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**Food & Fiber Systems is the world's oldest, largest, and most essential industry.**

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**Agriculture is the science, art, and business of cultivating the soil, producing crops, and raising livestock.**

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## I. Understanding Food & Fiber Systems

Agriculture is the world's oldest, largest, and most essential industry. Food and Fiber Systems, or agriculture, encompasses all the processes necessary to bring food and fiber products to the consumer, including production, processing, research, development, distribution, and marketing. Food and Fiber Systems provides people's basic needs of food, clothing, shelter, and more.

Food and Fiber Systems is complex and far-reaching. About 20 percent of the United State's labor force works in some part of the system. Globally, more people depend on agriculture for their livelihood than any other occupation. The growing world population will increase the demand for agricultural products, as well as qualified people to work in Food and Fiber Systems.

### A. Understand the Meaning of Food and Fiber Systems/Agriculture.

Food and Fiber Systems, or agriculture, provides the plant and animal products people need for food, clothing, and shelter. The word agriculture comes from Latin *agricultura*, *ager*, meaning land and *cultura*, meaning cultivation.

Traditionally, agriculture has been defined as the science, art and business of cultivating the soil, producing crops and raising livestock. Food and Fiber Systems also includes the

management of wildlife, range lands, forests, rivers, oceans and natural resources. In addition, people use agricultural products and knowledge to improve and beautify their homes and communities through horticulture and landscaping.

Agricultural production uses many kinds of inputs, including human resources and natural resources. Human resources are necessary to provide the labor and management for different components of the systems. Soil, water, air, and energy are the primary natural resources used in Food and Fiber Systems.

Food and Fiber Systems, or agriculture, is the foundation of a nation's standard of living. By providing the basic needs of food, clothing and shelter, agriculture permits individuals to pursue other interests and activities. To continue meeting society's basic needs, Food and Fiber Systems must sustain, conserve, and replenish resources.

### B. Understand the Essential Components of Food and Fiber Systems (e.g. production, processing, marketing, distribution, research and development, natural resource management, and regulation).

Food and Fiber Systems utilizes a wide array of components to create food, clothing and shelter products. Often, those products require special inputs or components. Just as there are many kinds of farms and ranches, there are many kinds of



processors, marketers, distributors, etc. The essential components of Food and Fiber Systems include production, processing, marketing, distribution, research and development, regulation, support services, and natural resource management.

The journey a product takes from producer to consumer usually includes numerous steps. Although some agriculturalists market and distribute their own products, the process often involves many people. Each step adds value to the product.

Processing takes a raw product, or commodity, and changes it to make it more useful for the consumer. Most agricultural commodities, such as fresh fruit, beef, cotton, and timber are processed in some form.

The marketing and distribution components take the processed product to the consumer. This may include transportation, wholesale and retail sales, and advertising.

Research and development includes the efforts of scientists to improve Food and Fiber Systems products. To meet the needs of a growing world population and generally increase the efficiency of the system, governments, private companies, and universities conduct agricultural research and development.

Many public and private agencies support and regulate the food and fiber system to ensure product safety, worker protection, and resource conservation.

Natural resources are a primary component of Food and

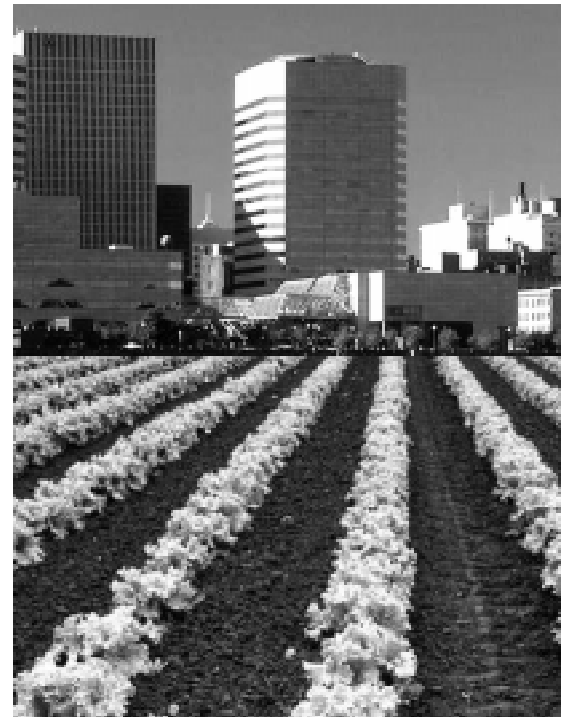
Fiber Systems. They provide the materials agriculturalists depend on to produce, process, market, and distribute agricultural products. The management of soil, water, air and energy is critical for sustaining agriculture.

### **C. Understand Food and Fiber Systems' Relationship to Society.**

When people think of agriculture, often they have the limited understanding that agriculture only affects individuals through food, clothing and shelter. However, many of the products people use daily, directly or indirectly, come from Food and Fiber Systems. Plants and animals, especially, yield numerous by-products in addition to the primary product.

Today, the majority of the world's people still directly work with the land. In developed countries like the United States, less than two percent of the population is involved in agricultural production. Instead, many people work in non-production aspects of Food and Fiber Systems, including processing, marketing, distribution, research and development, natural resource management, and regulation.

Agricultural production exists almost everywhere in the world, but it varies according to regional factors such as climate, soil and water quality, labor supply, and land-use priorities. People depend on food and fiber products not grown in their state or country. Within the U.S., each



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state is characterized by the agricultural commodities produced there.

The American agriculture system is one of the most efficient in the world. U.S. citizens spend the smallest proportion of income on food. Approximately 35 cents of each food dollar pays the actual production cost.

The ability to provide for future generations concerns many people today, and many agriculturists have made improvements towards a more sustainable agriculture system. Over time, human ingenuity has solved numerous problems of food production, storage, and preparation.

Throughout history, agricultural practices have changed in response to society's needs and new knowledge. Improvements in practices continue to occur with society's increasing needs for food, clothing and shelter.



#### **D. Understand the Local, National, & International Importance of Food & Fiber Systems.**

Agribusiness includes many enterprises associated with Food and Fiber Systems. These include brokers, processors, distributors, suppliers, and service providers such as consultants and financiers. The term agribusiness includes all industries that supply food and fiber products and services or process and distribute agricultural products.

All over the world, Food and Fiber Systems shares resources with other industries, households, and wildlife. Those include natural and human resources. Often, multiple uses allow scarce resources to be adapted for mutual benefit.

Early U.S. settlers brought food and fiber products from other countries. They also encountered plants and animals native to the New World. Some of those new products were traded and sent back to the colonist's native homeland. Expanding settlements and diverse cultures brought about demand for a greater variety of food and fiber products.

In America, the success of modern agriculture allows the U.S. economy the freedom to diversify and develop many other industries. Agricultural products still are the largest single U.S. export, and agriculture continues to be the largest industry.

Agriculture is an integral part of almost every economy, providing employment and raw materials for people's basic needs. Agriculture is the primary economic activity in many parts of the world, including America. In particular, rural areas are heavily dependent on agriculture. Weather changes, availability of supplies, market prices, and international political relationships dramatically affect the viability of local producers and agribusinesses. Globalization of markets may stabilize the impact of such events for consumers. Those who work in Food and



Fiber Systems in this country must understand the global market forces that determine demand for their products.

### **E. Understand Food and Fiber Systems Careers.**

Approximately 20 million Food and Fiber Systems jobs exist in the United States. About 50 percent of the jobs are in wholesale and retail trade of agricultural products, and many are in metropolitan areas. Processing, marketing, and distribution account for 30 percent of all agricultural jobs, while the remaining 20 percent are in production.

Today, Food and Fiber Systems is America's largest industry. More than 20 percent of America's workforce is employed in some phase of the agricultural industry. Seven people work in agribusiness for every farmer. In fact, more than 8,000 agricultural job titles exist.

Continued growth in world population means a greater demand for food and fiber. It also means a growing demand for qualified people in the agricultural industry. Almost 10 percent of today's professional jobs in agriculture go unfilled because more jobs are available than there are people who understand agriculture. Food and Fiber Systems is rapidly changing, and many non-traditional agricultural careers exist in technology, science, engineering, and related fields.

Educational requirements for work in agriculture also have increased and education beyond

high school is required for most positions. The demand for graduates in agricultural business and management, engineering, food science, sales, marketing, education and communications dramatically has expanded in recent years.

## **II. History, Geography, and Culture**

Food and Fiber Systems played a key role in developing and sustaining every civilization. Agriculture has been the work of most of humanity through the ages. Agricultural themes can enhance the study of any period of history, from ancient civilizations and cultures to the westward movement and contemporary social issues.

The entire globe is open to scrutiny through agriculture and many important historical figures, inventions, and events are related to agriculture. Cultural, physical, and political geography can be taught through Food and Fiber Systems studies worldwide.

### **A. Understand Food and Fiber Systems' Role in the Evolution Of Civilizations.**

Agricultural systems constantly have adapted to conform to the changing needs of society. Throughout history, people have relied upon Food and Fiber Systems for food, medicine, clothing, and shelter. Historical evidence shows humans were nomadic, relying on hunting and



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gathering before learning to work with plants and animals and to cultivate the land. Early agricultural practices facilitated the more complex societies.

People began to live in permanent settlements. Eventually, abundant agricultural production allowed people to pursue activities other than working the land for their livelihood.

Humans always have altered and affected the places where they have lived. Originally, people lived as hunter/gatherers in tribes and bands. The hunter/gatherers lived off the land, collecting and catching what was locally and seasonally available.

Hunter/gatherer cultures tended to be limited in population and technological development. As groups followed animal migration, they traveled across whole continents entering new territories and natural environments. The availability of food and shelter in the places they lived impacted the size of individual groups, tribes or clans.

Many hunter/gatherer cultures developed pre-agricultural practices in which they manipulated the environment to control or increase their kills and harvests. The American Indians burned grasslands, which stimulated the germination of desired plants that attracted greater concentrations of bison and other grazing animals to hunt.

Domestication of plants and animals may have occurred in many places at once. The application of these, and other discoveries, resulted in distinct practices depending on the local

natural environment. The first civilizations to rapidly grow with the arrival of cultivation were located in flood plains. Soil quality and available water made such rapid growth possible. The earliest irrigation systems were built about 7,000 years ago in Mesopotamia, which now is Iraq.

Agrarian societies, like the ones in Mesopotamia, expanded rapidly. The study of stars, moon, sun, and planets helped people schedule planting and harvesting. Cultivation practices enabled surplus food production.

With food stored, people could dedicate their time to other pursuits such as the arts, science, and culture. Surplus food and fiber products were traded using the barter system. Agricultural trade stimulated the development of measurement, accounting, and written communication.

## **B. Understand Food and Fiber Systems' Role in Societies throughout World History.**

Improvements in the ability to provide food, clothing, and shelter have been paralleled by improvements in the health and well being of people in the world. As a result, the world's human population has grown in proportion to agricultural production.

As early agricultural societies grew, they became more complex. When populations expanded, emerging societies began to look beyond their immediate environments for resources that had become locally depleted. The expansion



of societies has involved conflicts over crop and grazing lands as well as access to ports and trading routes. The permanence of societies has also been dependent on access to and stewardship of soil and water resources.

Agricultural production throughout the Mediterranean region became dominated by in-kind taxation exacted by the conquering Romans. Non-perishable products such as wheat, olive oil, wine, and timber were produced on a large scale and shipped long distances to support the city of Rome.

Eventually, soil erosion, deforestation, overgrazing, and conflicts between farmers and herdsmen dramatically reduced the productivity of agriculture within the Roman Empire. Hunger and social unrest destroyed the Roman political system, bringing the Dark Ages.

In many parts of the world, feudal societies emerged. Landowners or “lords” relied on slaves, serfs, or peasants to work the land. The workers relied on the lords for protection from raiding bands and robbers. Wars were fought over crop and grazing lands, as well as access to ports and trading routes.

With the development of feudalism, merchants emerged as a class of people who made their living traveling between regions trading goods from other places.

Among wealthy Europeans, demand for food and fiber products from distant lands increased. For example, silk cloth, carried overland from Asia, was finer and more luxuri-

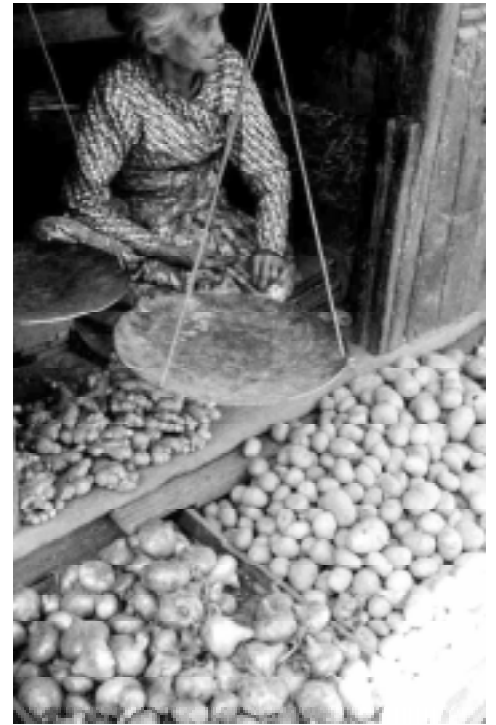
ous than the rough wool and linen people had been using for clothing. Also, spices helped preserve food and diversified the diet of Europeans in the Middle Ages. The desire for agricultural products, as well as precious gems and minerals, eventually led to exploration and conquest of the Americas.

Before the arrival of Europeans in the Americas, agriculture already was highly developed in Central and South America, although less so in North America. The Incas thrived in the West Andes Mountains with architecture and irrigation systems that rivaled those of ancient Rome and Egypt.

The Maya, Olmec, Toltec, and Aztecs living around the Valley of Mexico are considered the first to cultivate maize, or corn as we know it today.

Development of international trade between societies, cultures and nations led to industrialization. That industrialization, in turn, led to increased amounts of Food and Fiber Systems products and a higher standard of living for industrialized societies. Industrialization and international trade of agricultural products and services have led to alliances between nations and have created global societies where different cultures blend and co-exist.

Festivals and celebrations within societies also came about because of agriculture. Spring planting and fall harvest festivals have been celebrated for centuries. Other world celebrations still are based on agriculture.



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***The permanence of societies depends on access to and stewardship of soil and water resources.***

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### C. Understand Food and Fiber Systems' Role in U.S. History.

The most agriculturally advanced native people in North America included the Iroquois, who established permanent territorial associations around agricultural settlements and the Shoshone, who practiced agriculture in an arid climate, mostly relying on maize as a staple crop.

Most early American settlers were farmers. Many came seeking land, and religious freedom. When European colonists arrived on the East Coast, they tried to keep the agricultural practices they used back home. Many times, these practices failed, and mass starvation occurred in the early years of colonization. Spaniards found the Mediterranean climate in the west very similar to Spain, thus many of their agricultural crops including olives, grapes, figs, and cattle readily adapted to the new land.

On many occasions, American Indians came to the aid of the colonists, teaching them about native plants used for food and medicine. The settlers also adapted clothing and shelter from American Indians.

The colonies along the East Coast experienced economic prosperity derived from cash crops such as cotton and tobacco for export to Great Britain and other places. The Revolutionary War was waged over issues such as high taxes on agricultural commodities produced by the colonies. Many of the country's

early leaders, including signers of the Declaration of Independence, were agriculturalists.

Other historical events also relate to Food and Fiber Systems. The Homestead Act encouraged increased expansion of settlements west of the Mississippi River. Agriculture continued to impact U.S. history through the 20<sup>th</sup> century.

The crash of the stock market forced people to return to the land as a means of survival. The Dust Bowl drought on the Great Plains caused people to abandon farms and ranches in search of work in cities. Some of the nation's largest dam projects were undertaken to control flooding of prime agricultural land.

The labor demands of agriculture in the U.S. strongly affected immigration and migration patterns. Historically, U.S. agriculture has provided employment opportunities to immigrants from all over the world. Since the beginning of World War II, the farm population of the U.S. has been declining principally due to improved agricultural technology. Migration from farms to cities has added to the cultural diversity in modern America.

In pursuit of rapid growth and short-term economic success, some agricultural practices have caused loss of valuable nutrient-rich topsoil, clean ground water reserves, and species diversity. The creation of the National Park Service, National Forest Service and the Environmental Protection Agency, and others, can all be tied to agriculture.

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***The National Park Service, National Forest Service and the Environmental Protection Agency are tied to agriculture.***

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## D. Understand the Relationship between Food and Fiber Systems and World Cultures.

Historically, climate and geography have determined the plants and animals that grew best in a region. As a result, distinct eating habits emerged for people living in different places on Earth. As cultures and societies developed, religions and other beliefs further guided people's food choices. Food, language, dress, and the arts are characteristics that evolved in relation to specific cultures.

When people migrate, they bring their culture and diet. Immigrants brought some staples of the American diet to this country. The United States produces many food and fiber products introduced by immigrants. With increasing ethnic diversity, there are more opportunities for businesses catering to changing consumer tastes.

The U.S. blends culture and traditions of people from different climates and geographic regions. U.S. food and fiber products reflect these differences.

As Americans develop tastes for foods from all over the world, international consumers develop a great demand for U.S. food and fiber products. New plant varieties and animal breeds have changed eating habits in many places of the world. The introduction of new varieties of plants and breeds of animals may cause new challenges from pests and disease.

## E. Understand How Different Viewpoints Impact Food and Fiber Systems.

Some people view agriculture as nothing more than farming or ranching. Often, a person's background or even geographic origin forms contrasting viewpoints surrounding Food and Fiber Systems. Many social issues are related to agriculture. The U.S. has moved from a rural society to an urban society partly due to the loss of jobs in production agriculture and the increase of jobs in agricultural product processing, packaging, marketing, and distribution.

In addition to agricultural labor, society is concerned about issues such as land use policies, protection of the environment, pesticide use, food safety, and animal welfare to name a few. Other issues include the practice of food irradiation and the development of genetically engineered foodstuffs.

Some of the issues are local in nature, while some are regional, statewide, national, and even international. The determination of issues and the viewpoints of stakeholders are often related to historical, cultural and geographic factors.

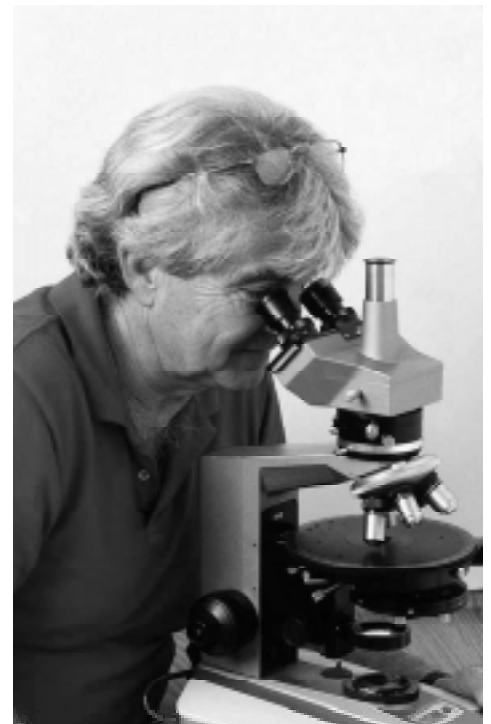
## III. Science, Technology, and Environment

The environment and agriculture are closely linked. Humans have transformed the environment through agricultural

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**Scientific and technological knowledge make agriculture more productive.**

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pursuits since before recorded history. Scientific and technological knowledge make agriculture more productive. Countless innovations have helped solve problems related to all aspects of the food and fiber system.

Agricultural abundance has made possible an increase in population worldwide, but this increase has put more demands on the planet's natural resource systems. Scientific observation and investigation have confirmed that ecosystems are delicately balanced and globally interrelated, and we can no longer independently manage agriculture and the environment.

The vitality of Food and Fiber Systems now, and in the future, depends on public understanding of this interdependence. The need to preserve the quality of shared resources, land, air, and water will make the work of those in the agricultural and environmental sciences more important in years to come.

### **A. Understand How Ecosystems Are Related To Food and Fiber Systems**

Ecosystems include plants, animals, environmental, and geographic factors that make up life systems. Food and Fiber Systems uses different ecosystems to produce, process, market and distribute agricultural products. Geography and topography, the factors that limit agriculture production,

generally determine ecosystem diversity.

Food and Fiber Systems depends on ecosystem management for sustaining and increasing production. The natural cycles of plants and animals intricately are related to agriculture. Other natural cycles, including water and soil, make the production of food and fiber products possible.

Humans have manipulated succession in ecosystems for centuries, not only for agricultural purposes, but for industrial and personal use as well. Left alone, those ecosystems eventually will regenerate.

Agriculture affects ecosystems in both positive and negative ways. Inputs required for agricultural production, such as fertilizers and pesticides, often come from outside the ecosystem. They increase production potential. Once introduced, chemicals may change the system's natural balance.

Modern agriculture is energy intensive, requiring non-renewable fossil fuels in all parts of the food and fiber system. As with any industry, air, water, and soil pollution are produced as a result of the activities of the system. Agriculture also is a leader in managing ecosystem pollutants.

The destruction of natural habitats through the draining of wetlands, soil erosion, and expansion into wild areas continues to be a problem. Self-regulation and governmental regulation in Food and Fiber Systems have made great strides toward stopping and reversing some of the problems.

Agriculture also enhances the

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**Agriculture is a leader in managing ecosystem pollutants.**

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environment. Landscape design and ornamental plants beautify homes and communities. Conservation and restoration efforts by agriculturists have re-created habitats for previously threatened species. Food and Fiber Systems designed to work with nature can even reverse damage to ecosystems from the effects of poor land management.

## **B. Understand Food and Fiber Systems' Dependence on Natural Resources.**

Soil, water, sunlight, and air are the renewable natural resources necessary for agricultural production. However, agriculture relies on living things and biological processes to transform these basic materials into food and fiber products. Food and Fiber Systems depends on plants, animals, and microorganisms. They range from the tiniest algae, bacteria, yeast, and fungi to edible plants, fiber plants, and trees, as well as insects, birds, fish, and even the largest of animals.

Living organisms use the resources, but also replenish natural resources. Plants improve air quality by capturing carbon dioxide and producing oxygen in the atmosphere. Perennial plants, grasses in particular, with their extensive fibrous root systems, can help reduce soil erosion. Poplar trees can clean sewage water while growing wood for paper pulp production. The life cycle of plants and animals adds organic matter to the soil.

In addition to the sun's

energy, Food and Fiber Systems also depends on non-renewable fossil fuel energy resources. This energy is used, for example, in the production, packaging, and application of chemical fertilizers and pesticides, in the manufacturing and operation of farm machinery, and in the distribution of agricultural products.

Some nations have abundant natural resources and can develop strong agricultural systems. Nations without the right combination of natural resources must rely on others for food and fiber. Nations also compete for available resources and those resources are traded between countries. The U.S. trades and sells Food and Fiber Systems products to other nations. In return, those nations may trade or sell resources or other goods and services to the U.S.

## **C. Understand Management and Conservation Practices Used in Food & Fiber Systems.**

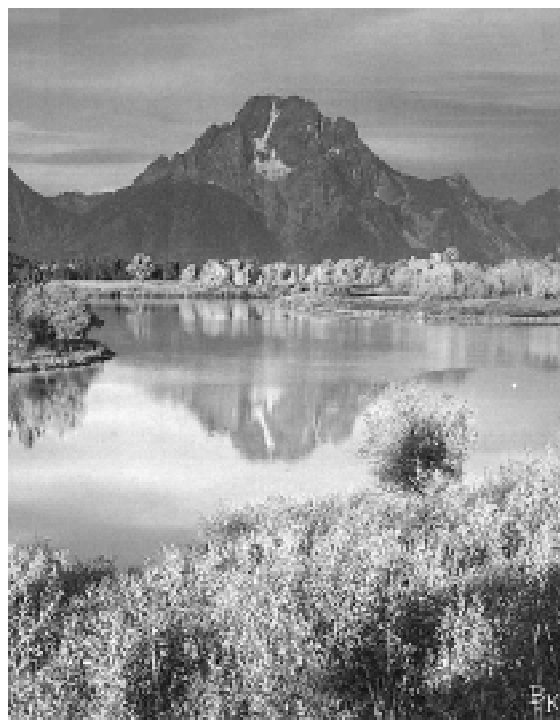
Conservation is the control and management of resources for present and future use. Agriculturalists have long been aware of the need to conserve natural resources. Conservation Districts have been created by all states to develop and carry out programs for natural resource conservation, use, and development.

The United States Department of Agriculture's Natural Resource Conservation Service provides conservation technical assistance through local conservation districts to individuals,

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***Agricultural inventions, such as the hay baler, have impacted every aspect of Food and Fiber Systems.***

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communities, watershed groups, tribal governments, federal, state, and local agencies, etc.

Conservation practices have been used in Food and Fiber Systems for years. Farming along the contour of hills or in terraces is an example of conservation technique that minimizes soil erosion.

Cover crops are grown to be plowed back into the soil to add organic matter. Cover crops also provide an alternative to leaving the ground bare for a season. The foliage keeps the topsoil from baking in the sun, and the roots hold soil in place when it rains.

Examples of other traditional conservation practices include crop rotation and the use of hedgerows. Farmers rotate the plants and animals they raise in one place to resist the development of disease-causing organisms. Hedgerows protect fields from the wind and provide habitats for beneficial species that help protect crops and livestock from pests and disease.

Some conservation practices, such as Integrated Pest Management, are relatively new. Dangerous inorganic pesticides have been phased out and regulations regarding pesticide use have become more stringent. IPM reduces dependence on pesticides by using combinations of practices to keep pest damage to crops and livestock in check.

There are other relatively new conservation practices. Minimum tillage reduces the number of times land must be tilled to prepare for planting, thereby saving labor costs while also

conserving topsoil and water. Genetic engineering has the potential to increase plant resistance to disease.

Sophisticated drip irrigation and soil moisture monitoring devices tell a grower exactly when, where, and how much water to apply to avoid waste. Modern agriculture is once again looking to traditional conservation practices to combine with state-of-the-art technologies in addressing environmental problems.

#### **D. Understand Science and Technology's Role in Food and Fiber Systems.**

Humans always have used technology in Food and Fiber Systems. The first technological advances were simple tools, such as sticks, for planting seeds or digging roots. More sophisticated developments, such as diverting irrigation water from rivers and selecting preferred seed and breeding stock, were critical to early agriculture.

Agricultural inventions came about through science and technology. Those inventions have impacted every aspect of Food and Fiber Systems. Some inventions, like McCormick's reaper and Whitney's cotton gin, improved production and processing capabilities. Others, like Carver's peanut butter, created new possibilities for storing and marketing products. Technological innovations, like gene-splicing and embryo transplanting, benefit agriculture and many other industries.



Technology to produce, process, and preserve agricultural products has been handed down through generations. Today, Food and Fiber Systems relies on technology in nearly every scientific field.

Examples of the application of science to real-world problems are found in each component of the food and fiber system. One of the most important technologies to change agriculture was the introduction of the internal combustion engine.

Machines effectively have replaced human and animal power in most aspects of Food and Fiber Systems. Fewer people are needed to do the manual labor agriculture once required. However, increasing numbers of people are needed to support new agricultural technologies.

For example, in the area of breeding and selection, scientists continually are working to develop improved plant varieties that are more nutritious and resistant to pests and diseases. Genetic engineering is revolutionizing this area of agriculture.

Many other aspects of agriculture have benefited from technology. Milk production, storage, and processing depend on microbiology. Plant Pathology research has revealed the role of insects in disease transmission. Chemistry has advanced the understanding of soil fertility and pest management.

Inappropriate use of technology, however, has led to problems, both for agriculture and the environment. People trained for Food and Fiber Systems careers

are needed to solve those problems. Biosystems and agricultural engineers find solutions to problems in soil and water conservation, tropical deforestation, and energy conservation.

Physiologists and toxicologists study agricultural chemical breakdown to determine environmental impacts. Biologists and microbiologists detoxify soil and water. Bio-researchers analyze information to make assessments and recommendations relating to plants, animals and humans.

Agriculture is the world's largest and most essential industry. People everywhere depend on the products of Food and Fiber Systems for food, clothes, and homes.

#### IV. Business and Economics

Agribusinesses engage in the production, processing, marketing, or distribution of agricultural products, or in supplying agricultural inputs.

Agribusinesses may furnish capital, machinery, equipment, chemicals, and supplies, as well as managerial and technical services. Revenues generated from Food and Fiber Systems businesses account for close to 20 percent of the annual U.S. gross national product.

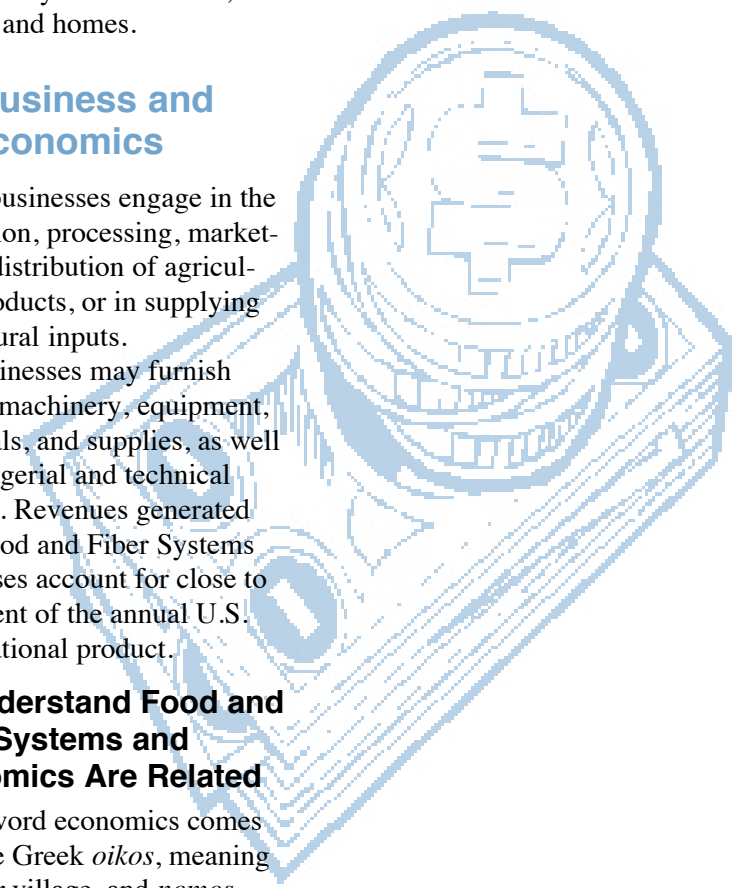
##### A. Understand Food and Fiber Systems and Economics Are Related

The word economics comes from the Greek *oikos*, meaning house or village, and *nomos*, meaning to manage or distribute.

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***Food and Fiber Systems represents a continuum extending from farms to factories, markets, and tables in every part of the world.***

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Economics involves managing the income and resources of a household, community, or government.

Agriculture and economics are interdependent. Throughout history, the development of cultures and economies has been based on agricultural practices. The economy of any household, community, or government depends on meeting food, clothing and shelter needs of the population.

Trade opportunities arise when product surpluses or shortages occur. For example, extreme weather may cause a shortage of a commodity in a state or region. Surplus production of the commodity in another region usually can meet the demand for the product. International marketing stabilizes the supply/demand fluctuations for most food and fiber products.

Natural, political, and societal events impact food and fiber trade. Weather that negatively impacts production influences prices of consumer goods. Elections and other changes in governments affect nations' economies and the global marketing of products and services. Changes in lifestyles, such as the trend toward lower fat foods, cause changes in consumer demand for products. Producers, processors and marketers use the expertise of economic analysts to better foresee and meet consumer demands.

Most of the world's people are employed in Food and Fiber Systems. Each step from produc-

tion to consumption of agricultural products generates jobs and economic activity. The primary economic activities of Food and Fiber Systems include:

- Production – the output of raw food, clothing and shelter products.

- Processing — the refining of raw products into finished goods.

- Supplies and Services - providing the inputs producers and processors require, including seeds, machinery, energy, chemicals, equipment, labor or expertise.

- Transportation and Distribution — moving raw products to processors and finished products to market.

- Marketing, and Trade — advertising, buying, and selling the products of Food and Fiber Systems.

- Research and Development— creating new crop and livestock varieties, new food and fiber products, uses for by-products, or new methods of producing, processing, and storing products.

- Finance and Insurance — providing capital to pay for and insure land, crops, machinery, and personnel.

## **B. Understand Food and Fiber Systems Have An Impact On Local, National, & International Economics.**

Food and Fiber Systems represents a continuum extending from farms to factories, markets, and tables in every part of the world. Producers sell



directly to consumers in places like local farmers' markets. However, most agricultural products are processed, packaged, and shipped long distances before reaching consumers.

There are large, international businesses that deal in food and fiber products. There are also smaller agribusinesses that rely on agriculture. Feed, seed and fertilizer dealers, implement dealers and equipment repair businesses rely on agricultural producers. The cardboard or plastic packaging manufacturer, restaurant owner, florist, and grocery store clerk also depend on Food and Fiber Systems for their livelihood.

Each step from production to consumption adds value to agricultural products. For example, what the producer sells for one dollar is processed and re-sold for more than one dollar. Packaging, transportation and advertising also add to the consumer cost of the product. The difference in the product price from the producer's sale to the consumer's purchase can more than double the final price.

Business opportunities exist in adding value to agricultural products, and many businesses use food and fiber inputs. Agricultural products are the raw materials of numerous industries. For example, the sap from tropical rubber trees is used to make car tires and tennis shoes; the fibers which surround the seeds of the cotton plant are made into clothing and paper; and trees become houses, paper, and packaging. Agricultural

exports are the number one income source for the U.S.

### **C. Understand Government's Role in Food and Fiber Systems.**

Government regulations exist to ensure an abundant and affordable food supply and to protect farmers, consumers, the environment, and the economy. Governments work to ensure that the market system operates without impediment to provide stability to the market structure. Tariffs and trade agreements between nations are measures used to provide that stability.

Some of the governmental functions regulating agriculture in this country include safety, inspection, and grading. There are regulations to protect the safety of agricultural workers. There are also safety regulations to protect human and animal foodstuffs. The United States Department of Agriculture and the Environmental Protection Agency are but two of the government entities performing agricultural inspections.

All meat and many other foods are inspected by the United States Department of Agriculture. The Environmental Protection Agency inspects watersheds and wildlife habitat for contamination. Nearly all agricultural commodities (eggs, milk, meat, grain, cotton, wool, etc.) are quality graded to ensure they meet government or industry standards.

Governments provide much of the funding for research aimed at improving agricultural practices.



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They also regulate trade through import duties and tariffs and create policies to manage the distribution of resources, such as water.

International Food and Fiber Systems issues sometimes require government intervention. Some agricultural products grown in other countries cannot be sold in the U.S. because they do not meet governmental standards or may carry parasites or disease that could damage U.S. agricultural products. The U.S. government regulates the use of illegal immigrant farm laborers in an attempt to prevent the exploitation of those individuals.

Government policies impacting agriculture are partly the result of political action by groups or individuals. People facing common problems band together to influence elected officials to help solve those problems. In some instances, issues are taken directly to the voters. Organizations, often with competing interests, advocate legislation favoring particular industries and commodities. The political process provides a means for settling differences about resource management and agricultural activities impacting the environment. Often, the best solution is a compromise between the two extremes.

#### **D. Understand Factors Influencing International Trade of Food & Fiber Products.**

Agricultural exports are a major component of U.S. foreign

trade. The import and export of food and fiber commodities are concerns of foreign policy makers. In parts of the world, land ownership, technology, and the education level of farmers limit what is grown. Additionally, currency exchange rates and world markets influence international trade choices.

Historically, nations have protected markets, thereby limiting international trade. The U.S. is establishing open trade policies with nations limiting or heavily taxing imports. The North American Free Trade Agreement, the World Trade Agreement the General Agreement on Trade and Tariffs, and other trade agreements work to minimize or eliminate taxes on food and fiber products.

International supply and demand affects the types and quantities of products produced and traded worldwide. Wars, political unrest, and related issues influence a nation's ability to produce surpluses for international trade. Adequate infrastructures, such as transportation and distribution systems, are required to successfully export and import products.

People in the United States are accustomed to food and clothing from other countries. Fresh fruit and vegetables from Central and South America supplement U.S. production, allowing a year-round supply. Beef from Argentina, wool from Australia and cotton from Egypt help provide stability to the market, but also force U.S. producers to be competitive.

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***Governments regulate trade through import duties and tariffs and create policies to manage the distribution of resources, such as water.***

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Numerous agricultural services are traded or sold between nations. Education, technology and consultation are a few examples of services traded among nations. Often, Food and Fiber Systems products or services are traded for industrial, or even military, products and services.

Increasing world population, food choices and economic prosperity are providing an expanding international market for affordable agricultural commodities. U.S. Food and Fiber Systems production is far ahead of the nation's consumption. With additional free trade opportunities, the nation's balance of trade—imports compared to exports— may become more favorable.

## V. Food, Nutrition, and Health

Food and Fiber Systems provides the abundant and affordable food supply needed for survival, growth, and health. Nutrition, food, and agriculture are inseparable. Knowledge of nutrition and health increasingly are important due to abundant food choices.

### A. Understand Food & Fiber Systems Provide Nourishment for People and Animals

People and animals depend on Food and Fiber Systems for survival. Food for humans and feed for animals come from agriculture. Often those food and foodstuffs are from the same raw

product, but are differently processed to be appealing and palatable to animals or people.

Most human foods are processed in some way. Many animal feeds are also processed. Processing adds flavor, increases digestibility, and makes food products more convenient. Processing also allows foodstuffs to be stored for long periods without spoiling or losing nutritive value.

Often, processing changes the raw product in such a way that it is unrecognizable. Corn syrup is used as sweetener in candy and confections. Grain and hay for animal feed may be ground and pelleted. The law requires processed foods to have an ingredient label attached.

Food and feed products may also contain additives. Additives are materials added to foodstuffs to aid in processing or preservation or to improve nutritive value, taste or visual appeal. Additives in food and feed sold in the U.S. are regulated and must be listed on ingredient labels.

### B. Understand Food and Fiber Systems Provide Healthy-Diet Components

Healthful eating means eating a variety of nutritious foods. Food contains six nutrients that people need for good health. These nutrients include carbohydrates, proteins, fats, minerals, vitamins, and water.

The USDA makes general recommendations about what people should eat. The USDA

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***Making bread, cheese or butter; raising fruits and vegetables; and preserving and preparing various foods always are great learning experiences.***

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Food Guide Pyramid suggests daily food servings. The Pyramid is made up of six sections, each containing foods of similar origin or nutrient value. When planning healthy meals, it is important to recognize the serving sizes according to the Food Guide Pyramid. The major food groups, their primary nutrients, and the number of recommended daily servings are important to a healthy diet.

Fats and sweets are not considered part of the major food groups and should be eaten in limited quantities. Some fats provide essential fatty acids, which are necessary for proper body function. However, foods primarily made of sugar or fat are considered empty calories because they provide little or no nutrition. Processed foods, in comparison to fresh foods, generally have more fat, sugar, and salt. Processed foods also may have preservatives added to extend shelf life.

An ideal diet, according to the Food Guide Pyramid, should provide all the essential nutrients for life stages, including, growth, maintenance, reproduction, and lactation. Exercise and activity levels are other considerations when determining food intake.

It is important to eat a variety of foods from all the major food groups. Breads, cereals, vegetables, and fruits form the largest part of the total diet, followed by milk and milk products and meat or meat alternates. Fats, sweets, and oils should form the smallest portion of the diet.

## **C. Understand Food and Fiber Systems Provides Food Choices**

Food and Fiber Systems provides a variety of year-round food choices. Foods not locally produced are available, partly due to the transportation and distribution networks.

Many factors influence food choices. One factor in food choice is cost. Generally, staple foods are less expensive; prepared foods are more costly.

Individual preferences are important in food selection. Many of these are based on habits, largely determined by cultural backgrounds. More Americans are purchasing food that is convenient to prepare because they choose to spend time on activities other than food preparation.

In addition to these fundamental factors, food choices are influenced by information that shapes opinions about food. Scientific research has revealed much about the nutritive properties of foods, as well as human requirements for nutrients. According to health professionals, eating well and exercising not only promotes health and wellness, but reduces risk of disease. Nutrition research findings affect consumer demand for specific foods.

Advertisements are another form of information that guides food choices. Advertising targets foods toward specific consumers. Demand also ultimately influences what is produced and how it is processed and marketed.

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***Individual preferences are important in food selection. One factor in food choice is cost.***

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The food industry tests and develops new varieties of foods and food-processing methods, and sponsors research to examine the health benefits of specific foods. The food industry works with health professionals and government agencies to ensure that nutritional benefits of foods accurately are represented.

Food safety is a growing concern among consumers. Agriculturists have worked to address food safety concerns through new management methods, technology, and the media. New technologies such as food irradiation and biologically engineered food products must be explained to consumers and safety concerns addressed if the technology is to be accepted.

The U.S. food supply is considered the safest in the world. Still, food safety issues do exist here and elsewhere. According to food safety experts, improper storage, handling, and preparation of food, both at home and at food establishments, poses the number one food safety problem today. Everyone who handles food in any form should know the basic safe food-handling practices.

#### **D. Understand Food and Fiber Systems Promotes A Safe Food Supply**

Safety concerns include microbiological contamination and drug and pesticide residues in food. As public health problems related to these substances continue to emerge, consumers may change some purchasing

habits or demand better regulation of food production practices. Together, food producers, consumer groups, and government agencies work to develop food safety and nutrition guidelines and regulations.

There are numerous food contaminants. Some, like insects, bacteria, and fungi, are living. Others, such as bone fragments or chemical residue are non-living. Contamination may occur during any step of food processing. Government policy and inspection guard against food contamination.

The USDA revised food-labeling laws so nutrition information on packaged foods is more complete and uniform to help consumers make healthier food choices. The USDA also regulates many areas of food safety, as well as providing consumer guidelines for safe handling, preparation and storage of foods.

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***Agriculturists have worked to address food safety concerns through new management methods, technology, and the media.***

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***The USDA reformed food-labeling laws so nutrition information on packaged foods is more complete and uniform to help consumers make healthier food choices.***

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