Addressing Misconceptions

Questions by Pillar

5 PILLARS of AGRICULTURAL LITERACY

Understanding the intersection between agriculture and society.

The Relationship Between Agriculture and the Environment	The Relationship Between Agriculture and Food, Fiber and Energy	The Relationship Between Agriculture and Animals	The Relationship Between Agriculture and Lifestyle	The Connection Between Agriculture and Technology	The Relationship Between Agriculture and the Economy
Land and Water Stewardship	Food Safety	Animal Welfare	Food Cost	New Developments	Careers
Family Responsibility	Inspection	Animal Safety	Nutrition	Impact of Technology	Impact on US Economy
Environmental Decision-making	Energy Sources	Animal Housing Systems	Processing	Biotechnology	Hunger
	Shared Values		Healthy Living	Environmental Impact	Role in Global Economy
	Ethics				
	Production Methods				

FOUNDATIONAL KNOWLEDGE

Definition of Agriculture | History | Taxonomy | Identification | Production Awareness

Who uses the greatest concentration of chemical pesticides per acre?

Homeowners actually apply the greatest concentration of chemical pesticides per acre. Pesticides are used when someone wants to get rid of a certain plant or pest. If you own a home, for example, you might use pesticides to remove dandelions from your yard or ants from your kitchen. According to the US Fish and Wildlife Service, homeowners apply pesticides at a rate up to ten times higher (per acre) than farmers. 67,000,000 pounds of synthetic pesticides are used on US lawns annually. That's equal to the weight of 22,000 Toyota Prius cars! Many farmers also use pesticides. According to the EPA, US Farmers spend $4.1 billion on pesticides annually. Pesticides are a tool farmers use to grow crops efficiently. Thanks to increases in technology, farmers today produce 262% more food with 2% fewer inputs (like pesticides) compared to 1950.

Does human activity causes all soil erosion?

Soil erosion happens naturally, whether or not humans are present. Water, weather and animals impact erosion as well. The Grand Canyon is a great example of natural erosion caused by water! Human activity can increase or decrease soil erosion. Farmers and ranchers know the importance of soil. Topsoil contains important nutrients that allow crops to grow. To prevent erosion, many farmers use conservation practices like planting cover crops in the winter.

How does farming and ranching impact wildlife habitat?

All people have the opportunity to harm or improve wildlife habitat. Farmers and ranchers value wildlife conservation and are working hard to improve habitat, while providing food, fiber and fuel to a growing population. To date, farmers, ranchers and other landowners have enrolled a total of 27 million acres in the Conservation Reserve Program to protect the environment and provide habitat for wildlife. Since the program started, more than 2 million acres of wetlands have been restored.

Is buying organic food better for the environment than buying food produced conventionally?

Ultimately, environmental sustainability comes down to the farmer, whether they produce goods organically or conventionally. Good farmers manage erosion, water use, control runoff and work to replenish the nutrients of the soil. There are many factors that affect environmental impact. Let's look at land use and transportation. An article published in the journal Nature by researches from Canada's McGill University and the University of Minnesota found that, as a whole, organic production produces 25% less food on the same land as conventional production. This is an average however, and some organically produced crops are comparable in productivity to conventionally produced crops. Transporting products also impacts the environment. All goods must be transported from the farm to a retailer, and often many stops in between. An organic or conventional farmer across the country may have a very sustainable farm, but transporting their goods to you can have an impact on the environment.

Do farmers use more or less land now, compared to the past?

In the US, farmland used for crops has declined by 70 million acres (15%) since 1982. This is caused on one hand by growing urban areas, and on the other, by increased technology that allows more food to be grown on less land. Globally, however, total farmland acreage continues to increase as developing nations strive to feed a rapidly growing population. Nations with less technology must use more land to produce the food they need. An article published in 2014 by Cornell University indicates that "by 2050 the world could have between 320 million and 849 million hectares (800 million - 2 billion acres) more natural land converted to cropland."

Does it require more inputs (labor, seeds, etc.) to produce food today, compared to the past?

US farmers and ranchers are actually producing more with less. According to the USDA Natural Resources Conservation Service National Resources Inventory, US farmers produced 262 percent more food in 2008 with 2 percent fewer inputs (labor, seeds, feed, fertilizer, etc.) compared with 1950. Globally this statistic varies drastically, with direct correlation to advancements in mechanical and biological technology available.

Can the world support more vegetarians than meat eaters?

Unfortunately the answer is not as simple as a mere calculation. Approximately 60% of the world's agricultural land is used for grazing. For more than 100 million people in arid regions, grazing livestock is their only source of livelihood. Half of the land area in the U.S. cannot be used for growing crops, and is used as grazing land instead. If cattle, sheep and goats were not grazed on this land, it would be of no use for food production.

Do cows cause global warming?

Environmental Protection Agency (EPA) reports indicate that cattle production is not a top contributor to greenhouse gasses. Livestock accounts for 3.1% of total U.S. greenhouse gas emission. For comparison, transportation accounts for 26%, and electricity generation accounts for 33% of total U.S. greenhouse gas emissions. Advances in the industry helped American farmers and ranchers reduce their overall carbon footprint by 16% between 1977 and 2007.

Do farmers use more pesticides and fertilizers when they use GM (genetically modified) seeds?

Using GM seeds that are selected for the right environment can actually decrease the amount of pesticides a farmer must use. Let's take a look at what's going on in the industry today. One of the most common GM varieties is called "Bt" seed - it allows a crop to release a protein from the bacterium Bacillus thuringiensis (Bt) that acts as a natural pesticide to certain insects. Use of pesticides with Bt crops has drastically decreased. Another common GM variety enables a plant to resist the herbicide glyphosate. For example, Roundup® is a common glyphosate product. Roundup® Ready Corn, a GM product, can still grow when Roundup® is applied. For these crops, herbicide use has increased, because farmers can apply the herbicide on all of their land. Glyphosate, however, is one of the mildest herbicides. It has toxicity 25 times less than caffeine. The ability to use Glyphosate more frequently has enabled farmers to decrease use of more toxic herbicides.

Do farmers waste water?

Water is necessary to grow plants that provide food, fiber and shelter for the world. Agriculture production in the U.S. accounts for approximately 80% of the nation's "consumptive water use". "Consumptive water use" is the term that describes water used and not returned to the original source. While agriculture requires significant water to grow crops and raise animals, unused water returns to the ecosystem. Farmers are focused on conserving water for several reasons: 1) Farmers know water wasted could mean a lack of the resource for future crops. 2) Water is expensive. Water wasted is money lost. 3) Farmers are cultivators. They use precise technology to know exactly how much water a plant needs to grow. Too much could mean poor production. 4) Many farmers rely on Mother Nature for water.

The Relationship Between Agriculture And Food, Fiber and Energy

If it is labeled "natural", does that mean it is safe?

Not necessarily. We have been led to believe that if it is natural, it will not hurt you, but this blanket statement is

not true. Bears and mountain lions are both natural! There are many naturally occurring toxins and carcinogens. Nicotine, opium, heroin, morphine and cocaine all come from plant sources. Arsenic, radon, lead and strychnine are all natural. According to the US Food and Drug Administration (FDA), "FDA has not developed a definition for use of the term natural. However the agency has not objected to the use of the term if the good does not contain added color, artificial flavors, or synthetic substances."

Does organic production use pesticides or synthetic fertilizers?

Synthetic fertilizers are not allowed in certified organic products, but select pesticides are allowable. The USDA National Organic Program (NOP) oversees organic certification. Organic producers must follow a strict process for production and processing of products. But organic does not mean "without pesticides". Natural pesticides and synthetic pesticides are allowed in some cases. The NOP requirements provide a list of synthetic substances that may be used in organic production, as long as these do not contaminate crops, soil or water. Alcohols, ethanol, chlorine and hydrogen peroxide are examples of some allowable synthetic substances allowed in organic production.

Are natural pesticides less toxic than synthetic pesticides?

This general statement is a common misconception. Several naturally occurring pesticides are highly toxic, even carcinogenic. Copper sulfate is highly toxic and shown to cause liver disease. Rotenone is a plant extract found in some species within the pea family. It has received significant attention because of studies indicating a potential link to Parkinson's disease. All pesticides, natural or synthetic, are reviewed and regulated by the Environmental Protection Agency (EPA).

Do farmers have higher than average rates of cancer because they apply chemical pesticides?

Farmers actually have lower overall cancer rates than the general population. The National Cancer Institute conducted an "Agricultural Health Study". The study began in 1993 and continued through 2011. The study concluded that farmers in many countries, including the US, have "lower overall death rates and cancer rates than the general population". This is due primarily to lower smoking rates among farmers, and a very active lifestyle.

The research also showed, however, that rates for certain types of cancer are higher in agricultural workers. Leukemia, non-Hodgkin lymphoma, and skin cancer are some examples. Research has not been conclusive on the cause of this increased rate.

Is natural and organic the same thing?

Natural and organic are not interchangeable terms. According to the Food Marketing Institute, "the term 'natural' applies broadly to foods that are minimally processed and free of synthetic preservatives." According to the USDA, "organic is a labeling term that indicates that the food or other agricultural product has been produced through approved methods that integrate cultural, biological, and mechanical practices that foster cycling of resources, promote biological balance, and conserve biodiversity." Organic processors go through a strict regulated certification process that involves reporting on how products are produced, processed and distributed. While the term "natural" is only vaguely defined, usually by the company producing the product, the term "organic" is clearly defined and subject to stringent federal regulations regarding its use.

Is food safety the farmer's responsibility?

Farmers and ranchers take food safety seriously. The food they raise are subject to extensive food safety regulations and inspections, and technology allows food to be traced back to the farm that produced it. Farmers and ranchers have a vested interest in food safety - the food they produce is not only for consumers, it is for their

family. The incidence of foodborne illness has dropped dramatically in the last 100 years. Yet while food safety starts on the farm, it does not end there. The companies that process agricultural commodities into food take care to ensure their products are safe. We must also do our part at home and at school to prevent foodborne illness. Here are a few important tips: cook foods to proper temperatures, use separate cutting boards for uncooked meat and ready-to-eat foods, store leftover food in shallow containers and refrigerate within two hours.

Could we get all of our electricity from solar?

Energy is like food - we need it every day, but we don't often think about where it comes from or what it takes to produce it. To keep the lights on (and other important functions) every day, we can't depend on one single source of energy. An article in The Guardian summed it up well, "to provide resilience and security we need a balanced energy mix that is secure, reduces emissions and delivers value." When the sun is not shining, we don't get much electricity from solar energy. When the wind is not blowing, wind energy is minimal. Balance provides consistent energy availability.

Do families own very many farms anymore?

Families own and operate most U.S. farms and ranches. Today, individuals, family partnerships or family corporations own 96 percent of all U.S. farms and ranches.

Is our food supply safe in the U.S.?

Yes. American farmers and ranchers are the starting point in our nation's food chain, which produces the safest food supply in the world. The U.S. Department of Agriculture (USDA) and the U.S. Department of Health and Human Services (HHS) are home to the primary federal food safety agencies. HHS is home to the Food and Drug Administration (FDA) and the Centers for Disease Control (CDC). The Food Safety and Inspection Service (FSIS) is housed at USDA. FSIS is "responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged." The FDA focuses on both fresh and processed food products. In addition to the federal agencies, many states have their food safety agencies and laws that govern the production of safe and wholesome foods within their respective states. The CDC's role is to prevent "illness, disability and death due to domestic and imported foodborne diseases". The CDC typically becomes involved when a food safety concern or outbreak has arisen.

How do we get electricity?

Energy used to make electricity in the U.S. comes from a variety of sources. Coal is used to produce 39% of the electricity we use in the U.S. Natural Gas produces 27% of our electricity, and nuclear power produces 19%. Hydropower is responsible for 7%, followed by other renewables including Biomass, Geothermal, Solar and Wind. Petroleum and other gasses make up less than 2% of electricity production in our country.

The Relationship Between Agriculture And Animals

Do brown cows produce chocolate milk?

No. All cows produce white milk. There are a number of breeds of dairy cattle - Holstein, Jersey, Brown Swiss, Ayrshire, Guernsey, and Milking Shorthorn to name a few - none of which produce chocolate milk. Chocolate milk is man made. Chocolate, from the tropical cacao tree, is mixed along with sugar into the white milk cows produce to create chocolate milk.

How many pounds of grain does it take to produce one pound of beef?

In the 1960's, information from the USDA was misinterpreted, leading people to believe it took 16 pounds of grain to produce one pound of beef. In reality, it takes 2.6 pounds of grain to produce one pound of beef in the

United States. For the first six to eight months of a calf's life it is primarily consuming mother's milk with a nibble of grass and hay to stimulate their rumen development. An average calf is 600 pounds before it begins to eat grain. 50-70% of a beef animal's feedlot diet is forages and feed that humans can't eat. These factors all contribute to the fact that it takes on average a mere 2.6 pounds of grain to produce one pound of delicious beef!

How much of the farm acreage in the US is used to produce feed for livestock?

Less than 18% of the harvested cropland in the United States produces animal feed. This figure includes both silage and hay production, which humans can't eat. How do hay and silage farmers work with the environment? Strip cropping and contour-strip cropping are two common environmental conservation methods. Using these methods, farmers plant strips of crops such as corn, wheat or soybeans with strips of alfalfa, clover, trefoil or vetch to hold the soil in place and slow water. This reduces soil erosion and allows water to infiltrate the soil. In addition to land used to grow crops for livestock, livestock are able to graze land that cannot otherwise be used to grow food for humans.

Could more people be fed if crops land was used for food for human consumption instead of livestock or livestock feed?

Animal agriculture plays an important role in feeding the growing population. Although it may appear that land used for livestock and livestock feed should be used for human food consumption, much of this land is not suitable for growing human food crops. Many acres used for livestock grazing are made up of forages that can only be eaten by ruminant animals, like cattle, and converted to products for humans to eat. Additionally animal agriculture provides the components humans need for a well-balanced, healthy diet and contribute a number of by-products including leather, ointments and creams for burns, insulin, paint brushes and sports equipment to name a few.

Are beef animals consuming grain that could be used to feed humans?

50-70% of a beef animal's feedlot diet is human inedible forages and feed. Cattle are ruminant animals, meaning they have a 4-chambered stomach. This unique stomach system is found in other farm animals like sheep and goats. These animals have the ability to graze pastures and eat forages that humans and other animals with non-ruminant stomachs cannot digest due to the fiber content. Cattle diets also consist of feed that has been converted from grain milling and processing waste. Cattle are able to convert this into a high quality protein for their diets. In fact, for every 100 pounds of human food produced by processing crops, 37 pounds of waste products are produced. These waste products will either be turned into animal feed or enter the waste stream to be disposed.

Do ranchers harm the environment by grazing animals?

Not necessarily. When properly managed, grazing animals can help the environment. "America's farmers and ranchers are considered everyday environmentalists," shares the Cattlemen's Beef Board. Ranchers work with the environment by practicing rotational grazing, using innovative technologies to produce more product with fewer natural resources, and partnering with environmental agencies to monitor and improve the environment.

What is animal welfare?

Animal welfare refers to the conditions in which an animal is raised. Animal welfare is important to ranchers because animals that are properly cared for will be healthier and more productive. According to the Animal Agriculture Alliance, "Producers take their ethical obligation to providing the best quality care to their animals very seriously." This Alliance has defined a list of Animal Care Principles for producers that include: "access to food and water, health and veterinary care, appropriate environmental and living conditions, implementing science-based husbandry practices, using proper handling practices, and provide comfortable and sanitary transporta-

tion to avoid stress."

Are ponies young horses?

A young horse is known as a foal. Horses come in many different breeds, including those classified as ponies. Ponies are small breeds of horses that, because of their size, appear much smaller when fully grown than larger breeds of horses. A horse's height is measured in hands from the ground to the withers (the area on top of a horse between its neck and back). A hand represents four inches. The term horse is generally applied to one that is 14.2 hands (4 feet, 9 inches) or taller. A mature horse shorter than 14 hands is considered a pony by the industry.

Is beef a healthy protein option?

Yes. Some cuts of beef can be as lean as a 3-oz. skinless chicken thigh. A 3-oz. serving of beef provides 10 essential nutrients including vitamins B6 and B12 and about half the daily requirement of protein. The National Institute of Health states that B6 is related to metabolism and immune function, as well as brain development during pregnancy. B12 helps blood cell and DNA development. Interestingly, no plants have naturally occurring B12.

What is the goal of antibiotic use in livestock?

There are three main reasons a livestock producer uses antibiotics; the least of which is to promote growth. More commonly, antibiotics are used to treat ill animals or prevent disease within a herd. Ranchers give antibiotics according to the instructions on the label and under the direction of a veterinarian. They don't like to use antibiotics unless it is absolutely necessary, because antibiotics are expensive and they take time to administer.

The Relationship Between Agriculture And Lifestyle

Are brown eggs more nutritious than white eggs?

No. There is no nutritional difference in the two colors of eggs. Both are good for you and part of a balanced diet. Different breeds of chickens lay different colored eggs. White Leghorns and Golden Comets are common breeds of egg-laying chickens. The White Leghorns lay white eggs, while the Golden Comets lay brown. Often, the color of the egg is the same as the color of the skin around the chicken's ears. Depending on where you live, you might see more brown or white eggs. There are more brown eggs in the Northeastern U.S., and more white eggs in the Western U.S.

If it says locally grown, does that mean it is from my community?

Not necessarily. This may come as a surprise, but if you're buying or eating locally grown food, it may not be food grown in your community. There is no set determination for the definition of locally grown. Locally grown products may have been grown at a local farm just up the road, in the same county as your farmers market, or possibly even within the same state. However in other cases, locally grown may come from 250, 400, or even 1000 miles away from the spot of sale. The Food, Conservation and Energy Act of 2008 defines locally grown as "being transported less than 400 miles, or from within the state in which it is produced". But retailers, states, farmer's markets, and other organizations may use their own definition. Want to know where your food comes from? Read the label or ask your local grocer.

Is global hunger caused by a shortage of food?

Not necessarily. In many cases, hunger is not caused by a shortage of food. In fact, the world produces enough food to feed everyone. Even Africa produces enough food to feed their continent. In most cases, hunger is caused by poverty. Poverty results in the inability to purchase food, safely store food, or transport food from where it is grown to where it is needed.

Are fresh, raw vegetables healthier and more nutritious than frozen vegetables?

Not necessarily. Research shows that frozen vegetables can even be more nutritious than fresh vegetables! Here are two reasons why: First, frozen vegetables are often left to ripen longer than fresh vegetables. As they ripen and mature, they become full of vitamins, minerals and antioxidants. Second, vegetables begin to lose their nutritional value as soon as they are harvested. Freezing slows this process. Scientists conducted a test on frozen and fresh vegetables. They found that vitamin C in fresh broccoli dropped by more than 50% within one week, but in frozen broccoli it dropped by only 10% in an entire. Those only eating fresh, raw vegetables may be missing out on the full nutritional benefit of eating vegetables from a variety of sources.

Is buying local and organic the same thing?

No. Local is a definition based on location. The Food, Conservation and Energy Act of 2008 defined locally grown as "being transported less than 400 miles, or from within the state in which it is produced," but retailers, states, farmer's markets, and others can come up with their own definition. Organic is a definition based on production method. According to the United States Department of Agriculture, organic farms follow a set of standards outlined in the Organic Foods Production Act. Products are held to these standards all the way from farm to table, and are subject to regular onsite inspections. Want to find out more about the National Organic Program? Visit www.ams.usda.gov/AMSv1.0/nop.

What does the label on my egg carton mean?

Here are some common labels:

- Omega-3 Enriched: ingredients like flaxseed and fish oils are added to hen's diets to increase omega-3 content
- Organic: hens are not in cages and are raised according to the USDA's National Organic Program guidelines.
- Free-range: hens are raised with access to the outdoors
- Cage-free: hens are allowed to roam in open areas

But don't be confused by the jargon. While an enriched egg may have additional nutrients like Omega-3 fatty acid, these eggs still have the same calories, protein, and total fat of conventional eggs. When it comes to production method, research suggests the diet of the hens is more important than where they live. Each production system has pros and cons. In order to maintain the egg production needed for the national and global demand, and keep egg prices low, layer houses with conventional cage systems are needed in the egg production process.

Where does our food come from?

83% of the food we eat in America is grown by U.S. farmers and ranchers right here on our own soil. About 17% of the food we eat is imported from other countries. The process of getting food from the farm to the table is called the "Food Supply Continuum." This continuum encompasses a number of steps in three main phases: pre-harvest, harvest, and postharvest. Included in pre-harvest is the producer or farmer, transportation of the product, and marketing of the product. The harvest phase includes harvesting the meat, fruit, vegetable or food product and processing it into a usable form. The final stage is postharvest, encompassing retailing the product, distributing the product through the food service industry, and finally reaching the consumer

Can I eat healthy without spending a lot of money?

Yes. Food in the United States is very affordable. We only spend an average of 10% of our disposable income on food, compared to 20% in countries like Poland and 47% in countries like Camaroon. According to the USDA Center for Nutrition Policy, a family of four on a thrifty meal plan can eat at home for about $131 a week. American farmers work hard to provide consumers safe, healthy and wholesome food at these affordable prices. Additionally, consumers can follow tips from www.myplate.gov about healthy eating on a budget. These include

creating a game plan before grocery shopping, learning to correctly read food labels, and researching budget-conscious meals.

Is agriculture a necessary industry?

Agriculture is a necessity! It creates jobs, helps our economy and provides our basic necessities - food, fiber (like cotton and wool), and shelter (like lumber for homes). Jason Fearneyhough, the director the Wyoming Department of Agriculture, shared that "there is a high possibility that there will be 9 billion people to feed, clothe, and provide shelter for by 2050. And more than likely, this population explosion will need to be supported with fewer resources, more regulations and less understanding of where our food comes from and what it takes to get it from the farm or ranch to your table." Farmers of all ages face this challenge, and must continue to be advocates for the importance of agriculture and the need for the industry in the future.

Is high fructose corn syrup the cause of obesity in the U.S.?

Not necessarily. High fructose corn syrup (HFCS) is a common sweetener in sodas and drinks. Recently it has come under fire for impacting obesity, but research suggests that there is no significant difference between HFCS and other sweeteners. Researchers are confident, however, that too much sugar of any kind in a diet can lead to obesity. The American Heart Association recommends no more than 100 calories a day from added sugar for women, and 150 calories for men. That's equal to about 6 tsp of sugar for women, and 9 tsp for men.

The Relationship Between Agriculture And Technology

What are genetically modified organisms (GMOs)?

According to the World Health Organization, GMOs are defined as, "organisms in which the genetic material (DNA) has been altered in a way that does not occur naturally." GMOAnswers.com explains that biotechnology is the term that is used to describe the process of "making a copy of a gene for a desired trait from one plant or organism and using it in another plant." Genetic modification happens in nature, just not consistently. GMOs are the product of consistent modification by scientists.

Are genetically modified organisms (GMOs) the only organisms with genes?

No. Living or once living things contain genes, whether they are genetically modified or not. "Gene" is the root word for genetics. Genes are located on chromosomes. They control the traits of an organism, such as height, productivity, drought tolerance or pest resistance.

Can eating a genetically modified fruit or vegetable change a person's genes?

Eating GMO products does not impact our genes. Our bodies digest the proteins and absorb the amino acids in food. The body cannot tell where a protein comes from, and treats all proteins alike. This misconception may stem from the issue of allergic reactions. When a gene from one organism is transferred to another, there is a chance that a person could have an allergic reaction to the gene that was placed in the new organism. The World Health Organization explains that the "transfer of genes from commonly allergenic foods is discouraged". They clarify that there have been no allergic effects found related to GM foods in general.

Can farmers save and replant GMO seeds?

GMO seeds, like any others, can be saved and replanted. This misconception is a result of so-called "terminator genes" that were researched in the 1990's to make seeds sterile, but they never made it into production. However, when farmers purchase GMO seed, they enter into contracts with seed companies and sign an agreement to purchase new seed each year and not save seed from their crops to plant the following year. This is a result of two factors, neither of which is related to the ability of the harvested GMO variety to sprout if planted. First, the

contract's provisions are binding and represent a business decision on the part of the farmer and the seed company's desire to protect their variety and, certainly, to encourage future sales. Second, most commercial growers don't save seed because the generation of harvested seeds will not uniformly contain all of the desired genetic traits of the original seed.

Will we need more farmers to feed the growing population?

There are two issues to break down in this question. First, the population is growing and more food will need to be produced. It is estimated that, by 2050, the global population will reach 9 billion and agricultural production will need to increase by 60 percent. But this does not automatically mean we will need 60 percent more farmers. Technology will play a key role in increasing efficiency to meet the rising food demand. However, it is important to note that America's population of farmers and ranchers is aging. The median age of farmers is 55.9 years, which means the U.S. will need to train a new generation of farmers and ranchers to fill the gaps left by those retiring in the next twenty years.

What is the difference between cloning and genetic modification (GM)?

Genetic modification and cloning are not the same. Cloning provides an exact copy. Cloned genes can only be copied in the same specie. Genetic modification (genetic engineering) something scientists do to pick out a specific set of genes, and place these genes in an organism where the traits would be helpful. This can happen across species. Take corn, for example. No one likes pests eating their corn. So scientists found a naturally occurring bacteria called Bt. This bacteria usually lives in the soil, but scientists were able to extract the gene that kills insects from this bacteria. By adding this gene to a corn plant, it can naturally fend off pests.

When a private company funds research, will the research be biased toward the company?

Even when a company funds research, they engage scientists from the public sector to conduct research. These researchers have no obligation to provide research that supports the cause of the sponsoring company. These scientists independently analyze data and report their findings.

What is RFID technology?

Radio frequency identification (RFID) is a technology that has been used to identify and track livestock animals. You'll find RFID in action on dairy farms for example, where cows often have high-tech collars that help the farmer track how much the cow is eating and how much milk she is producing. Researchers suggest that this "tagging technology" could be expanded to crops, so that an individual crop could be traced more efficiently from the farm to the table, using a simple computer chip. RFID has already made it into the hay-bailing market, where farmers use the technology to track large bales of hay and keep track of important characteristics, such as weight and moisture level.

What kind of technology do farmers use in the field to help the environment?

GPS (Global Positioning Systems) is a common technology used by farmers. With GPS, farmers can track every location on the farm and know what the soil needs at that exact location. Soil moisture meters and crop sensors are also trending technology that helps farmers more efficiently dial in the inputs they must use, like water and fertilizer, to grow crops. Sensors placed directly in the field can send information to a farm office showing how much water is in the soil and what the nutrient level is for key nutrients like Nitrogen. This technology can also communicate in real time with tractors and other equipment, so that each area of a field gets just the right amount of water or fertilizer applied.

How is tractor technology changing?

Tractor technology is changing! Auto-steer and GPS (Global Positioning Systems) help make farming more efficient. Tractor technology is also helping the environment. Manufacturers have developed new "Tier 4 engines" that are practically smokeless. They require less maintenance from operators, get better fuel efficiency, and have more power and clean exhaust! These tractors are more expensive for (up to 9% higher than previous models). New computer technology also allows farmers to gather data on planting and harvesting, which can provide valuable information on how to improve efficiency and productivity.

The Relationship Between Agriculture And The Economy

Are we losing family farms because corporate farms are taking over American Agriculture?

America's farms are still family farms. Family farms do incorporate for the same reasons that other businesses incorporate - taxes, structure, family home protection, etc. And yes, some family farms are becoming larger to take advantage of efficiencies of scale and to spread out their overhead costs. However, they are still considered family farms. Family farms and ranches make up 96 percent of all farms in the United States, a statistic that has held steady for many years.

If a farm is large, does that mean it is a corporate farm?

Just because a farm is large in number of acres, does not mean it is a corporate farm. Individuals, family partnerships or family corporations own 96 percent of all U.S. farms and ranches. Non-family corporations own just 4 percent of America's farms and ranches. In recent years, some of these family farms have chosen to incorporate advantages in the form of taxes, business structure, family home protection, etc. Additionally, the last census shows the total sales of non-family corporate farms have remained steady for the past twenty years, and the number of family farms has grown by nearly 4%.

Does most of the money I pay for food go back to the farmer?

Not necessarily. According to Food and Farm Facts 2013, off-farm costs such as marketing, processing, wholesaling, distributing and retailing food products account for an average of 84 cents of every retail dollar spent on food. That leaves an average of only 16 cents returning to farmers and ranchers. Over the years, this number has been on the decline. In 1980, farmers received 31 cents out of every retail dollar spent on food in the United States. And, while this number continues to decline, the farmers' expenses to produce food for our country continues to rise.

Does my food price go up because farmers want to make more money?

When you see an increase in price at the grocery story, don't assume it's going into the pocket of your local farmers. For the most part, farmers are "price takers", not "price setters". When their crop or animal is ready to sell, they have to sell at the current price. On average, only 16 cents of every retail dollar return to farmers and ranchers. And as food prices increase, the amount of moneymaking it's way back to farmers doesn't always correlate. In fact, in many cases farmers and ranchers see an increase on their end in the form of the cost of inputs. These inputs include land, equipment, fertilizer, chemical, see, buildings and facilities, maintenance, labor, fuel, heating, feed, taxes, insurance, and more. And as these expenses continue to rise, farmers and ranchers continually strive to increase their yields and efficiency so they can remain competitive and profitable in the long term.

Is agriculture a luxury or a matter of national security?

American agriculture is a matter of national security. We have made astounding advancements in agriculture

since colonial times. During colonial times one farmer fed four others. Today, one farmer produces food for 154 others. American agriculture is vital to our country! Consider the impact to not only the United States, but globally, if our food supply was interrupted or contaminated. According to the Agricultural Security and Nationally Coordinated Networks: The Need for Federal Support of Research, Education, and Extension publication, agriculture is "one of the seventeen recognized critical infrastructures (Food and Agriculture) of the United States, and by extension, the world."

Do agricultural exports help the economy?

According to Food and Farm Facts 2013, $141.3 billion worth of American agricultural products were exported around the globe in 2012. China and Canada are the largest trading partners of the U.S., together accounting for 1/3 of all U.S. agricultural exports. About 36% of all U.S. agricultural products by value are exported yearly, including 94 million tons of coarse grains, soybeans and feed, 4 million tons of poultry meats and 3 million tons of fresh fruit. For years, agriculture has been one of the few U.S. business sectors with a positive trade balance when exports are compared to imports.

Does the United States import more agricultural products than we export?

Agriculture has a positive trade balance, which means we send out (export) more than we bring in (import). The United States ag exports account for $141.3 billion with soybeans, beef, veal, pork & poultry, and fresh and processed fruits and veggies topping the list. United States agriculture imports total 103.2 billion with coffee and cocoa, fresh and processed vegetables, and grains and feeds accounting for the majority.

Is the primary focus of the USDA agricultural programs?

Agriculture programs equal only 16% of the USDA budget. Conservation and forestry and other programs including food safety, rural development, and research and marketing/regulatory programs account for an equal amount of the budget at 6%. The primary focus of the USDA's budget lies with the food assistance and nutrition programs. These account for nearly 75 percent of the budget. These programs include the Supplemental Nutrition Program or SNAP (formerly known as Food Stamps); Women, Infants and Children or WIC; and school lunch/breakfast programs. USDA also has many programs that provide benefits to all Americans, ranging from environmental enhancement through its conservation and forestry programs to assisting rural communities provide critical services, such as water, sewer treatment, electricity and telecommunications, as well as building schools, churches and rural businesses through its Rural Development programs.

Is more money spent on agriculture than on health care?

Health care far outweighs agriculture in terms of the 10-year federal big budget items. In the U.S., 10-year federal spending amounts to approximately $46.7 trillion. Of this, 64% or $29.9 trillion will be spent on health care, social security, and net interest on public debt. On the other hand, agriculture accounts for a mere 2% of the budget, or $975 billion including food assistance and nutrition programs. Without these programs, the agriculture baseline would account for less than .5 percent or $211 billion of the total $46.7 trillion budget.

Is food in the United States considered expensive?

Of all the developed countries in the word, the United States has the most affordable food. United States consumers spend just 10% of their disposable income on food each year. The closest behind the U.S. is Italy, spending 15%, Poland at 20%, and the Philippines at 36%. Consumers in Kenya and Cameroon spend over 40% of their disposable income on food.

Be sure to check out these other supporting resources in the online version of Addressing Misconceptions:

Credibility Checklist

Implementation Strategies

Content References

Questions? Ideas? We want to hear from you!

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