Houston’s Food Supply
Is it sustainable?

Why do we need food?
Where does it come from?
How secure is our food pipeline?
How much local food is there?

What if we grow it ourselves?
YUM. FOOD GOOD  
But it could be better and so could quality of life  

SURVIVAL  
We eat to live  

PLEASURE  
The mechanism that keeps us from starving ourselves  

FROM EARTH TO MOUTH  
The biofactories of life are dazzling and even magic  

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Think local, eat fresh food, do it yourself, share with your friends and neighbors  

HOUSTON FOOD HISTORY  
Beyond survival, on to high-speed economic growth  

HOUSTON FOOD TODAY  
There’s plenty of it, but we must export most of what we grow and import most of what we eat  

OPPORTUNITIES AND CHALLENGES  
Possibilities are huge, but a significant paradigm shift is needed to ensure food security, safety, and freshness  

THE GARDEN CITY  
Cities, towns, villages, and neighborhoods in green infrastructure - a successful economic model  

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One of the very nicest things about life is the way we must regularly stop whatever it is we are doing and devote our attention to eating.” Luciano Pavarotti, a man who did his duty in this regard, said that. Food is at the very heart of our lives and our culture. So what is food? Where does it come from? Are we in Houston safe in our food supply? What can we do to improve all aspects of what we eat?

For most of us, gathering nuts and berries and scrabbling in the dirt for roots was long ago pushed into legend by the creation of agriculture. We learned how to grow our own. That completely changed our diet, and for most people it put an end to their wandering ways, and villages, towns, cities, and nations came into existence.

Working on this issue of TOMORROW, we soon discovered the enormity of the undertaking, this business of moving nutrients and the Sun’s energy through the web of life. When it’s about food, it turns out we’re less interested in survival than we are in pleasure. Fortunately, our brains are full of receptors and places that get excited by sights, textures, aromas, and tastes, so we feed ourselves. Otherwise, why bother?

As a result, we’ve learned how to do delicious things with organic matter. So when we travel to France or Italy we’re astonished at the variety and richness of food. And now we’re beginning to understand how much food culture is related to everything else we do and believe. In Italy, where food is the essence of life on a daily basis, people grow food, make dishes, trade food, talk about food, and celebrate meals regularly.

I got started on this topic when I read “Under the Tuscan Sun,” a love song by Frances Mayes to a place that is crazy about food. My wife is a great cook, and we’ve always had some kind of garden, but this book raised the bar for me. The concept of caring about food, planting it, watching it come out of the ground, picking baby vegetables and eating them in the garden with a glass of wine, cooking things you’ve grown - this is good stuff. This feels like a high quality of life.

Our exploration into food naturally confirmed a lot of suspicions, chief among them that one huge strategy for better health and higher quality of life for all Houstonians might be much greater emphasis on growing high-quality, great-tasting food right here. Some argue that if every person could focus more on what they’re eating, everything about them and their homes would change for the better. Healthier, stronger, smarter, more productive, even happier - all these are attributed to attitudes about fresh local food.

The big message in this magazine, then, is Buy Fresh Buy Local and/or Grow It Yourself. It’s surprising how many people do the latter, but the bulk of our citizens are more likely to do the former. Locally grown organic food is the fastest-growing segment of the food industry. For many people, the day of industrial agriculture is over, and their numbers are rising.

One of the most interesting ways to see evidence of that is to notice and attend the growing number of farmers’ markets in the region. Five years ago, there were no markets dedicated to locally grown food. Today there are quite a few, and some of them are open twice a week.

The market folks tell us the biggest need is for more growers. Demand is outstripping supply, and we need to figure out how to fix that. In thinking about more local farmers growing for the local market, we confront an issue of the steady depletion of prime farmland at loop roads that bring it into availability for development. If we are going to think about how food and sustainability work together, we’re going to have to have a new paradigm for how we develop. I believe the answer is the concept of the Garden City. (More on that on the last page, as always).

In the meantime, we can grow our own right here in the city, close to home. And just so it’s clear how close to home this can be, in my 5,000-square-foot lot in the Montrose (most of which is used up by our house), we are now (mid-October) growing okra, broccoli, cauliflower, pears, limes, Meyer lemons, Mexican thorn limes, oranges, basil, oregano, thyme, canteloupes, cucumbers, potatoes, tomatoes, green beans, peppers, and chives, not to mention a million flowers. And wait until Springtime, when peaches and grapes and all the rest are ready to eat!

- David Crossley
We eat to live.

Food is what an organism consumes to support its metabolism, the complete set of chemical reactions that occur in living cells. All organisms are open systems that exchange matter and energy with their surroundings. These processes are the basis of life.

Nutrients in food provide energy to the body, and is the brain’s first priority, even before movement. Energy is mysterious, but it is essentially the whole game, moving through everything, constantly changing, “energizing” first one thing and then another. The energy we need comes originally from the Sun and moves through plants and other animals to get to us.

Humans are animals that eat almost anything to get energy. So we spend time picking up various kinds of food and putting it in our mouths. Immediately, mechanical and chemical processes begin to break the food down into smaller molecules that can be absorbed and used by body cells. There are two phases - digestion (mechanical and chemical processes) and absorption of the nutrients to the blood stream to be distributed to cells of the body.

The three basic nutrients the body needs are glucose, fatty acids, and amino acids. Glucose from carbohydrates, amino acids come from protein, and fatty acids come from fats and oils. They all have different jobs, but what the brain craves is glucose.

The brain runs on glucose.
Fat cells run on fatty acids and glucose.
Muscle runs on amino acids.
The intestine runs on glucose and amino acids (glutamine).

**The Processing System** From the mouth, food is propelled in waves through a series of flaps and sphincters into the stomach. For 3-4 hours, stomach muscles mechanically break down the food and mix it with hydrochloric acid (to kill germs) and gastric juice, which breaks protein down into amino acids. Eventually the stomach squirts this mush into the small intestine where enzymes break starch into glucose, remaining protein into amino acids, and fats into fatty acids and glycerol. The 20-foot long intestine is lined with tiny fingers called villi (below center - in 3D - and at right). These provide maximum surface area to absorb nutrients through their walls and into the blood stream. Glucose and amino acids pass right into the blood capillaries inside the villi (right) and on to the liver for more processing, while the fatty acids and glycerol go into lymphatic vessels inside the villi, and eventually into the bloodstream. All the leftovers in the intestine, mostly fiber, goes to the large intestine to become feces, which is expelled.
Pleasure

The mechanism that keeps us from starving ourselves

Food appears to have two purposes: nutrition and pleasure, and some scientists say we eat primarily for pleasure. This dynamic helps us survive. Older people often lose their sense of smell or taste or both, and they lose interest in eating. So the brain that controls ingestion uses chemical tricks to create pleasure to make sure it gets what it needs. Of course, that pleasure often leads it astray, into the world of french fries and ice cream.

The brain is full of receptors for all sorts of substances, and it gets its information from several senses. When we see food, that can put the brain into a "gimme" state with varying degrees of ferocity (brain sees potato chips, brain sees a carrot; brain, in the absence of discipline, says gimme the potato chips).

Then we smell the food, and then we taste it. Each of those sends messages to the brain, which has a generalized pleasure center to sort out the many delights it enjoys. On the other hand, acid and bitter tastes suggest No, and sometimes that's life-saving.

The brain likes salt, fat, and sugar, so commercial foods are designed with lots of those. Food can be manipulated to create pleasure, craving, and even addiction. America's favorite foods: Doritos, vanilla ice cream, garlic, KFC chicken, and chocolate.

Just being exposed to a food can increase liking. Seven to ten helpings of broccoli can create a positive memory of it. Actually, what prevents us from liking something is called "neophobia," basically fear of new. Once the fear is gone, the brain reacts positively, which is why some people can eat worms and some can't; it's all a matter of practice.

THE TASTE MESSengers

Fries The brain craves salt, sugar, and fat. French fries can deliver all of it, as well as Dynamic Contrast and great emulsions. We humans really like those. That's why fries are the second most popular menu item (first for women, who aren't so enamored of men's favorite - hamburgers; those come in second for women).

THE BASIC TASTES
Saltiness, sweetness, sourness, bitterness, umami (savory)
From Earth to Mouth

The biofactories of life are dazzling and even magic

Food is any substance, usually composed of carbohydrates, fats, water and/or proteins, that can be eaten or drunk by an animal or human being for nutrition or pleasure. The production of food begins with the Sun, which bathes the Earth in energy.

The Primary Producers are green plants and certain types of bacteria and algae. They’re called the Primary Producers because they are the ones that produce usable energy for the rest of the living organisms.

Herbivores eat plants. Some examples of herbivores are deer, cows, elephants, rabbits, most insects, and birds that eat fruit and seeds. Sometimes scientists call this level of the food chain the Primary Consumers.

Carnivores eat the animals that eat the plants, so they’re sometimes called Secondary Consumers. Most of these animals can’t eat plants at all, and so they would starve to death if it weren’t for the Herbivores digesting the plants first. Cats and dogs, killer whales, sharks, spiders, snakes, wolves, vultures, hawks, eagles, crocodiles, and many other

Decomposers eat dead things, both plant and animal. This group are mostly bacteria and fungus, but includes earthworms, sow bugs, and many others.

CORN: KING OF THE GRAINS

In the US, corn production is twice that of any other crop. Christopher Columbus took corn from the New World to the Old World and today it’s produced on every continent of the world except Antarctica. Corn is a major component in many food items like cereals, peanut butter, snack foods, and soft drinks. Soft drinks usually have high fructose corn sweeteners in them. It’s a complex plant, with each potential kernel having a tassel that must be pollinated for the kernel to form. Like other grains, the corn kernel is packed with energy and various nutrients, which modern processors have learned to separate for different uses. Most of America’s corn crop is used for feedstocks, but in recent years, it’s been used to produce ethanol, a controversial gasoline additive that has caused a rapid rise in food costs.

SEAFOOD

Marine life is a major source of protein in the world. It is the most threatened of all food sources, and a major scientific study in 2006 found that if current fishing trends continue all fish stocks worldwide will collapse in 50 years.

FRUITS AND VEGETABLES

Prolific converters of the sun’s energy, fruits and vegetables are mainly sources of carbohydrates, although some contain small amounts of protein and fats, as well as vitamins, minerals, and fiber.
Human beings are Omnivores. We eat almost anything. Some other mammals, birds, and fish are omnivores, too, but no one disputes that we’re are the top of the food chain. In fact, we tend to eat pretty high up on the food chain, which means the energy used to produce a lot of our food is vastly greater than what we get from it.

We eat meat, fish, dairy, fruits, vegetables, nuts, grains, eggs - you name it. The other omnivores we eat the most of are chickens and pigs. In fact, pork is the most widely eaten meat in the world. All the pigs in North America are descended from a herd brought to the New World by Hernando Cortez in 1539. But beef-eating is on the rise since the late nineteenth century, when pork began to be seen as “a coarse and boring diet of the poor.”

We have turned mere eating for survival into a feast we try to enjoy several times a day. We’ve learned to put foods together with other foods and we’ve learned how to cook it, to create bewildering sights, smells, textures, aromas, and tastes.

Not all of us bother with that, however. We’ve also learned how to eat out. And many in America have forgotten

NUTRIENTS We’re after carbohydrates, proteins, and fats and lipids (as well as some minerals and vitamins). In food we measure energy as “calories,” or units of heat. Fat has about twice as much energy as proteins or carbohydrates.

FOOD PYRAMID The food pyramid at right is an update released by the US Department of Agriculture in 2005. For the first time, the pyramid stresses activity and moderation along with a proper mix of food groups in the diet. Each iteration of the pyramid has been controversial, with the Harvard School of Public Health referring to the previous one as “tragic” because it didn’t point the way to healthy eating. Harvard says the new pyramid “dismantles and buries the flawed pyramid,” but now it doesn’t convey enough information to be useful. The official pyramid has none of the pictures of various foods or the explanations of the colors that are shown here. In order to use the pyramid, it’s necessary to log on to mypyramid.gov and work your way through the various meanings. This does, however, provide for the tailoring of recommendations suited to a person’s body type and age, which is a major improvement over the old food pyramid. Harvard now has its own Healthy Eating Pyramid. Others have criticized USDA for responding to pressure from meat and dairy producers, for instance in changing its advice from “decrease consumption of meat” to “have two or three (daily) servings.”

where food comes from. When children are asked that question, they usually say “From the grocery store.” We take food for granted, and considering its purpose that is getting to be a problem that threatens our health and well-being.

(Portions of this section are excerpted from an article at ftexploring.com)
A world of trouble: population growth, globalization, industrialization, pollution, erosion, disease, war

Even though there is enough food produced to feed all the people of the world, up to 2 billion people intermittently lack food security due to varying degrees of poverty, and nearly a billion people are chronically hungry. At the same time, obesity threatens many others, and malnutrition in overweight people is not uncommon.

While people are hungry, we feed almost half the world’s grain to livestock, which returns only a fraction of that energy in meat. Frances Moore Lappé notes that “Since the 1970s, the rates of growth in food production have been lower in the basic grains and tubers eaten by poor, hungry people than in fruits, vegetables, oil seeds, and feedgrains for meat, eaten largely by the planet’s already well-fed minority.”

Getting surplus food to hungry people is a problem of distribution. Obstacles range from government corruption to communication breakdowns. But getting food to anybody is increasingly about burning fossil fuels. Various sources say food travels between 1,500 and 2,500 miles to get to your plate. In Houston, we get some lettuce flown in from Australia. Within days after 9/11, when planes were grounded, it was difficult to find fish in restaurants, because most of it is flown in. As fuel prices rise, will it be possible to fly food in, or even bring it in long-distance trucks?

There is a complex processing and distribution system for the food supply, and any number of sudden events such as hurricanes or acts of terrorism can tear it to pieces. The need for food to travel great distances also means much scientific work has been done to create food products that travel well. Fresh greens in the bag from California must be suffused with a variety of chemical gases to remain “fresh.”

GLOBAL TRADE A worker in Tokyo uses a handsaw to begin the process to reduce a tunafish to the delicacy below left, sushi. The Tsukiji fish market where this photo was taken is the source of fish for many vendors in the Houston region. Various sources say food travels between 1,500 miles and 2,500 miles to reach your plate.

GLOBAL HUNGER The proportion of undernourished people is shown below. Red indicates the highest proportion, above 35%, and yellow the lowest, below 5 percent. More food is produced every year than there are people to eat it, but distribution is restricted by economics, culture, government corruption, warfare, and more.

CONSOLIDATION Intensifying competition and increased consumer mobility forced grocery retailers to close older and smaller stores and replace them with bigger, more competitive “super stores.” These trends resulted in a decline in the number of stores from 208,300 in 1970 to 127,980 in 2000. Now traditional supermarket chains are struggling to defend themselves against competition from non-traditional rivals, the biggest being WalMart.

“Food is our common ground, a universal experience”
James A. Beard
Even local production of food is threatened as suburban growth policies push food sources further from the metropolitan core. Maps of US development overlaid on maps of the US prime farmland show we have settled where the best land is - and paved it.

Global corporations acquire patents to seeds and prevent farmers from saving seeds for next year’s crop, reducing genetic diversity. And no one knows yet what the outcome will be from those genetically modified plants - and animals - as their genes move through the food chain.

Monocultural crop practices reduce biodiversity and prevent natural pest control from occurring, while encouraging pests to develop immunity to chemicals. Species of plants and animals are becoming extinct at a rate that alarms scientists.

In any event, industrialized farming has damaged much of the land, which is eroding in many places. Agrichemical pollutants from erosion have entered water tables, streams, and rivers, and are now affecting the marine food chain - which affects us (see pyramid at right).

Disease has become a massive threat. Topps Meat Co. recalled 21.7 million pounds of hamburger because of E. coli bacteria. Nightmarish mutations like Mad Cow disease raise questions about the wisdom of feeding ground-up animals - including cattle - to cattle, which are herbivores.

Children are encouraged to become hooked on salt, sugar, and fat, and for the first time there is a chance that the next generation will not live as long as the present generation.

And now global climate change threatens to rearrange the agricultural map. Already birds and other creatures are finding their cycles out of sync with their food supplies. Some food pests could be energized by rising temperatures, and changing humidity. In Houston, plants that just need a little chill each winter might not get it, and production could suddenly cease.

Can we produce enough food in the region to sustain ourselves? It’s a lot to think about, and a lot to do.
The Holistic View

Think local, eat fresh food, do it yourself, share with your friends and neighbors

Basically, holism is the idea that all the properties of a system (biological, chemical, social, economic, and so on) cannot be determined or explained by the sum of its component parts alone. The general principle of holism is summarized by Aristotle’s statement that “The whole is more than the sum of its parts.”

In a high-speed world of achievement and gain, holism and systems are annoying distractors. But holistic ideas slowly work their way into markets, and change happens. Fifty years ago “environment” and “ecology” were words few people heard or read, but today those issues are rising quickly to the top of the public agenda.

In the holistic view, food is just part of living, and acquiring food is sometimes seen as a purely personal responsibility and sometimes as a job for a community. But the core of that discussion is that people ought to consider not just acquiring food, but producing it. This is said to re-establish a connection to nature, and thus to some sense of one’s place in the whole of things.

The basic idea is to get your hands in the ground and come to some sort of understanding of the life within it. This activity will then produce the “Ten Thousand Joys” that come from growing and eating fresh, living food right off the plant and then taking a bunch of it into the house and whipping up frittatas and soffritto and pesto, maybe with some limoncello afterwards. Yes, at the high end, holism is reminiscent of Tuscany.

“Tuscany,” as a concept, is entirely about quality of life. As the urbanist Andrés Duany likes to say “Everybody in America has a higher standard of living than somebody in Tuscany, but everybody in Tuscany has a higher quality of life than anybody in America.” While this statement is obviously a little over the top, the meaning is clear. Quality of life is different from standard of living.

Many of us say we don’t have time for gardening (or partners, or children, or friends, or fun) because we’re too busy. A Tuscan might ask if we are actually living, or are we instead performing?

Frances Mayes, in her books about Tuscany, talks about its people as ones “who inspire the world with their knowledge of how to live like gods.” She notes that they “thrive on their local markets, which provide not only food, but social life,” and concludes that “the intense sense of community we feel in Cortona revolves around the table.” Eat well, be well, they say.

Of course, naps play a part in the Southern European way of life, too, which brings up the topic of Slow Food. Slow Food began as a protest against the opening of a McDonald’s restaurant in Piazza di Spagna, Rome. Today, it’s a global organization that claims 83,000 members in 50 countries, which are organized into 800 convivia or local chapters. There’s one in Houston, and several local restaurants subscribe to the principles. Today, 42 states in the US have their own convivia.

That movement spawned a more general Slow Movement, which includes Cittaslow, the Slow Cities movement. There are many other sub-areas, including Slow Travel, Slow Shopping, and Slow Design, to name a few, all of them under intense study at the World Institute of Slowness (theworldinstituteofslowness.com). The purpose, generally, is to slow down and live. It is a movement that is at once serious and hilarious. Associated websites occasionally have warning messages on their “contact us” page saying “it may take us a while to get back to you.”

Among other things, Slow Food seeks to encourage the enjoyment of regional produce, traditional foods (which are often grown organically), and to enjoy these foods in the company of others. The Houston Slow
Food convivium meets often, and there is always food and talking involved. Blueberry season is celebrated, figs, whatever is out there in the fields at the moment.

Perhaps one of the strongest tides in this holistic world is the idea of seasons. Writers like Barbara Kingsolver, in her book “Animal, Vegetable, Miracle,” argue that eating locally by the season - whatever is available right now, right here - is a new world of “eating well, in every sense.”

Eating seasonally means your local season. If strawberries are in season far away, that doesn’t count. Ultimately, this is about localism. As Adam Gopnik said recently in The New Yorker, “The point of localism is to encourage sustainable agriculture by eating things that nearby friends and farmers grow or raise and that don’t have to be shipped halfway around the world, guzzling fossil fuel, to get to your table. The rules generally involve eating within a radius of a hundred or sometimes three hundred miles.”

Gardening is the number one national hobby, and many people in cities are becoming farmers. If they can grow enough, they can make a decent living selling to restaurants and farmers’ markets. Not only are health and taste impacted by this activity, but the dollars tend to stay in the region. The farmer can make significantly more dollars, in terms of the percent of the retail price, than in the conventional distribution scheme. Farmers in the industrial agriculture system sell food as commodities that are then subjected to a series of actors who each take a little out of the price the consumer will pay. At a farmers’ market, the farmer gets almost the whole consumer dollar.

On a larger, more regional scale, all of this has sparked another movement called New Ruralism. New Ruralism is described as a framework for creating a bridge between Sustainable Agriculture and New Urbanism. It claims that sustainable agriculture can help bring cities to a deeper commitment to the environment and economy of the surrounding countryside on which they depend.

A program at UC Berkeley, called “Agriculture at the Metropolitan Edge,” is evolving “a vision to preserve and enhance urban-edge areas as places indispensable to the economic, environmental, and cultural vitality of cities and metropolitan regions.” They are looking for ways to see the metropolis as whole, with urban, suburban, and rural parts.

As we begin this conversation, we are required to look at soil type, climate, and shape of the land. We are beginning to think about the ecosystem and everything that’s happening in it. An ecosystem is the network of the interactions between organisms and their environment. An ecosystem has both living and nonliving components. Humans tend to think of the “environment” as something that is outside, something other and not part of them. But as we saw in the section on Earth to Mouth, there is no end or edge, or, really, any “other.” Neighboring ecosystems are interconnected, so it is often difficult to tell where one ends and the other starts.

Thinking like this makes thinking about specific issues, like conservation, easy. In the holistic view, we treat the world carefully and gently because we are selfish. We want health and sustainable prosperity, and the more we dig in the earth and admire its bounty the more we realize what selfish means. Holistic approaches to living are not entirely detached from the idea of self interests that is so important in the mechanisms of markets. Understanding, however, what is truly in one’s self interest is the hard part.

Market failures, such as the inability to correctly assign costs to externalities, encourage inferior methods. Often, those methods result from viewing humans as annoying and expensive, and to drive costs down, humans are replaced. Localism, on the other hand, values things like human work and healthy dirt.

**SLOW FOOD** The snail is the icon of the Slow Food movement. The movement has spread to the US and Houston, where members meet to eat.

**HOW TO PLAY THE GAME** Advice from the field: eat and buy as locally, organically, and seasonally as you can. This creates demand in the marketplace, which creates the choices you want. Over time, try to move as much as you can of your food purchases and consumption into the two inner circles at left. Favor whole products over processed ones, although wonderful local products made from various foods are available, too. Pay attention to whether producers can make a living at it, and whether meat, eggs, and dairy products come from animals who lived and died humanely. Take time for food, and share it with friends and family.

**WHAT CAN I GROW, PROCESS, COOK MYSELF?**

**WHAT CAN I OBTAIN FROM FARMERS AND PRODUCERS IN MY REGION?**

**WHAT CAN I OBTAIN ONLY FROM OUTSIDE MY REGION?**

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CARPORT GRAPES providing shade

EVENING WINE in the parsley patch

PET LIZARD rampant on cucumbers

MEYER LEMONS grow like weeds

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Beyond survival, on to high-speed economic growth

Once people in the Houston region organized their lives around food. The Otoquasac were a small tribe that roamed the lower San Jacinto and Trinity river valleys, fishing in family groups along the upper reaches of Galveston Bay. In winter time they settled into semi-permanent villages along Spring Creek, in the northern part of present-day Harris County. There, they hunted bear, deer, and buffalo, and sometimes cultivated maize.

The Karankawas roamed the region, too. The first Karankawa, so the legend goes, was the child of the Sun God and Moon Goddess, and his cradle was an oyster shell that rocked upon a cloud. One day while his parents quarreled the cradle was knocked from the sky and fell into the Gulf of Mexico; the tears of the goddess account for abundant rainfall along the coast. So the Karankawas revered the oyster.

Early Europeans had different responses to the Houston region. Frederick Law Olmstead, who travelled the region in the 1850s, said “This is not a spot in which I should prefer to come to light, burn, and expire; in fact if the nether region...be a boggy country, the Avernal entrance might, I should think, with good possibilities, be looked for in this region.”

Others, like David Crockett, saw abundance and lushness. In a letter that has some wondering about its authenticity, Crockett is said to have called Texas the “garden place of the world.” He went on to say “I have no doubt that it is the richest country in the world good land and plenty of timber and the best springs and good millstreams good range clear water...it is in the pass where the buffalo passes from north to south twice a year and bees and honey plenty.”

Cattle, cotton, and timber were huge businesses in the early days, but stories about food are scarce. The largest amount of food cropland was devoted to corn, and Houston exported wheat, cattle, rice, and sugar. A pest infestation after the Civil War caused planters to turn to growing rice, which is still abundant.

There were pears in Pearland and sugar cane to fuel Sugar Land. There were truck farms all over the lower parts of the region and strawberry festivals to celebrate the existence of that excellent fruit.

By the 1880s, the frontier had practically disappeared, and row crops were started where only cattle grazing had been practical before. But during the same period, cattle raising changed “from frontier adventure to business enterprise,” according to the Texas Almanac.

By the turn of the century, the trend from the farm to the city had started, with less than four workers in 10 being in agriculture and with four families out of 10 already living in urban areas. Commerce was the driver, and the natural world began to recede into the movement of goods and money. Even the second most productive estuary system in the United States, Galveston Bay, and the vast Gulf of Mexico were eclipsed in terms of food production by the coming of oil, refineries,
and large-scale shipping. Rather than a source of protein, the rivers and seas were seen as ways to move goods - and to dump wastes.

All along, though, the place gained a reputation where you could put a stick in the ground and it would grow. Today, there are trees where there were no trees before. We have planted millions of seeds and plants, and new life is growing everywhere - not all of it considered beneficial. But no one flying into Houston will deny it's a garden place.

THE GROWERS Clockwise, from right: Planting rice on a Japanese farm near Houston. A pioneer trucker and his family with their wares in Seadrift. Picking strawberries near Houston. Your basic Texas watermelon postcard at work on the “big” myth for the state and the region. Judging sheep at Texas Agricultural and Mechanical College in College Station. Boxed figs headed to market in Aldine. Gentlemen farmers picking oranges.
Between agriculture and fisheries, the Houston region is a source of huge quantities of food. Abundant fresh water, rich land, mild climate, and a large Gulf/bay/estuary system provide a wide range of possibilities for food production.

Gulf fisheries are some of the most productive in the world. In 2000, the commercial fish and shellfish harvest from the five US Gulf states was estimated to be 1.7 billion pounds (approximately 772 million kg), which represents almost 20% of the total domestic landings in the United States. In the same year, commercial catches in the Gulf represented approximately 25% of the total US domestic commercial fishing revenue and were valued at over $900 million. The Gulf also supports a productive recreational fishery.

Estuaries are among the most productive natural systems on the earth, and Galveston Bay is the second most productive system in the US (although the declining health of Chesapeake Bay could change the order). Microscopic algae (phytoplankton) engage in photosynthesis, just like plants. On a per acre basis, as much carbon dioxide is converted into plant material in an estuary as is converted in a rain forest. The green material is immediately eaten - the first step in the estuarine food chain. Without the estuarine food chain, there would be no speckled trout or redfish or flounder in the bay, not to mention shrimp, oysters, and crabs. Both land and marine animals feed here. These warm shallow waters provide a nursery for many fish and shellfish.

Houston is also a major international agribusiness center emphasizing the marketing, processing, packaging, and distribution of agricultural commodities. Agricultural products represented 17.4 percent of Port of Houston export tonnage in 2004. In 2006, 229,393 acres - 19.12% of Harris County’s land area - were classified as agricultural or timber land for property tax purposes. Agricultural income in the Houston region in 2006 totaled $1,209,416,450, up 1.9% from 2003.

Houston has a very eclectic restaurant scene. In a region where nearly 100 languages are spoken, the diversity of restaurants may be unmatched in the US. The region always scores at or near the top in most

**WATERSHEDS** The Texas Triangle megaregion, shown below, has great quantities of water rushing through it. Several large rivers and hundreds of miles of bayous and creeks are everywhere. Each color is a different watershed.

**ECOREGIONS** A diverse set of ecoregions come together in the Texas Triangle. A Gulf, bays and estuary systems, rivers, forests, plains and prairies, and coastal areas provide variety for both wildlife and humans to gain access to food.
lists of great cities for restaurants. Houston is also home to Sysco, the
nation’s largest supplier of “meals-away-from-home” processed food.

At the other end of the spectrum, poor nutrition in Houston is re-
sponsible for undernourished children, rising rates of obesity, diabetes,
hypertension, and heart disease. In a survey of Harris County adults,
only 23.6% reported eating the recommended five or more servings of
fruits and vegetables each day. In 2005, 65.6% of surveyed adults in
Houston-Baytown-SugarLand area were overweight or obese.

Inadequate nutrition is linked with poverty. The Houston Food Bank
says more than 727,000 Texas Gulf Coast residents live in
poverty. The Food Bank alone feeds more than 80,000 indi-
viduals each week. There are 800,000 people in southeast
Texas who are food insecure, or
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meal is coming from.

Value of Agricultural Production

<table>
<thead>
<tr>
<th>County</th>
<th>$000</th>
<th>% of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austin</td>
<td>140,117</td>
<td>11.59</td>
</tr>
<tr>
<td>Brazoria</td>
<td>91,140</td>
<td>7.54</td>
</tr>
<tr>
<td>Chambers</td>
<td>22,107</td>
<td>1.83</td>
</tr>
<tr>
<td>Fort Bend</td>
<td>212,011</td>
<td>17.53</td>
</tr>
<tr>
<td>Galveston</td>
<td>23,445</td>
<td>1.94</td>
</tr>
<tr>
<td>Harris</td>
<td>364,730</td>
<td>30.16</td>
</tr>
<tr>
<td>Liberty</td>
<td>73,159</td>
<td>6.05</td>
</tr>
<tr>
<td>Montgomery</td>
<td>190,246</td>
<td>15.73</td>
</tr>
<tr>
<td>San Jacinto</td>
<td>27,556</td>
<td>2.28</td>
</tr>
<tr>
<td>Waller</td>
<td>64,907</td>
<td>5.37</td>
</tr>
<tr>
<td>MSA Total</td>
<td>1,209,416</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Texas Cooperative Extension

<table>
<thead>
<tr>
<th>WEST CROSS TIMBERS</th>
<th>Light-colored, sandy soils, and sands.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTRAL BASIN</td>
<td>Reddish-brown to brown, neutral</td>
</tr>
<tr>
<td></td>
<td>slightly acid, gravelly and sandy</td>
</tr>
<tr>
<td>EDWARDS PLATEAU</td>
<td>Dark, calcareous stony clay and some</td>
</tr>
<tr>
<td>BLACKLAND PRAIRIE</td>
<td>Uplands - dark-colored calcareous clay</td>
</tr>
<tr>
<td></td>
<td>and clay loams</td>
</tr>
<tr>
<td>EAST TEXAS TIMBERLANDS</td>
<td>Light-colored, sandy loams and sands, some silt and clay.</td>
</tr>
<tr>
<td>COAST PRAIRIE</td>
<td>Uplands - light-colored, clay loams, and clays.</td>
</tr>
</tbody>
</table>

RICH SOILS The sediments that make up these soils are the result of a
complex history of uplift and erosion that begins in the Rocky Mountains
and ends in a convoluted pattern of rich alluvial soils and wetlands.
Opportunities and Challenges

Possibilities are huge, but a significant paradigm shift is needed to ensure food security, safety, and freshness in Houston. The great food strengths of the Houston region are a moderate climate, a range of great soils, abundant fresh water and a rich marine system. Also, the people here have demonstrated an affection for green things that has generated tree cover where trees didn’t exist before, plus huge amounts of personal, commercial, and civic landscaping. We also have an ample labor force to support labor intensive industries such as aquaculture, greenhouses, orchards, and vegetable production.

The great weaknesses in Houston is a tendency to see everything in reductionistic economic terms in which land is only useful for development. With this is a faith in the ability of the rest of the world to supply us with cheap food via our vast transportation infrastructure system.

The greatest challenge we face is the addition of 3,500,000 more people by 2035, all of whom need to be fed, and who need places to live, work, learn, play, and shop. The region plans to sacrifice between 1,000 and 1,500 square miles of green land to accommodate those people in the same way we have accommodated the last 3,500,000 or so people.

The great opportunity is to see the region differently, to imagine that we could focus development in many places that already have infrastructure, jobs, schools, services, and stores.

One important challenge will be to place more value on fresh, locally grown and produced food. Today, people in Houston are willing to spend more on transportation than in any other region in the US, but we want our produce to be cheap. We don’t want them interfering with our desire for all the television services and monthly costs we can get.

Some of our counties’ officials are excited about paving their land, but in other counties there is a desire to retain a rural character. While much of the “agricultural” land has minimum agricultural use to enable a tax exemption, those “gentleman farmers” usually have the wealth to keep the land out of development. Opportunity lies with many of those places.

Localism in many forms can help keep a dollar in use in the region longer. The difference between giving a local farmer a dollar vs. spending it at WalMart is profound in terms of whether that dollar does more work here or goes straight to Bentonville, Arkansas.

We need a fresh look at industrial agriculture and globalization. We grow tons of rice here, but eat very little of it (we export and import rice). Thousands of acres of commodity soybeans are raised and sold at prices that barely sustain the farmers. Yet shoppers are buying “edamame” at significantly higher prices. Edamame is soybeans. Could soybean farmers here raise edamame instead of commodity soybeans?

There are organic and locally grown food waves as consumers think about freshness, health, and taste. Many communities could use the niche buyers to sell all manner of other local products at the same time.

So much variety can be grown in Houston, and a good source for that information is the book “Year Round Vegetables, Fruits, and Herbs.”

**LAND OF PLENTY (OF POTENTIAL)**

It is possible to grow at least the following in Houston: azuki beans • amaranth • apples • apricot • arugula • Asian peas • asparagus • asparagus beans • avocado • blackberries • bananas • basil • beet • beet • beets • black beans • blueberries • bok choy • broccoli • Brussels sprouts • buckwheat • Burdock • butter beans • cabbage • cantaloupe • cardoon • carrot • casserole • cauliflower • celere • celery • chava • chicory • chile peppers • Chinese cabbage • chives • cilantro • collards • corn • cress • cucumber • cumino • dill • fava beans • Feijoa • fennel • field corn • fig • gai lan • garbanzo beans • garlic • ginger • grain amaranth • grapefruit • grapes • green beans • groundcherry • head lettuce • horseradish • Irish potato • Jerusalem artichoke • jicama • jujube • kale • kiwi • kohlrabi • kumquat • leaf lettuce • leeks • lemons • lentil • loquat • luffa • mango mulberries • mesclun • mint • Muscadine • mustard greens • nectarines • nopal • okra • onions • orange oregano • papaya • parsley • parsnip • passion fruit • pawpaw • peach • pear • pecans • peppers • persimmons • pinto beans • plum • pomegranate • popcom • pumpkin • radish • raspberries • rice • rose • rosemary • salsify • savory • scallions • shallots • sorghum • Southern peas • spinach • strawberries • sugar cane • summer squash • sunflowers • sweet corn • sweet peppers • sugar • Swiss chard • taro • thyme • tomatillo • tomato • tropical yam • tumeric • turnips • watermelon • winter melon • winter squash

**HOUSTON VEGETANNUAL** Adapted from a drawing in Barbara Kingsolver’s book “Animal, Vegetable, Miracle,” this tree shows progression of some of the fruits and vegetables possible in Houston throughout year. Those in green above are on the tree.
Flowers for Metro Houston,” by Urban Harvest’s Bob Randall. Randall says “Nearly any vegetable and fruit sold in a Houston supermarket can be grown and has been sold in a local farmers’ market.” Randall advocates using abandoned properties for community gardens. This strategy could help provide food availability for the poor, and perhaps provide training and income opportunities.

In the end, the big issue is land. There are strategies to build cities, towns, villages, and neighborhoods in ways that would use far less land and improve the quality of life for a lot of people.

To do all this we have to shift the paradigm for regional planning, broaden the constituency for agriculture, broaden the ability to produce, and make the connection between our lives and the dirt around us. In some places the idea of “regional food systems” is evolving, which usually is a collaborative effort to integrate agricultural production with food distribution to enhance the economic, environmental, and social well-being. Houston obviously has the means to deliver food to people, but today we cannot be said to have such a regional food system. We could change that.

To do so, we have to find ways to provide economic viability for farmers. Celebrating local foods is a way to help do this, and promotion of farmers as land stewards and health providers is another. Education of consumers is key. Connecting the problem of food access for underserved communities is a win/win situation.

We need strategies for farm-to-restaurant connections (and the promotion to consumers of those connections), more farmers’ markets, more farmer education, “Buy Fresh Buy Local” campaigns, and more energy put into agritourism.

As with any comprehensive strategy, everything has to happen in concert. We now consider air and water in our regional transportation planning, which is the prime determinant of how much land we use for development. However, we do not consider food supply. So when large highways like the Grand Parkway are planned for rural areas, they do not consider the loss of agricultural land. Our regional transportation planning is becoming much more holistic. We could also take food supply into account and change the dynamic to help conserve the land we will need to sustain our food security as the world changes.

**HOMEGROWN** Farmers’ markets have sprung up all over Houston in the last couple of years. This one is the Bayou City Market in mid-October. They all have somewhat different philosophies, but basically they support local farmers and producers, who both grow food and process it into products. “Local” is usually more important than “organic,” but local organic is the goal. And the Houston region is a place where a fantastic variety of foods can be - and are - grown and produced. Here is a short list: cheese, yogurt, milk, goat, cattle, lamb, chickens, eggs, rice, corn, sugarcane, soybeans, oysters, shrimp (wild and farmed), redfish, flounder, other Galveston Bay and Gulf of Mexico wild fishes, crabs (wild and farmed), crawfish, catfish, bullfrogs, tilapia, pecans, peanuts, vegetables, spinach, leafy greens, tomatoes, cucumbers, peppers, potatoes, pumpkins, fruits, blueberries, peaches, strawberries, figs, pomegranates, persimmons, honey, herbs, preserves including mayhaw jelly, fig preserves, and various chutneys, boudain, lots of kinds of sausages, and an increasing variety of produce brought here from India, Viet Nam, Mexico, and all around the world - not to mention wine!

**WE EAT OUT A LOT** The Houston household food budget is something our ancestors, even a generation ago, wouldn’t recognize. Almost half our food costs are “away from home,” and we spend a big chunk on meats, fish, and eggs.
The Garden City

Cities, towns, villages, and neighborhoods in green infrastructure - a successful economic model for the Houston region

Writers have been asking whether urban agriculture could be the next design revolution. The source of the idea is largely Ebenezer Howard, whose 1902 book “Garden Cities of Tomorrow” is the most-translated book about planning. Howard argued that enormous cities were unhealthy and inhuman, as London of the time certainly was. He believed there was a marriage of town and country that was possible, and he called the concept the Garden City.

He envisioned a series of small cities of 30,000 or so residents that were as self-sufficient as possible in terms of homes, jobs, schools, and shops. All development would be tightly clustered and surrounded by agricultural and natural land, and each would produce its own food.

Howard and his colleagues actually built two of these garden cities outside London, although once the money started to flow in, the principles Howard insisted on began to flow out. As a result, no true Garden City has ever been built. Regardless, the idea of green space near homes became the organizing principle for the new town of Radburn, NJ, where the “garden” surrounded each home. The agricultural aspect disappeared. This began the suburban development type that has dominated the American market for 60 years.

Still, the general concept has played out on the ground in many places, perhaps most famously in the Randstad region of the Netherlands (map, below right). Now it has become the basis of the European Union’s vision of “a future in which regions with multiple centers organize into collaborative economic clusters that form sustainable networks of access, mobility, and green infrastructure.”

A search for the term “green cities” today returns 208,000 entries (in mid-July that was 150,000). The green city is the hottest topic on earth because it resonates with the mix of urban and nature that people crave. In a long-term Gallup Poll, people, asked where they would live if they could live anywhere, choose “small town” head and shoulders over either “suburb” or “city.” People want the possibility of intense interaction and sophistication that come from urbanism, but they always want to be able to walk out of town to the countryside.

We in Houston are embarking on development projects to accommodate 3,500,000 people by 2035. This is a huge opportunity to work on this idea of clusters surrounded by green infrastructure. Many of our small towns and cities are thinking about this kind of future and working to keep the kids down on the farm by improving the quality of their urban centers and adding jobs beyond farming.

Listen to Ebenezer Howard:

“There are in reality not only, as is so constantly assumed, two alternatives—town life and country life—but a third alternative, in which all the advantages of the most energetic and active town life, with all the beauty and delight of the country, may be secured in perfect combination; and the certainty of being able to live this life will be the magnet which will produce the effect for which we are all striving—the spontaneous movement of the people from our crowded cities to the bosom of our kindly mother earth, at once the source of life, of happiness, of wealth, and of power. The town and the country may, therefore, be regarded as two magnets, each striving to draw the people to itself—a rivalry which a new form of life, partaking of the nature of both, comes to take part in.”

GARDEN CITIES IN THE NETHERLANDS The Randstadt, at right, is a cooperative cluster of towns and cities surrounded by green infrastructure. Light green is agricultural land. The Randstadt has a very high quality of life, and it ranks just behind the Paris and London regions in Europe in terms of Gross Domestic Product.