO Response	11.1

reflect the precipitation pattern of the State. The Texas Coastal Prairie in which Prairie View A&M University is located, represents about 9.0 million acres of forest, crop and rangeland and has a dense cattle population (approx. 20% of the beef cattle in Texas).

The agricultural income for Waller County in 1978 was an estimated $26,432,000. This figure compares to $25,034,000 in 1977. The estimated value of specific commodities in 1978 was as follows:

Beef Cattle	*$ 9,800,000*
Rice	*6,930,000*
Soybean	*2,410,000*
Corn	*2,070,000*
Peanuts	*1,260,000*
Hogs	*970,000*
Milk	*950,000*
Watermelons & Vegetables	*672,000*
Hay	*610,000*
All other Livestock & Poultry	*406,000*
All Other Crops	*194,000*
Agricultural Related Income	*160,000*

Acreages of the main crops grown in Waller County are corn (19,000), soybeans (16,000), rice (13,000), commercial vegetables (13,000), peanuts (5,500) and watermelons (2,000). The foregoing represent one third of the agricultural land in cultivation, the remainder being in pasture and range chiefly. The percent use shows cropping systems in which corn is rotated with peanuts and rice is rotated with soybeans.

The major soils of the area are the Kenney, Hockley and Wockley Soil Series.

Crop Production

Although the population of Texas and the United States is continually increasing, the state is under no immediate internal pressure to increase food supplies, even though its farm acreage is declining for some crops. There are approximately 16 principal field crops and 20 major fruit and vegetable crops grown in Texas. Wheat, cotton, grain sorghum, oats, and corn are the leading field crops in terms of acreage; watermelons, onions, cabbage, carrots, and cantaloupes, are the leading vegetable crops. Grapefruit, oranges, peaches, and pecans are the major fruits and nuts grown.

There has been a gradual increase in acres planted to wheat from 6,800,000 acres in 1980; 7,800,000 in 1981; to 8,200,000 acres in 1982. Corn acreage has decreased to only 1,200,000 acres planted in 1982; the decrease in acreage for cotton, down to 1,760,000 in 1982. There was no decline in grain sorghum from 1980 to 1981; however acreage was increased from 1982. Oats acreage increased from 1980 to 1981 by about 20,000 acres. Even though rice is not a leading crop, it is nevertheless an important one in the state. Rice acreage at 450,000 acres in 1982, represented a 10,000 acre decline from earlier years.

There was a decrease in total acres harvested for cabbage from 1980 to 1981 by 800 acres; watermelons are up from 36,000 acres harvested 1980 to 43,900 acres in 1981 and 49,100 acres in 1982. Gradual decrease in total acres harvested for onions from 1980 to 1981 by 1,300 acres. Total carrot acreage increased in 1981 over 1980 by 3,000 acres. There was a decrease in cantaloupe production from 1980 to 1981 by approximately 2,000 acres.

Grapefruit, oranges, peaches, and pecans are the principal fruit and nut crops. Total production for each one of these crops increased from 1980 to 1981 except for grapefruit.

Total production for fresh vegetables, tuber crops and field crops was estimated to reach record levels in 1982. Wheat will undoubtedly remain the leading crop in the state, followed by grain sorghum, with an eventual decline in cotton acreage. Within a few years, rice is expected to increase in acreage along with hay (native species).

Watermelons will continue to be the leading vegetable crop closely followed by onions. Even though lettuce acreage was only about 4,600 in 1981, it is expected to increase in the future as well as the cabbage crop.

Cattle

Cattle daminate livestock production in Texas, contributing some 70% of cash receipts from livestock and products each year. The January 1, 1979 inventory of all cattle and calves in Texas totalled 13,900,000 head valued at $4,795,500,000.

The state leads nationally in beef cattle, cattle feedlots, sheep lambs, wool goats and mohair. In 1978 it ranked 9th in dairy cattle, 7th in turkey and broiler, 9th in eggs and 17th in hogs.

Raising beef cattle is the most extensive agricultural operation in Texas. Nearly all of the 254 counties in Texas derive more revenue from cattle than any other agricultural commodity. Within the boundaries of Texas are 12.5 % of all the cattle in the U.S., as well as 16 % of the beef breeding cows and 12 % of the calf crops.

Texas marketed 4,915,000 head of grain fed cattle in 1978. Total feedlot marketing in Texas accounted for about 18 % of the total U.S. fed cattle marketings.

The number of milk cows on Texas farms, as of 1979, totalled 310,000. Milk production totalled 3.433 million pounds in 1978 with dairy farmers receiving a gross income of $399,464,000 in 1978. The number of milk cows has declined since 1945 when there were 1,594,000 head.

Small Ruminants

The dairy goat industry in the United States today is composed primarily of small holders who keep goats for a family milk supply, as a hobby-breeding operation, and/or for youth projects (4-H, FFA). Less than one percent of all goat owners are involved in commercial dairying.

The American Dairy Goat Association has 20,000 members nationwide. Comparisons of ADGA membership data with actual known goat owners in specific areas has shown that the total goatkeepers are at least five times the Registry Association memberships. It can be estimated that 100,000 families in the U.S. are raising dairy goats today. Texas has some 4,500 herds averaging 20 head per herd. Data from herds on DHI production tests show 1,600 herds on its test with an average herd size of nine milking does. Fewer than 50 herds had 50 or more milking does. Texas has 46 herds on its test averaging 11 head per herd plus young stock.

4-H statistics for 1981 reported 19,000 dairy goat projects, an underestimation. A clear error in the data reports California as having 43 goat projects when the actual number was 2,369. Because goats are included with other "dairy" projects and do not have a separate 4-H award program, many goat projects are counted as dairy projects and many are not counted at all because the 4-H member does not have a strong reason to turn in a record book at the end of the project year. When the 4-H data for food animal projects are totalled and compared, dairy goats comprise less than 4 percent of the total in most states but somewhat more in others. In Connecticut, the most goat-active state in the statistics, dairy goat projects are 15 percent of the food animal projects. Texas 4-H interest has increased 10 fold since 1978.

Commercial Dairying - An estimated 14 million pounds of goat milk are marketed by commercial dairy interests in the United States each year. Of this, 7 million pounds is utilized in the production of evaporated and powdered goat milk (up to 25% of this is exported); 4 to 5 million pounds is marketed as whole fluid milk; approximately 2 million pounds is utilized in the production of goat cheese. The amounts of other goat milk products (yogurt, ice cream, butter, etc.) produced is not significant. The typical goat dairy is a very small producer/distributor operation which handles the milk from a single farm. A handful of goat dairies are somewhat larger and handle the milk produced by a number of farms.

Nationwide, 85 to 100 dairies are licensed as goat milk processing/bottling plants. The average dairy markets 125 gallons of milk a week and about half of that milk is sold as retail raw milk. From 20 to 25 of these dairies produce goat cheese exclusively, with most production coming from less than five to ten farms each handling 500 to 1,00 gallons of milk a week. The two big operations in the nation are the evaporating plants in Arkansas and California. Each has 30 to 100 producers and handles roughly 10,000 gallons of milk a week. Texas has few commercial operations but many small volume sellers.

The total number of goat farms which have a market for their milk through a properly licensed dairy operation is slightly under 300. In addition, an estimated 50 to 100 farms are selling goat milk to cow milk processing plants. Various surveys have suggested that at least 20% of all goat owners occasionally sell milk to friends, neighbors or casual at-farm customers. This is legal in some states, not legal in others.

Horses

The horse industry of Texas includes the commercial breeding farm and the one horse backyard paddock; the million dollar thoroughbred stallion and the $50.00 grade pony; the race horse owner and the 4-H member. Nowhere else can one find such a diverse collection of individuals and enterprises with a common interest.

The scene of the horse industry has undergone many changes since the 1920's. In the 1920's, the horse and mule population was about 7.9 million. In the early sixties, the horse population decreased to about 1.4 million due to the decline of the need for horses for farming or military purposes. Unrecognized was the fact that the horse was assuming a new role in the recreation industry.

Throughout the sixties, the horse industry increased dramatically. In 1971, it was estimated that there were about 2.3 million horses. This shows an increase since the low in the sixties.

Many segments of the horse industry have grown at the rate of 10-15% per year. The horse population has grown at a rate of 5% per year from 1971-1974. In the southern region there were 2.7 million horses in 1974. This is 33.7% of the 8 million horses in the United States. Based on a recent quarter horse journal survey, these horses require over $700,000,000 for feed, $250,000,000 for health care and result in the purchase of $397,000,000 worth of tack riding apparel, etc. Thus, the horse industry is a multi-billion dollar business.

Swine

Swine production in Texas has undergone much change during the last decades to the extent that commercial pork production in Texas is now a dynamic industry located largely in the Texas Panhandle Plains area. Although hogs are produced on farms and ranches throughout most of the state, swine production is an important source of income in 168 Texas counties. Texas has the potential and resource for a greater expanded swine industry.

In 1981, the hog inventory on farms and ranches in Texas numbered 800,000 head compared to 630,000 in 1982. There were fewer hogs in all market weight groups in 1982 when compared with the 1981 hog inventory. The market weight groups are 60 pounds and under, 60-119 pounds, 120-179 pounds; 180 pounds and over. Pigs per liter averaged 6.77 in 1982, compared to 7.0 in 1981.

Texas hog producers have moved toward confinement in environ-

production units. However, Texas still has a large number of small hog farmers as producers move from pasture to confinement pork production.

At the present time, Texas pork producers are producing 30% of the pork consumed by the inhabitants of the state. Texas meat packers purchased slaughter hogs largely from the Nebraska/Kansas area, to help meet the demand for pork and pork products for an expanding state population.

Reproductive efficiency, baby pig survival, efficiency of feed utilization and waste management, have been identified by Texas swine producers as the most important problems associated with maximum swine production. For Texas pork producers to reach economic potential in pork production, research is being conducted to provide solutions to these problems. Texas is the leading state in sorghum production. Much emphasis is placed on improved utilization of sorghum grain and Texas-produced high protein feedstuff in an effort to enable the Texas Swine industry to became more competitive with the Midwest.

Poultry

Texas is the 7th leading state in egg and broiler production, and 8th in turkey production. The main areas are Tyler, Nacogdoches, Shelby, Gonzales, and Fayette.

The poultry industry is divided into:

A. Commercial Egg Industry-for the production of table eggs.

B. Breeder Flock Industry-for the production of fertile eggs for hatcheries.

C. Broiler Industry-for the production of poultry meat.

D. Turkey Industry.

Supplementing these industries are the hatcheries, and the frozen egg industries. Fifty percent of the eggs produced go directly to the commercial market for consumption, while 40% go to the frozen egg industry and 10% to the solid egg industry.

Broiler Industry - In November 1982, 78.5 million fryers were placed in the field. Ninety-nine percent of the fryers that are produced come from the contracted or integrated system. These fryers are slaughtered at 6-8 weeks of age with an average dressed weight of 3 1/2 pounds. These contractors are located within a radius of 50 miles from the processing plants. The average feed conversion for a broiler/fryer at 8 weeks old varies between 1.9 to 2.1 pounds of feed to 1 pound liveweight. The price to consumers varies from 45 to 60 cents for 1982. The price for a day old broiler chicken varies from 40 to 44 cents.

The supermarkets, hotels, restaurants and institutions remain the major outlet. Broilers are sold either as live, fresh packed, frozen, chill packed, and parts.

Turkey Industry- At the end of November 1982, 1.2 million turkeys were slaughtered in Texas. Compared to a 1981 production of 1.669 million, there is a decline in the demand for turkey meat. These figures include fryers, roasters, young turkeys, and old breeder hens. The average weight for the fryers was 4-9 pounds, the hens 10-16, and for toms 14 pounds. The market price for turkeys ranges from 49 cents to 70 cents per pound. Over the last 5 years, the turkey producers have became involved in further turkey processing. There is a large plant in Waco, which makes turkey hams, rolls, and sausages.

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PRAIRIE VIEW A&M UNIVERSITY

College of Agriculture
P. O. Drawer U
Prairie View, Texas 77446
(409) 857-2811