Environmental Sustainability: Hunger in the Class Room

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Rationale

Upton Sinclair's 1906 novel *The Jungle* was primarily written to uncover "the inferno of exploitation of the immigrant factory workers" in turn of the 20th century Chicago.The public instead fixated on the safety of their food supply. Immigrant Lithuanian workers fell in to fat rendering tanks and were ground up along with the pig and beef parts and sent out to the world as Durham's Pure Leaf Lard. As a result of the public outcry Congress would pass the *Meat Inspection Act and Pure Food and Drug Act* of 1906. This would eventually lead to the formation of the Food and Drug Administration in 1930. Sinclair's visceral portrayal of then big business meat packing plants and the grinding poverty of the workers changed the food industry. A hundred years later much has changed in the food industry and yet a few things remain the same. Much of our food industry is in the hands of a few behemoth agribusiness companies such as Cargill, Monsanto, Smithfield, ADM, ConAgra, Bunge, Tyson and Syngenta. What sickened us in 1906 is once again haunting us in 2010. In the US illness and death from contaminated meat, chicken, peanut butter, lettuce and spinach have been headlines in the news since the early 1990's.

With a growing world population heading to seven billion how can we continue to provide safe and nutritious food to the world's people? How can we make sure that our food production will be sustainable and of a quality needed and desired by the entire world's population? My students are the same age – 13 – as I was when I first read *The Jungle.* It changed the way I looked at food and some of the choices I made when eating. I want my students to examine where their food comes from, whether it's a burger from McDonald's, corn on the cob and Pop Tarts from the grocery store or mom's homemade pastitsio. I want them to recognize the difference between agribusiness and sustainable agriculture. From there, I would expect that they be able to make good and healthy choices that will change our local food landscape now and in to the future. Their actions can help sustain our agriculture which in turn could affect a change on the local, national and world wide economy of food. This generation of kids can change linkages between

them as the consumers and the food producers. The connections we need are “impossible when our food choices are so distantly removed from their sources”.

Background

Sustainability

What is sustainability? According to the National Sustainable Info Service, sustainable agriculture is “one that produces abundant food without depleting the earth’s resources or polluting its environment”. Like nature, the systems that produce crops and livestock are self-sustaining. Sustainable agriculture is tied to our global economy, declining oil supplies and global food security. This movement consists of small farmers, environmentalists and agricultural scientists who saw how our 20th century farming methods devastated our water and soil, the basis of our agricultural production. The huge industrial agribusiness approach along with massive government subsidies, made our food cheap and plentiful in the US. The 20th century industrial model has caused a “depletion and degradation of water and soil, diluted the biodiversity of our crops, increased dependence on oil and driven an immense amount of acres into the hands of fewer farmers”. Sustainable agriculture encourages “biodiversity, recycles plant nutrients, prevents spoil erosion, utilizes minimum tillage, protects our water and integrates our crop and livestock enterprises on the family farm and minimize the use of pesticides”.

How can we achieve sustainability? There is no one single formula for success. Some of the things we can do to move towards sustainability would include utilizing the local farmers markets, selling to restaurants, agri-tourism, reducing the use of synthetic fertilizers, eliminate tillage (plowing all on the field under) protecting the quality of our water and reducing runoff, decreasing leaching, build a healthy soil that will house beneficial organisms, restore predator-pest balances, abandon monocropping in favor of crop rotation and manage pastures to support a diverse selection of forage plants for our livestock.

Where do we start? A class room of kindergartners planting a garden, eighth graders visiting sustainable livestock farms or a community college like Central Carolina Community College is a good place. CCCC in Pittsboro, NC (near Chapel Hill) established a partnership with the NC Cooperative Extension. With input from the Carolina Farm Stewardship Association, a curriculum to grow better, healthy food has

been established. The North Carolina market is hungry for sustainably grown products, whether veggies, meat, pork, poultry, eggs and dairy products. About 85% of certified organic products are grown out of the state. That percentage is changing.

North Carolina ranks as 28th in area size, similar in size to New York and Arkansas. North Carolina farmers mirror the national agricultural scene. There are some 5 million fewer farms in the US today than in the 1930's. North Carolina has approximately 48,000, down from 55,000 in 2001, with farm size an average of 436 acres. From 1978 to 1992 North Carolina farms decreased by more than 40%, mostly in farms up to 2200 acres. In 1860 North Carolina had 69,000 farms. It was not uncommon from 1910 to 1930 that sharecropping farmers earned 9 cents a day. The 1940's farm population was at 40% and 8.5% of those farm families had no flushing toilets. The 1950's numbers were at about 301,000 farmers, thanks in part to returning WWII vets and mechanization. In the past 20 years we have lost ½ of our farms, 2,000 per year. In 1950 each farmer provided food for 27 others. Today a farmer provides food for 137 people. In 1900 an average NC farmer had about $131.00 ($3460 today) worth of farm equipment, including horse or mule. Today it is not uncommon for a farm to have $1 million plus in farm equipment. In 1883 average corn yield for North Carolina was 11.5 bushels per acre. In 1992 that figure was 95 bushels, with fertilizers making up part of that enormous leap forward.

There are more hogs, turkey and chickens than ever in North Carolina. Dairy cattle and sheep have declined. Historically, North Carolina agriculture was one of subsistence. Now it is a cash crop operating in a worldwide market. For example, hog farms have fallen from 28,000 in 1987 to 8,000 in 1997 but the amount of hogs have more than tripled. Large agribusinesses like Smithfield have bought out smaller family farms. Seven million hogs have taken over the land once known as the tobacco capitol of North Carolina.

North Carolina is 2nd in the nation, after Iowa in the hog farming industry. NC accounts for 22.1% in cash receipts for hog products. Along with the hog invasion has come the odor invasion. This is a set up for an emotional grower asserting his right to earn a living versus a neighbor who has the right to have odor free stench. The ratio of pigs to people in Duplin County, NC, is 32 to 1! Hogs provide 9.5 million tons of waste, which is stored in 10 acre lagoons 12 feet deep. The lagoon's material can leach out in to local groundwater supplies. Hogs are kept in holding cells resembling death row solitary confinement. Smithfield is the largest pork producer in the state. Local organizations and newspapers such as the *Raleigh News and Observer* have furthered the cause to stop hog farms from polluting the land and lives of the Eastern Carolina people.

In July of 2007 North Carolina became the first state in the nation to ban the construction and expansion of the hog lagoons and spray fields. North Carolina State University researchers have encouraged Smithfield and other pork producers to transition from traditional lagoons to more environmentally friendly methods of waste disposal. Cleaner hog waste systems will help reduce costs and spur new markets for waste byproducts, benefiting farmer, economy and the environment. The slow but steady rise of organic hog farms in North Carolina, such as Grateful Growers, is starting to change the hog industry and our dinner plate. Free ranging pigs rolling in the mud, such as the heirloom Tamworth breed, originating from early 18th century England, supply farmers markets and several restaurants that are moving in the direction of the local food movement in the Charlotte region.

North Carolina shares 8.34% of the poultry slaughter business in the US, number one being Georgia with 14.92%. Poor animal living conditions on many poultry farms cause the chickens increased levels of stress hormones. This hormone allows the growth of *Campylobacter*, a food borne bacteria which sickens 2.4 million Americans each year. The CDC estimates that 124 people die each year as a result of these bacteria. Researchers are identifying steps to reverse the *Campylobacter*, such as reducing stocking density, "controlling humidity in the chicken's environment which thereby reduces the chicken's stress". Tom Humphrey, lead researcher at the UK's University of Liverpool says that a happy chicken is a safe chicken! If customers would just pay a few more pennies for their chickens these deadly outcomes could change and we would have better chickens and healthy people.

In the US federal health officials estimate that food borne diseases sicken 76 million people a year and kill 5,000 Americans each year. Four companies control 83% of all beef processing. In 1996 the USDA determined that 7.5% of beef samples were contaminated with *Salmonella*, 12% with *Listeria* and 30% with *Staphylococcus aureus*. This is a result of filthy conditions in which many of our farm animals are raised and the high speed at which they have to be processed and delivered. In order to gain the most profits, large meat packing plants have increased the speed of their production. For example, in the late 1980's a meat packing plant processed 175 cattle per hour. Today that number is 400. Because the lines move so fast it is exceedingly difficult to keep feces from spreading to the tables. In 2002 meat packing giant Con Agra recalled over 19 million pounds of contaminated *E. coli* meat. The recall did not move fast enough. One person died, 35 others had been sickened and 80% of that beef had already been

consumed. The USDA cannot close a meat plant down that has not met supposedly rigid USDA inspection standards and the recall process lengthens. USDA can suggest how things should be handled but often this does not happen. There are not enough teeth in the laws that govern the meat packing industry. Smaller and sustainable meat houses operate at a much slower pace because they handle much smaller amounts. Knowing your rancher and the practices they utilize is extremely beneficial, although expensive, for the consumer.

Mecklenburg County (Charlotte) has about 236 farms (19135 acres). That averages out to about 81 acres per farm. Crops such as corn, soy, beans, tomatoes, strawberries and other fruit make up about 43% of the farms. Pasturing consists of about 22%, wood 26% and other products close to 8%. Crop sales for Mecklenburg totals $71.5 million, livestock $3 million. Included in these farms and market values of products sold are several sustainable farms. Dan Rosenberg founded Instant Organic Garden in Charlotte in 2006. These are gardens using organic principles and located in homeowner's back yards. Poplar Ridge Farm offers Certified Organic Community Supported Agriculture (CSA) products. People can purchase a full, half or mini share of the produce grown on the farm. In return they receive organic flowers, eggs, poultry, goat's milk cheese, pork and beef. Other farms within 20 miles of Charlotte, like Grateful Growers, Laughing Owl Farm and Big Oak Beef produce organic and conscientiously grown food. Heritage breeds such as Tamworth hogs, Delaware chickens and Blue Swedish ducks are part of our nation's culinary and agricultural history. Hormones, chemical fertilizers, meat byproducts, antibiotics are not used and animals are not confined. Large agribusiness won't do this.

Food is a complex issue for all of us. Seventeen thousand children die worldwide each day as a result of starvation, according to the UN. Somewhere in our world a child dies of hunger every five seconds, although we have more than enough food to feed us all. We have to find a way to meet these needs without compromising the ability of our children to meet their needs. We must take into consideration "working and living conditions of workers, needs of rural communities, and consumer health and safety both now and in the future." Nourishing the land and taking care of natural resources from local to national to global will help us meet sustainability. Reaching sustainability will take everyone, from farmer to policymakers, researchers, retailers and consumers.

School/Community

I teach 8th grade US/NC Social Studies at Bailey Middle School in Cornelius, North Carolina. Part of my year long focus as part of the sustainability unit will be on the history of food from 1492 to present day. This objective will be incorporated into immigration, settlement and how the need for food drove our history socially, politically and environmentally. How we have dealt with settlement, food growth and distribution does not bode well for continued and equal sustainability for our community, nation and world. We are looking at a population of 7.6 billion in 2025 and 9.1 billion in 2050.

To understand the context in which I created this unit, it will be helpful to understand the following demographics and other information. Mecklenburg County's population is about 800,000 and still growing. Surrounding counties add another million more to that population. This makes it the 18th largest city in the United States. Racial makeup of the city is 55% Caucasian, 33% African American, 11% Latino, and 4% Asian. CMS (Charlotte Mecklenburg Schools) is the 2nd largest school system in the state and 20th largest in the nation. Approximately 132,000 students attend the 161 public schools within the system.

Bailey Middle School draws from three suburban communities at the north end of the county. These communities include Huntersville, Cornelius and Davidson. These are former text mill towns built along the railroad line. The towns are surrounded by large rural areas. Huntersville's population is 38,000. Estimated median income is $$81,000 (state is $46,500) and average house prices are $260,000 (state is $154,000). Cornelius' population is 14,800, average housing is $315,000 and median income is $80,000. Davidson's population is 9,600, median house prices are $353,670 and income is $78,300.

Ten miles to the south, Charlotte is home to Bank of America, Wells Fargo, Duke Energy and NASCAR. The city is still considered the nation's second largest banking center, after New York. Universities that are based in Charlotte include University of North Carolina at Charlotte, Johnson C. Smith, Davidson College, Central Piedmont Community College, Queens University, Kings College, and Johnson and Wales University.

Bailey is a relatively new school, built when the school system and the city was flush with money in 2006. Its current population is 1330. The current racial makeup is 10% African American, 77% Caucasian, 2% Asian, 7% Latino, and 2.9% multi. I have 180 students this year in my History classes. Social Studies and Science are taught every

other day in an A day B day format. Students are grouped according to ability in 8th grade as a result of Standard Plus Math or Algebra and Standard Plus Language Arts or Honors Language Arts. Standard Plus Math is at 8th grade or slightly above grade level. Algebra is a high school course with an End of Course test that covers it as a successful completion of one of the four required high school math classes. Standard Plus Language Arts is at or slightly above grade level. There are six teachers on the Panther team, two Language Arts, one Standard Plus Math, one Algebra teacher, one Science and one Social Studies teacher. There are 450 eighth graders and we have 2 and ¾ teams. Other grade levels operate similarly. In addition there are foreign language, computer, band, PE, art, dance, drama and EC (exceptional Ed) classes within the school. While there are no honors Science or Social Studies classes, students end up being tracked as a result of Language Arts and Math. So, four of my classes are higher than average and two are at or slightly below grade level. Classes meet for approximately 90 minutes a day, Science, Social Studies and electives every other day. A fifth block after lunch is used for remediation for those students who scored less than a three on End of Grade tests. Those not in remediation are in a study hall, jazz band, year book or AVID (Advancement Via Individual Determination). School hours are 8:45-3:45. Students have four classes plus their fifth block each day. There is a very active fall, winter and spring sports program as well as several cultural arts events.

North Carolina administers EOG (End of Grade) tests in middle school and EOC (End of Course) tests for any high school test, such as Algebra. EOG tests can determine whether a student passes the 8th grade or stay behind. EOC test count ¼ of a student's yearly grade. EOG's are not counted in this way. There was an EOG test for Social Studies up until four years ago. The test consisted of multiple choice and a DBQ (Document Based Question) essay. Our school system budget is under constant fire and bringing back the test for Social Studies is not high on the budget list.

One last group of statistics may help you form a complete picture of our student body. Free and reduced lunch is a federally funded program that provides free or greatly reduced prices for breakfast and lunch to students who qualify based on size of family and parent's income. Bailey Middle is currently at 21.5% free and reduced students. This means approximately 285 students here at Bailey qualify for this program. Some schools within CMS are at a 90% free and reduced level. The breakfast and lunch they receive may be the only decent meal they get during the day. There is a one meal a day during the week when school breaks for summer. The feeding centers are located at several high schools in Mecklenburg County. Of the 180 students I have about 39 are on free and

reduced lunch. At a school where the F/R rate is 90% and the population is 600, 540 students are given breakfast and lunch Monday through Thursday. That's a mind boggling 21.6 out of 25 kids in the kindergarten class.

History of Food as a Driving Force in the United States

The eighth grade curriculum for US/NC history is not necessarily about food. However, so much of our history from 1492 is driven by the search for a better life, religious freedom and the free land that came with arrival to early America. Early communities like Jamestown and Plymouth supported populations of over a hundred each but a cruel winter, inexperience and starvation left each colony with less than 55 people alive after the first winter. Once news of gold in the form of tobacco and Virginia's headright system hit England people came in droves, eventually in the millions. The headright system offered 50 to 100 acres of free land to heads of the household. The land was not really theirs to take but once disease and guns wiped out many local Native American villages the land was taken. By 1775 the colonies were looking at 2 million, in 1860 31 million, 1900 76 million, 1960 179 million and finally 2010 300+ million. Our early increases through the 1920's were driven by immigration.

I start the year with the Big Hunt and Native American movement from Asia across the Bering Strait to the Americas. Their journey would eventually lead to the domestication of the potato, tomato, corn, various beans and squash. I address how the Colombian Exchange will radically alter what our dinner plate looks like. These foods will change the global diet and economy. Corn or maize can be found on every continent except Antarctica. Corn has become the basis for not just our dinner plate but also the food for livestock and fuel for our automobiles. Corn played an important part in the opening up, railroad building and development of the Great Plains during the 19th century. There are over 500 uses for corn, everything from polenta to rayon to pesticides to biofuel.

The potato was domesticated an estimated 5,000 years ago in central Peru and Chile. It may be a dull, misshapen, object with little smell but it has transformed our historical landscape. It fed us and our animals and gave us vodka. It's used as an adhesive in the textile industry. Today the world eats upwards of 75 pounds of potatoes per person per year! Potatoes provided up to four times the calories per acre than corn, wheat or barley in 19th century Europe. The potato or the lack of it drove the Irish from their homeland by the millions. An estimated 4+ million emigrated out of Ireland from the 1820's into the

early 20th century. They came in search of jobs, survival, free land and political rights. Starving, broke, politically disenfranchised by the British the Irish made up over one half of all immigrants to the United States in the 1840's and one third during the 1850's. They provided the backbone for the Union Army during the Civil War.

Ireland is similar in size to Maine. About one third of Irish farm land was taken up by the potato in the 1840's. Landless laborers rented land and could grow an acre of potatoes, milk a cow and provide enough food for the whole family. Not much variety but enough to keep them alive. The lack of diversity in the potatoes imported to Ireland left the crop vulnerable to diseases and in 1845 disaster hit. A blight spread like wild fire through much of Ireland. The blight turned the newly harvested potato into a slimy mush. In less than four years over a million Irish died from the famine. There was enough food grown in Ireland but it was exported to England to feed hungry factory workers. By the time the British were ready to deal with the famine or forced to due to world public opinion, it was too late. Those that had not starved to death or were not attacked by opportunistic diseases that often came with starvation emigrated to America and Australia.

The Irish that survived the ship journey to America came seeking food, a second chance at life and the right to vote. In 1859 New York City alone, "55% of those arrested were the Irish." They were met with Nativist and anti-Catholic sentiment and "No Irish Need Apply" signs at every door. The Irish helped to carve out a very distinct ethnic identity and helped to build the foundation for today's cultural and political pluralism in the United States. The Irish persevered through hard work were able to rise through the ranks of society, slowly but in less than 60 years. They built the United States physically with the transcontinental railroad and politically, "seeking redress to their political rights lost to them during their time in Ireland." In the end, immigrant peasants beget one of the largest political dynasties in America, the Kennedy's. All to be blamed on the lowly spud! What will the next genetically modified potato be capable of doing? Igorota, a new genetically modified strain of potato, might be the next big purchase for McDonalds. It has more than 18% dry matter which fast food chains like McDonalds want in order to make crisp and super sturdy French fries.

The Grapes of Wrath and *Of Mice and Men* came out of the Depression and the Dust Bowl. They were modeled on the hard working farmers who lost their land and heritage to the economy and the dust. The United States encountered one of the greatest ecological and agricultural disasters in the 1930's. How did the land that fed America for

over 60 years fail its people? Waves of immigrants, construction of the transcontinental railroad, the Homestead Act, with its gift of 160 acres, and John Deere's steel plow encouraged settlers. Cattle overgrazing, harsh winters led to more land falling to the plow. A land that was originally called the Great Desert in the 1700's had infrequent rains. A few wet summers and bumper crops encouraged the growth of larger scale farming. Agricultural practices that were utilized actually brought on more soil erosion and depletion. Loss of American native grasses with roots 24" in length created a situation ripe for the coming Dust Bowl. Along with improved technology, inflated grain prices during and shortly after WW1, farmers went to town with aggressive zeal in cultivating a land that should have remained untouched. The soil held in place by those claw-like long roots had been eliminated by over-tillage. Drought hit, soil lost all moisture and became a fine dust that insidiously found its way into every nook and cranny of the farmer's house. Add higher winds that occur naturally in this area and you now have a recipe for disaster. Late 1933 brought the first in a series of Black Blizzard storms to the Dakotas. Mid spring next year brought more storms and they hit and blew dust all the way to Boston. 1935 gave birth to the devil of the black Blizzards, Black Sunday. Twenty black earth blizzards roared across the plains, burying people, cars, and farms, killing new born babies and eventually depositing the dust on London, England window sills.

The Dust Bowl began the largest exodus of American farmers and families that supported the farming community. Whole towns were deserted. More than 2 million people left, most heading west, like the "Okies" from Oklahoma in *The Grapes of Wrath*. Mexican Americans from Texas to Colorado also immigrated to the rich fertile farming valleys of California. Roosevelt's Civilian Conservation Corps would plant 200 million trees from the Canadian border to the Mexican border in hopes of breaking the wind, holding water in the soil and the soil to the ground, a job those American native grasses had been born to do. By late 1938 the amount of blowing soil was reduced by at least 60%. When regular rain returned in the mid 1940's, prices on wheat jumped and farmers ripped the trees up to plant the grain. Few of the 200 million trees remain today, except for some elms and cottonwoods twisted by the winds. Many of the No Man's Land towns established in the 1890's no longer exist; many are shells or ghost towns. Towns like Inavale, Nebraska lost over 60% of their population from 1935. Much of the small single farm families, originators of this disaster, were now gone. One positive note is that hundreds of thousands of acres in the Dust Bowl area have been returned to their native grasses, where bison and antelope have returned to graze. What happened here in the Great Plains is happening in other places. Desertification is making its move in the Sahel,

Africa, and Western China and even in Australia along the Murray River. What lessons have been learned?

We began as a nation of farmers. Today less than 1% of our population is in the business of farming. Government subsidies started during the New Deal in the 1930's have become a system of payoffs to huge corporate farms growing wheat, corn, soy, cattle and pigs, items that are already in oversupply. Subsidies can be as much as $400,000. Huge systems of water pumps and pipes suck water out of the Ogallala Aquifer, the nation's biggest source of fresh underground water. The water is taken up 8 times faster than it can be replaced. Thirty percent of irrigation water used in the US comes from here. Cotton grown in Texas is shipped to China because there is no longer an American market. These farms get over $3 billion in subsidies annually. The cotton returns to Wal-Mart in the form of cheap clothes.

A major effect of the Dust Bowl era was the birth of the Green Revolution. Norman Borlaug, an American agronomist and engineer, worked in Mexico during WWII. An increase of food production starting with the hybridized corn and wheat would forever change the world's farm fields. Hybridized corn and wheat would stand up to pests and drought. Synthesized fertilizers, new breeds of pesticides and herbicides would change how we fed our livestock, serve our dinner and run our cars and farm equipment. Cheap food could become readily available but at what eventual cost to humans and the earth.

In 1961 India was facing a massive famine. Borlaug worked with Indian agronomists and he imported wheat seed from the International Maize and Wheat Improvement Center. India's Green Revolution was on its way to repeating its victory in Mexico, building an aggressive program of plant breeding, development of huge irrigation projects and financing of agrochemical businesses. A new dwarf rice called IR8 was developed. It could produce many more grains of rice than before. But it would have to be grown with the use of certain fertilizers. By 1968, IR8 was the miracle rice yielding 5 tons of rice per hectare with no fertilizers and 10 tons with fertilizers. This was 10 times the yield of regular rice. What would you choose? By 2001 India was able to be amongst the most successful and profitable producers of rice, shipping 5 million tons at the growth cost of $200 a ton. The program then moved to the Philippines. Heavy usage of pesticides reduced the frog and fish species living in the rice paddies.

Attempts to introduce the Revolution to Africa were not as successful. Problems endemic in Africa included political corruption, no infrastructure and lack of will on the

part of many governments. After all, America could send them the grain for free. Environmental factors like land slope, lack of water and irrigation networks and a variety of poor soil types would also be a factor. However, in 2005, Malawi, after chronic poverty, hunger and famine, attempted a go at the Green Revolution. Seeds and nitrogen fertilizer were subsidized and Malawi has steadily been able to feed its people and maintain a surplus.

At the heart of this Green Revolution is the use of improved pesticide, herbicides, synthetic fertilizer, and hybridized seeds, massive machinery, the very antithesis of the sustainability movement. With close to one billion people unable to feed themselves and suffering from malnourishment it is hard to look at what the Green Revolution contributed and say that it was "bad". Many eat themselves into obesity with the "oversupply" of food. The UN estimated that the earth's output could feed up to 9 billion people if reduced waste, increased efficiency and distributed food fairly. With our population at 6+ billion it would seem that we have more than enough to feed everyone. Should I worry about feeding the hungry or Genetically Modified crops? What are the causes of starvation? Poverty? War? Discrimination? Government politics and machinations? Inequality? Overpopulation? Countries with starvation export a lot of their products to feed the cattle, pigs and sheep in other countries, much like the Irish during the famine of the 1840's. There was always enough food for the Irish to eat. There was never a deficit. English landlords exported the grains instead to feed its factory workers in England. Arguments are that the Green Revolution brought us volumes of food but not "increased value or quality of food." The Revolution created a monoculture (one crop grown over a large area) of grains. Sustainable farmers incorporate polycultures of grain. Higher yield grains often have fewer flavors and could contain more gluten. Increased mechanization brought about larger farms and higher usage for water. The US uses about 70% of its fresh water for agricultural purposes. Russia's Aral Sea was over utilized its water for cotton growth. A saltier sea has subsequently killed most of the native fish. Intensive uses of nitrogen fertilizers have created algae blooms that then in turn deplete the water's oxygen. Biodiversity of crops and plants were also at risk. Forests are being cleared due to soil degradation. That soil in turn will become degraded and the farmer will move on, much like cotton farmers in the South after the Civil War. Species of plants and animals disappear each day. Nitrate (contained in the fertilizers) levels in the soil and water have exceeded the safety limit where synthetic fertilizers were heavily used in India.

Also contrary to the principle of sustainability is the CAFO. A CAFO is a Concentrated/Confined Animal Feeding Operation. Much of the chicken, beef and pork we consume come from CAFO's. The EPA defines a CAFO as "an operation which confines, feeds and maintains an animal for 45 days to 12 months". No grass. No other vegetation in the confinement area. A CAFO could include 1,000 cattle, 2,500 hogs and up to 12,000 chickens. An egg laying chicken shares her space with up to 82,000 other hens. An egg laying operation can sustain up to 1 million chickens at its facility. Food is produced at a very high volume. There is little consideration for the environment, animal welfare or our food safety. Antibiotics are administered to keep the animals from getting diseases. Waste is excessive and manure often runs off into our surface water which in turn contaminates our water and kills our fish. Two percent of our livestock farms produce over 40% of our food. This can lead to irresponsible practices and diseases which sicken or kill us. Like grain farms, huge government subsidies are paid to these CAFOs. So the price tags are not really realistic as far as actual costs.

How we have historically dealt with settlement, population, food growth and distribution does not bode well for continued and equal sustainability for our community, nation and world. According to UN projections we are looking at a human population of 7.6 billion by 2025 and 9 billion in 2050. How can we supply enough food to the world's hungry? For those that have enough food one billion are overweight. On the other side 800 million are undernourished. And each day 17,000 kids die as a result of hunger, starvation and the opportunistic diseases which feed on the malnourished.

Change comes slow. Change to address food for all can come through education of our children. Changing our current and future view of food depends on how we educate our children and ourselves now. Starting small and simple we can alter what food is available and sustainable for our future generations.

Strategies

I felt strongly that my unit would not be viable if I did not experience it and develop it at the same time. If a problem developed it needed to be addressed in order to make the unit successful. How do I get my students to make a connection between events in US history to what they eat now, where they get their food from now and how that ultimately affects the future of our food supply? Food is such a big part of their history, from initial settlement to immigration to food laws, to destruction of our land through farming

missteps, to creation of more and cheaper foods but at what expense. With all this food that is available how can hunger be explained, whether at school or in the world.

The strategies I plan to use include a hunger awareness fundraiser as an introduction, planting a vegetable garden at school, utilizing graphic organizers such as a KWL chart and Venn diagram, a food journal, foldable, field trip(s) to a sustainable farm(s), analysis of political cartoons, and viewing of a variety of short animated/live action videos and also seeing *Food, Inc* in its entirety and snippets of *Super Size Me* and *Fast Food Nation*. Implementing these strategies will help me to accomplish my objectives. This can also work in tandem with a science curriculum.

My subject is taught all year. This allows me to take these strategies and fit them into various units throughout the year. I have chosen to start the unit with my two lunch time classes. Although classes throughout the day are 75-90 minutes long, bad weather often cuts our physical activity time out. This gives me an extra 25 minutes with these two particular classes. I am teaching the NC objectives as laid out by my curriculum and add these activities in at least once a week.

The first strategy is a Penny Race fundraiser. It is a nice ice breaker introduction into this whole unit. We do this at the end of September, about four weeks into the start of the school term. Students in the 16 eighth grade home bases or 1st block classes compete with each other for five days. A small reward of open lunch is thrown in for the "winner". The fundraiser introduces hunger in our community. Many of my students think of hunger as a remote item, if at all – Haiti, Somalia, and Bangladesh. It is happening right in their class.

The next strategy has to be done quickly. We continue to talk about food. I would be at colonial settlement in my curriculum in early October and this fits in perfectly. We will watch parts of PBS *Colonial House*. Parents have volunteered to come and prep a small plot of land on school property. The vegetables are planted in much the same fashion as the kids saw on *Colonial House*. This will help to start connecting the idea of settlers not eating much or a greatly varied diet until these crops mature.

The next groups of strategies are good for getting my students thoughts on paper and getting them organized. KWL and Venn diagrams are utilized to get this organization started. What they know about their food, what I want them to learn and what eventually

will be learned goes into the KWL. Compare and contrast is a big part of history and the Venn diagram works perfectly with this.

This leads into the next strategy, which will be making foldables that have room for definitions of 16 food and environment related items. I will give them eight things I want and they may choose the other eight, preferably mystery items from their food labels. This will help them become familiar with what is in their food. It may say chicken veggie soup but how much chicken is in that soup. And is it real chicken as far as breast, thigh etc. or is it bits and pieces of chicken parts that many would normally not eat. They will have to learn how to read the ingredient label and realize what is listed first is what the big ingredient in their food is. Is it water? Veggie pulp? I will provide them a list of words that are listed as ingredients as a guide to help them in their search.

The next strategy will be a combination of political cartoons, animated and YouTube shorts and selected scenes from *Food, Inc, Super Size Me* and *Fast Food Nation*. Political cartoons are a great way to get the kids in to the day's lesson. I start off with Gary Larson's *Far Side*, then do a little lesson on propaganda and bias and then finally introduce them to cartoons from the specific era we are covering. They will be assigned some homework to locate sites on the internet that deal with sustainability and environmental political cartoons. We will share and discuss. I have some from Grinning Planet and Tom Fishburne that we can analyze. For my curriculum, opening up the history of the political cartoon is a great activity. By now they know the nature and history of political cartoons. The YouTube videos will introduce them to some new ideas. Teach away from the book is what we are always encouraged to do. Access to YouTube was denied to us at school but it was brought back about 18 months ago as a potentially valuable resource. *Cooking with Clara* from the Depression or the Dervaes family engaging in farming in the middle of Pasadena helps to connect the kids to some real life lessons.

One of the last strategies I will use with both classes will be one or two trips to sustainable farms during the school day. I am not sure if we will be approved for two but I will attempt to apply for two trips. This strategy is important because it is a wrap up of the unit. Both farms are similar in nature but one of the farms carries more animals. The farms were chosen because of their proximity, their steady supply of goods to our small farmers markets and local restaurants in the community and for the experience that it will afford the kids. They will see sustainable and conscientious farming first hand. A visit to a local big chicken farm was turned down by the company owner.

Activities

Lesson One: Penny Race

A penny race is a tool I have used for several years as a way to help our community. This year my focuses were Angels and Sparrows Soup Kitchen, Loaves and Fishes Food Bank and the Cornelius Animal Shelter. Angels and Sparrows is less than five miles from the school and feeds a health and warm lunch five days a week to people in need. Loaves and Fishes distributes non-perishable food items county-wide. The last organization is the recently constructed Cornelius Animal Shelter. It is a no-kill facility that also spays and neuters the rescues. The Penny Race is conducted about four weeks into the start of the school year. Students who have been at Bailey in sixth and seventh grade know it well as it is an eighth grade only activity.

Money is collected the first 15 minutes of the day, while students are heading to their class. There are 16 home bases in eighth grade. Each teacher has duty outside their room door. For one week we all shake our jingle jars madly to attract donations. The goal is to collect as much as we can but I like to make a game of it. Pennies need to go to your assigned home base teacher. Silver coins, paper and checks go on any one of the 15 "enemy" home bases. At the end of the week the teacher with the most pennies and least silver, paper and checks wins. A reward, open lunch or sitting with your friends instead of your class, goes to the winning home base. With 250 kids sitting by class in the cafeteria, this is a treat. The race gets very competitive and we have fun sabotaging each other's jars. We call it bombing. Pennies are your friends, silver, paper and checks your worst enemy. The ultimate goal is to raise as much as possible. The kids know this but love the game. Money is counted at the end of each day by parent volunteers. The totals are written on a big board in the hall by day's end so the kids know who to target the next day. It is chaotic but serves a great purpose. Friday is a killer morning and takes the parents hours to count. The winner is announced in the afternoon. The teacher who won this year was actually in the negative (more silver than pennies) but had the closest amount to positive. The total raised was $1,000 and this was divided amongst the three agencies. The objectives are two-fold: helping the three agencies and making students

aware of the need for these kinds of services in our community. Some of our students have actually benefited from these services, either eating at the soup kitchen in the summer when free and reduced meals are no closely available or through canned goods given to them through Loaves and Fishes.

Lesson Two: Where does the Food Come From.

Once the Penny race has ended we head into Colonial America, settlement, reasons and conditions. A wonderful unit opener is PBS *Colonial House*. I specifically pick scenes from Disc 1 Episode 2: *Harsh Reality* (*All Work, Muskrat*), Episode 3 *Fat Mamma* and *Punishment*, Episode 4 *Daily Grind;* Disc 2 *Reckoning,* Episode 7 *Harvest* and *Women's Work,* Episode 8 *The End Back to Reality*. The series is eight hours in length and documents a group of 16 people in 2003 who "step back in time" to 1630's Maine, minus all the accoutrements of modern society. I tell them that this is not like their favorite reality show. These people chose to do this. They are English and Americans, racially diverse, young and old (including a 10 and 13 year old), and coming from a great range of life careers such as carpentry, minister and college professors. Survival is the objective! I show selected pieces from start to finish, about 45 minutes total. Food is a big part of this time traveling experiment that takes place over 5 months. These people farm, cook and work as others did almost 400 years ago. This will be the lead in to the next activity, which planting a garden. The kids love the video and actually ask to see more. We hope to do something similar with PBS *Frontier House* in the mid spring. They complete a little written activity as to why this would work for them or why not and we all share. Their biggest objection was the food, or lack of it, and privacy. Oh, and 13 year olds do not like hairy arm pits! Only a couple said they couldn't handle the loss of their cell phone and X-Box.

Lesson Three: How Does Your Garden Grow?

The colonials in *Colonial House* were provided with flour, dry beans, salted meat (which went bad) and seeds to plant a garden. Class discussion ensues as to what to do if you have to wait for your food to grow. A garden is planned. Supplies needed: gardening tools, rotor tiller, compost, organic soil, and cow manure, a variety of vegetables for a fall into winter garden, trellis posts, 2 to 4 pounds of cheap fish, string, veggie planting guide and a water supply of some sort. A hot plate, skillet, olive oil, salt and pepper if you plan to cook these in the class room could also be added to the supply list.

The soil at school is, quite frankly, horrific. It is baked dry and lacks any substantial nutrients. The school is in a rural area of the county. There are a few farm houses around, a football field, a park with softball and soccer areas, a new high school, and an active adult lifestyle village in the back of the school. I chose a protected spot with limited access by both students and wild animals. It is sheltered between the U shape of the building. We did locate it on the sunnier side. Students marked the 10 by 10 spot. A parent and one of my students spent a couple of hours tilling the plot. Because the land is so hard and first frost concerns were at our back, we chose the easy way. The following day the students and I amended the soil with compost, manure and organic soil. The kids were able to work the soil to about 4 inches down. We had earlier studied that Native Americans had little in the way of fertilizer and often used fish carcasses as a natural form of fertilizer. Three days of rain cancelled one of my volunteer parents fishing expedition so he brought in about 4 pounds of store bought tilapia. We chopped it up and placed it in each hole where a vegetable was to be planted. About 1 inch of soil was placed on top of the fish. The vegetables plants were donated by the local jail. They have an inmate program where part of their day is spent working with a variety of plants. The single condition they put on the donation was that we donate the food back into the community. Relying on donations is key to this activity. The veggies donated were radishes, peas, turnips, Brussels' sprouts, Swiss chard, and carrots. They came to me as seedlings. The kids planted the veggies, about a hundred in all, the first week in October. Students took turns and watered every day for two weeks. No other fertilizers were used. North Carolina is in the 7 hardiness zone. Temperatures rarely go below 15F degrees in winter. Except for the radishes, all took off. By November 1 we were able to pick some peas that we trellised – sticks in ground, connected by string and guide the peas up on to the string so it can grow upwards. By Thanksgiving we may be able to pick sprouts and Swiss chard. We will harvest and turn most of it over to the Angels and Sparrows Soup Kitchen. I will keep a little bit of each veggie so that I can cook it on a hot plate in the class room. I will add a bit of olive oil and some salt and pepper. The kids can sample a little forkful of each veggie. They have been very patiently awaiting this process. The objective was to introduce them to freshly harvested veggies. It teaches them how they can grow and maintain a tiny garden. They can compare fresh to canned. It also calls in to play the need for volunteers to supply this project and that there is a return to our community in the form of the harvested veggies. A late winter garden is planned for mid March. We hope to put in some strawberries and a week or so later some tomatoes. These should be harvested before the school year ends.

Lesson Four: Graphic Organizers

The third activity involves graphic organizers such as the KWL chart and Venn diagram. The KWL is a good place to start with as to what they know about their food supply, what they want to learn and what have they learned. This chart is used several times during the year for a variety of my lessons. The Venn diagram is used to compare and contrast. On the left portion of the circle they can list the vegetables they grew and how they tasted. On the right they can list the veggies (frozen, canned and fresh from grocery store) their parents purchased. In the center of the overlapping circles they can list the similarities between the two. I will use this activity again when we compare and contrast sustainable and big agribusiness farming.

Lesson Five: Animated Shorts, YouTube, Films and Political Cartoons.

This is an ongoing activity that can take place beginning, middle and end of unit. I have already utilized *Colonial House*. The political cartoons and short videos may be used as warm ups. Political cartoons are selected from a variety of sites such as grinningplantet.com or krankyscartoons.com. Some have copy write infringement laws, so permission may be needed before you use a transparency. Otherwise I can use the LCD projector. These are very visual activities. How to interpret political cartoons are covered in all the grade levels and also in Language Arts. I do go over what typical symbols are commonly used (e.g. dove=peace, chubby=greed or excessive wealth) and do a refresher on bias and propaganda. We examine at least one a day. Local or national print on line offer a great variety and source of cartoons. I encourage them to look at archives of political cartoons and also political cartoons from that actual time period. Once their attention is captured, they often comb the web for a cartoon pertaining to their subject and bring it in the next day. I also encourage them to look at foreign newspapers to get a non-American view. Sites like *The Guardian* UK, www.abc.net.au (Australia) or www.france.24.con/enfrance are among a few that can be used. If I have time, I will use the LCD and my computer to give them examples.

The next part of this activity is utilizing short animated or short videos, usually less than 5 minutes. These are also used as warm ups and class discussion. Again Grinning Planet has quite a lot of fun and creative videos. *Return of the Thurm* (Martin Short as an oil exec), *Home Sweet Home* (claymation about the earth repairing itself)by Anita Sancha is one of my personal favorites along with *Cooking with Clara During the Depression*. Access YouTube and input *Cooking With Clara Depression.* Clara is at least 94 and of Italian heritage. She has little lessons on how to survive, as she did, during an economic

downturn. Simple but delicious and nutritious and something the kids can do at home. A bit longer is one from YouTube called *Homegrown Revolution-Radical Change Taking Place* (at least 30 of them). It focuses on the Dervaes family who live in the middle of Pasadena. They have converted every space around their house and put in a sustainable garden that feeds not only themselves 365 days a year but also supplies several restaurants. I highly recommend this one! If one family can do this, anyone can. The objective of this is to show how you can make do with less and how you can have a hand in what you eat by growing it.

The last activity in this part of the visual aids is a series of films. I will show most of *Food Inc*. (PG), a no bones spared look at where our food comes from and the hand that large agribusiness has in our food supply. *Super Size Me (*PG13) and *Fast Food Nation* (R) require parental permission. I will not show the whole video, only snippets as I did with *Colonial House*. These videos cover many of my objectives with this unit. The KWL chart can be used for *Food Inc.* A class discussion is always important to get them thinking and questioning.

Lesson Six: Foldables

Students are going to construct a foldable that I call a snail. Paper and scissors will be all you need to start. Laptop computers from the media or a trip to the computer lab will be needed at the end. The objective here is to familiarize them with food ingredients and terms. You can use standard white or colored computer paper. Make it a square, 8 ½ by 8 ½. You can measure and cut or fold one corner over to the opposite side until you have a triangle. Cut the non triangle off and open it. You now have a square. Fold it vertically in ½ and vertically in ½ again. Open and fold now in opposite direction horizontally ½ and then again ½. Open and you have 16 little boxes. Cut up the center fold away from you to the start of the fourth box. Cut the two out wings in the opposite direction to the start of the fourth box. You will have a W shaped object. Take the right top of the W and fold it back and forth, never over itself. You will know it is folded correctly when you open it and it should fall freely accordion-like. If it won't open all the way refold it until it does. Place it on your desk as though it were a book. The top is your title page. All the work goes inside, starting on the back of the title page. You can number each panel 1-16 if you think you will mess up and end up writing on the wrong side.

I model it for them while they do a practice copy on notebook paper. I also have one on the board from start to finish in alternating colors to show the different stages. What

goes in the snail? I give them 8 words. They will put the word at the top and then define it with two mini facts or definitions. If it is an acronym, like FDA, they have to tell me what that is. My words for them are: sustainability, organic, CAFO, FDA, agribusiness, biodiversity, E-coli, GMO. They provide the 8 other items and mini definitions from food labels of cans/packages they have consumed, including items such as high fructose syrup, xanthium gum, polysorbate 80, whey and cheese culture. The list is endless. I will keep a sampling of canned soup, boxes of mac and cheese, frozen entrees,and cookies in the room if they need to search for additional items. It takes about an hour to do this process start to finish. Sometime, they like to put a little mini picture or symbol at the bottom of each square, after their definition. High fructose syrup could be an ear of corn, whey could be milk.

Lesson Seven: Field Trip(s)

I have one trip to a sustainable farm planned for March. Laughing Owl Farm is primarily an organic vegetable growing operation and the owner preferred that I come out in March to see them starting the season. This is a family farm. I want the kids to see a sustainable farm, possibly two, at work. They will be out at the farm for about 3 hours and will tour the whole place. Mr. Mullis, the owner, will be interviewed by the kids. Questions asked will relate to why he farms utilizing a sustainable and organic manner, has he always farmed this way or was there a time in his life when he was considered a conventional farmer, and if so, why did he make the change. I would expect them to ask what the challenges are and how does he cope with them. Mr. Mullis has a tiny little weekly news article in the *Charlotte Observer* Wednesday food section. We will view several of these starting in December. It may give the kids a clearer picture of what to expect when they visit his farm. After all the activities they have completed with this unit I feel they will be better prepared to take on this last encounter. Another farm in the community, Grateful Growers, provides pork and other products to the local area. We would like the kids to see this farm also. This gives them an opportunity to compare and contrast both farms.