HISTORY OF FOOD AND MARKETING

LESSON 1

FOOD PRODUCTS MARKETING
AGRICULTURE MANAGEMENT 302

SCOTT COLBY
**Introduction**

*To a worm in horseradish, the world is horseradish.*

- Yiddish Idiom (Anonymous), origin from [Malcolm Gladwell TED Talk](https://www.ted.com/talks/malcolm_gladwell) (approx. 3:41)?

There is a tendency to assume that things have always been the same and are the same everywhere. This limits the imagination of food marketers. So to start this course we’re going to step away from marketing and business principles and take the long-view of food and society to see how food environments have changed over time and to gain perspective on where many of today’s hottest trends come from. This will allow us to distinguish between food marketing fads and real trends that will persist into the future.

**Cravings and Optimal Diets**

Evolution theory teaches us that a species adapts to its environment. Therefore the food environment that a species has adapted to is optimal for the evolutionary fitness of its individual members. In other words: it’s the most healthful.

What is the food environment to which we are best adapted? Agriculture is approximately 10,000 years old—not enough time for significant metabolic evolutionary adaptations to take place. The optimal diet is pre-agrarian.

In conjunction with a mountain of medical research that generally agrees with this hypothesis on a piece-by-piece basis, this broad reasoning is what has motivated the popularity of the Paleolithic diet among nutritionists.

The Paleolithic Era spans from 26 million years BP (before present) to the dawn of agriculture 10,000 years ago. During this time humans lived in small groups, used fire, and developed tools and culture. Much good research suggests that early humans lived a life of leisure, although this is controversial.

Food was procured through hunting and gathering. How effective were these “primitive” methods for supplying adequate sustenance? Better than agriculture! Famines were rare and fossil remains provide evidence that Paleolithic man was in relatively good health. The height of humans dramatically declined, bones narrowed, and teeth decayed with the onset of agriculture.

It is only recently that post-agricultural humans have bounced back from what Jared Diamond has deemed “The Biggest Mistake in
Human History.” Many of today’s biggest trends in food marketing can be traced to this divergent step from our natural food environment. Our bodies and instincts are ill-adapted to the food environment we inhabit today. If you feel like you are in a fight with yourself as you try to eat a healthful diet -- that is because you are!

What Paleo Man Ate

Early diets were comprised entirely of meat, fish, nuts, fruit, vegetables, eggs, insects, honey, and (the most nutritiously perfect food of all) breast milk.

**Pause to Reflect:** Do you often crave refined carbohydrates? Look at the list of foods that were available to us 1 million years ago. Is there an evolutionary explanation for your cravings?

Answer: Yes! Your addiction to sweet foods is in some ways as real as a crack addict’s addiction. When you consume sugar, you have an opioid chemical response. Your internal mechanisms reward you for your healthful behavior.

*Say what? Sugar is not healthful!* Look again. There are three natural sweet food types. Honey is rare enough to be ignored. The other two are fruit and breast milk. There are very good reasons for you to be naturally inclined to gorge on sugar. There is no chance that you have a distant ancestor that did not crave the sweet flavor of breast milk. Craving fruit sugar was advantageous too. Fruit bearing plants co-evolve with their eaters as frugivores (fruit-eaters) spread their seeds. In other words, it is in the best interest of fruit plants to promote the health of their fruit eating minions so that they will be better able to spread seeds and will be attracted to the fruit. But why do we gorge on sugar? Fruit is seasonal and the season following the fruit season tends to be harsh. Better fatten up while you can. Unfortunately, we always can now. This is an example of our evolved instincts being ill-adapted to our modern food environment. The opportunistic food marketer uses these instincts to sell product.
Table I Percent Calories of Paleolithic Human Diets by Macronutrient

<table>
<thead>
<tr>
<th></th>
<th>Paleolithic Humans</th>
<th>Modern US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>27% (19-35%)</td>
<td>15.4%</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>33% (22-40%)</td>
<td>51.8%</td>
</tr>
<tr>
<td>Fats</td>
<td>42% (59-25%)</td>
<td>32.8%</td>
</tr>
</tbody>
</table>

Compared to Paleolithic humans, we eat 43% less protein, 22% less fat, and 57% more carbohydrates. If the Paleolithic diet is optimal, then we are far from optimal. A child born in the U.S. in 2010 has an estimated 33% chance of developing diabetes and this figure jumps to 50% if they are an urban youth. Public health policy makers have placed reducing childhood obesity atop their priorities list. Smart food marketers have anticipated the consumer response. This “hot” food trend has its roots in deep human history and is not likely to go away.

**Historical Note: Fat vs. Carbs**

We are currently correcting a terrible mistake. In 1955, President Dwight Eisenhower had a heart attack. In the ’50s, having a heart attack could get you fired. It meant you were weak, and possibly unable to perform in your job. Ike, a no nonsense five star general and president of the United States, was not weak. He wanted to know how a tough guy like him—who did everything by the book the right way
—could come to have a heart attack. He demanded an answer to the question, “Why did I have a heart attack?” Diet and cigarettes were both factors -- when his doctor told him to stop smoking, he did with military precision, and never had one again.

At the time there were two competing hypotheses in the scientific community: the carbohydrate and fat hypothesis. The nascent science was preliminary at best, and answers were decades away. Nevertheless, Ike wanted an answer.

Congress and the USDA assembled a panel of the world experts to choose. But they couldn’t. The scientific evidence simply did not admit a conclusion that could be said with reasonable certainty. In the end, the fat hypothesis “won” by one vote.

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1 When his doctor told him to stop smoking, he did with military precision, and never had one again.
After that, funding for scientific research was awarded with the presumption that the fat hypothesis was true. You were unlikely to get funded for research looking into the effects of carbohydrate consumption on heart disease.

Furthermore, the fat hypothesis reinforced the popular “folk theorem” that fat makes people fat. In fact, it is far more complicated than that. Carbs, especially refined carbs, are stored as fat. Chronic high consumption of carbs—especially refined carbs—results in insulin resistance: an accident of biochemistry that makes cells greedily store fatty acids even while you’re hungry.

Popular media and food marketers celebrated the fat hypothesis. Magazines and TV shows touted a low fat diet as the answer to looking trim and attracting that special someone. Foods were reformulated to be “low fat” or “fat free.” But fat tastes good, so something had to be added to compensate, and that was usually sugar. It became—and still is—difficult to get regular yogurt. Instead “low fat” and high sugar yogurt came to dominate.

Here’s the kicker. The best evidence to support the fat hypothesis in the 1950s was rigged. Ancel Keys, a Harvard professor and scientist, was the biggest advocate of the fat hypothesis. He collected data on countries’ heart disease and fat consumption rates. When he didn’t get the answer he was looking for—that fat consumption is correlated with heart disease—he purposely omitted some countries from his analysis so that he did. Without his rigged studies, the panel would have voted for the carbohydrate hypothesis and we would not be facing alarmingly high diabetes rates.

Today we don’t know all the answers, but we do know that the low fat diets that were popular in the 70s, 80s, 90s, and 00s is not good for you. You will inevitably consume far too many refined carbohydrates resulting in “metabolic syndrome:” insulin resistance, diabetes, and heart disease. This has led the Harvard School of Public Health to recommend increasing your fat consumption, with one caveat: **Not all fats are equal. Some fats are more healthful than others.**

A low omega-3 to omega-6 ratio will cause global body inflammation putting you at bigger risk for autoimmune diseases and heart diseases. Based on current day hunter and gatherers, archeological research of Paleolithic diets, and medical research, lower than a 1:4 ratio is good. *(The U.S. population average is much lower at 1:10.)*

Polyunsaturated fats are better than more saturated fats, although a recently a meta-analysis of the extant scientific literature has concluded that the mountain of literature looking at the relationship between totally saturated fat and heart disease shows, if anything, a weak connection.

Finally, trans fat—something completely absent to Paleolithic humans and only available in trace amounts to modern man through bovine milk two hundred years ago—are never to be consumed. The good news is after 2017 you won’t have to worry about that. Our government has required all added trans fat to be removed from our food system.

Where does that leave us? Confused, obese, diabetic, but with good enough answers to do better. In the end, it looks like a diet as fatty as the diet we consumed during our evolution is at
least better than the low fat diet we have been eating the last few decades, especially if we eat the same fats—omega-3s and polyunsaturated fats and no trans fats—that Paleolithic man ate. And cut out the sugar!

Policy makers are trying to help. In 2015 the FDA announced a revision to the nutrition panel. The old panel reflects recommendations based on the fat hypothesis; the revised panel reflects recommendations based on the carbohydrate hypothesis with less emphasis on fats and more emphasis on refined carbohydrates.

Most of the foods that we commonly consume today were not available to early humans: 72% of the calories we consume today are “new.” These include the 11% of our calories that come from dairy products, the 20% of our calories that come from refined cereal grains, 19% of our calories that come from added sugar, and 17.6% of our calories that come from refined vegetable oils. We also consume far more sodium. It is easy to see why many of our food instincts lead many of us to suboptimal health outcomes.

Many of the departures from our most “natural” diet provide opportunities for food marketers. Gluten free, dairy free, artificially sweetened, low sodium, and aerated food processing are all solutions to problems causes by our internal mismatch with our food environment.
**Figure I. Western Diets Are Mostly Made Up of “New” Foods**


<table>
<thead>
<tr>
<th>Food or food group</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy products</td>
<td>% of energy²</td>
</tr>
<tr>
<td>Whole milk</td>
<td>1.6</td>
</tr>
<tr>
<td>Low-fat milk</td>
<td>2.1</td>
</tr>
<tr>
<td>Cheese</td>
<td>3.2</td>
</tr>
<tr>
<td>Butter</td>
<td>1.1</td>
</tr>
<tr>
<td>Other</td>
<td>2.6</td>
</tr>
<tr>
<td>Total</td>
<td>10.6</td>
</tr>
<tr>
<td>Cereal grains</td>
<td></td>
</tr>
<tr>
<td>Whole grains</td>
<td>3.5</td>
</tr>
<tr>
<td>Refined grains</td>
<td>20.4</td>
</tr>
<tr>
<td>Total</td>
<td>23.9</td>
</tr>
<tr>
<td>Refined sugars</td>
<td></td>
</tr>
<tr>
<td>Sucrose</td>
<td>8.0</td>
</tr>
<tr>
<td>High-fructose corn syrup</td>
<td>7.8</td>
</tr>
<tr>
<td>Glucose</td>
<td>2.6</td>
</tr>
<tr>
<td>Syrups</td>
<td>0.1</td>
</tr>
<tr>
<td>Other</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>18.6</td>
</tr>
<tr>
<td>Refined vegetable oils</td>
<td></td>
</tr>
<tr>
<td>Salad, cooking oils</td>
<td>8.8</td>
</tr>
<tr>
<td>Shortening</td>
<td>6.6</td>
</tr>
<tr>
<td>Margarine</td>
<td>2.2</td>
</tr>
<tr>
<td>Total</td>
<td>17.6</td>
</tr>
<tr>
<td>Alcohol</td>
<td>1.4</td>
</tr>
<tr>
<td>Total energy</td>
<td>72.1</td>
</tr>
<tr>
<td>Added salt, as sodium chloride</td>
<td>9.6³</td>
</tr>
</tbody>
</table>

¹ Data adapted from references 22–24.
² In the US diet.
³ Salt from processed foods, table salt use, and cooking; in g/d.
Neolithic Revolution

Paleolithic humans likely did what some would call farming of non-grain crops as seeds from discarded wild fruits propagated next generation plants near camps that would then be relied upon year after year. However, this non-systematic method was not enough to cause the dramatic Neolithic revolution that propelled humanity into modern society. That would take the accidental discovery of grains as a bountiful food source.

The Neolithic Revolution marks the dawn of grain agriculture circa 10,000 BCE. Crops were first domesticated and systematically grown around 11,000 BCE in the Fertile Crescent which includes parts of current day Iran, Turkey, Syria, Jordan, Israel, and Egypt. Livestock was domesticated 6,000 BCE. By 5,000 BCE agriculture was widespread in the region and city-states were formed.

A highly recommended book that traces the rise of civilization and answers the question why did civilization emerge where it did, when it did, and the way it did?

What was so special about grain crops, such as wheat that made it the essential ingredient for civilization? Two words: storable surplus.

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2 Paleolithic woman is sitting by a fire playing with a piece of grass. Like a child pulling petals from a flower, she is pulling apart of piece of grass, absentmindedly throwing the pieces to the ground. Some of those pieces land in a cup. The group moves on leaving the cup behind. After a couple months the group returns to the site to find the cup full of a brown liquid. One brave goofball gives it a try. Beer!

“Many scientists believe events like this launched agriculture and the Neolithic Revolution that led to the defining characteristics of human society. If this true, it is not an exaggeration to say that civilization started with a cup of beer.”
Spread of Agriculture: Where there was a grain, there was an advancing civilization

Prior to surpluses of storable food, your liquid (ready to be traded) wealth lasted until it spoiled. You had no hope of trading across any great distance, or time by borrowing and lending. Markets were barter based, meaning if you wanted to convert a wild boar you caught for some blue berries your neighbor found, you had to do it directly—boar for blue berries—without any intermediate money. This made markets and large scale marketing impossible.

In other words, the thing that changed hands had to be of intrinsic value. With stores of value, something more convenient could be exchanged despite not having any intrinsic value because there was a reliable store of value that could “back” the worthless thing being exchanged. That worthless thing is called money.

Such a system would not be feasible without something storable such as wheat. Now trade could be conducted a lot easier. You could sell your boar and get some coins. Then you could walk with your portable coins to a market where blue berries are sold and buy some without transporting your boar. Beforehand it may not have been feasible to have found agreeable terms of trade because the boar is non-divisible: the amount of blue berries needed to be a fair trade would not have been useful to you because they would have gone bad by the time you could trade them all. Your alternative would have been to take the blue berries and try to trade them for more things, but that would have been a headache with a lot of uncertainty. It probably would have been better to stay put and eat as much boar as you could. With money, market activities became a lot easier and so more market activities took place.

We see this legacy today throughout the world including in the U.S. wheat penny.
So much happened all at once with the adoption of grain agriculture that instead of thinking in terms of one thing causing another, scientists prefer to think all the institutions and behaviors that happened at the same time as emergent. [Link to wiki page: https://en.wikipedia.org/wiki/Emergence] This gets around chicken and egg problems such as how could large trading markets exist without governing institutions and money, and how could governing institutions and money come to be without large trading markets? The answer is they emerged at the same time and, in a sense, caused each other to exist.

All at once the following happened:
• agricultural surpluses of a storable crop (e.g. wheat)
• settler communities (can’t be a nomad when you need to tend your crops and protect your surplus)
• high population concentrations and growth to support cities and…
  o trading centers
  o governments and laws
  o property rights
  o money
  o number systems (got to count your money)
  o time measurements (need to know seasons for agriculture)
  o important technological advances
  o accumulation of possessions (not practical with a nomadic life style)
  o long distance trade
  o cultural exchange
  o specialization of labor activities (with tradeable food surpluses, you can trade non-food outputs for food)
  o art (same as above, but mostly the domain of those with high levels of stored wealth and a lot of time on their hands)
  o disease epidemic (requires high population densities)
  o wealth inequality (not possible to maintain beforehand)
  o famine (from failed crops)

None of these would have happened without the advent of a storable crop, or at least to the extent that they did, and many others are interrelated or interdependent. Many would not have happened without some other ones. There are so many connections and pre-requisites that if you draw causative arrows you’ll get knots and circles and convince yourself the whole thing is impossible. Yet like an elaborate snowflake that is formed around a grain of dust, around storable surpluses of grain spontaneously emerged the knots and circles of civilization.

Pause to Reflect: After that bit of poetic writing and the highlights of that list, you may have forgotten that we started this lesson talking about how wonderful life was before agriculture and how it all went downhill with agrarian society. If that was truly the case, why would people sign up for the drudgeries of ag life with its endless toil, malnutrition, disease, and periodic famine?

[Answer: Agrarians societies are stable in the sense that once an ag society there is no going back (have you even considered becoming a hunter and gatherer?), and dominant in the sense that at the interface of agrarian society and non-agrarian society the ag society always wins. This is largely the result of differences in size. Agrarian society has economies of scale through trade and specialization—the bigger group the more efficient. Hunter gathers had diseconomies of scale: if the clan got too big, food in an area could not support the clan. Therefore city states

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3. Snowflakes require a speck of something to form around.
could forcefully dominant hunter gatherers. But also, agrarians had more at stake since they were tied to the land and felt entitled to it by their man-made property rights.

There is as second answer as well: most didn’t choose their life style, but were born into it. After all, despite the occasional famine, and malnutrition, most years there was a surplus of calories. That meant making babies, and an explosive population growth rate as we will now see.]

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**Growing People**

While Neolithic Revolution resulted in smaller people, humanity made up for it with more people. This may seem paradoxical but there is a good explanation. Stunted growth may occur from a failed crop in one of the early years of a child’s life. But that child may go on to have many offspring when they grow up, and with surpluses and economies of scale in agriculture, that is exactly what they did.

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**Figure II  World Population**

The World Population graph shows exactly how this happened. In the early days people were figuring it out as they artificially selected superior crop varieties, markets emerged and the components of civilization emerged. Starting circa 5,000 BCE the benefits of surpluses combined with the economies of scale to farming to make exponential population growth with a
rate that persisted until circa 1650. At that time the exponential growth rate increased even more with the Agricultural Revolution. Finally, the exponential growth rate has increased once again with Industrial Agriculture.

This graph paints a rosy picture, but was the quality of life of humanity improving over this time period? The answer is no, then barely, then dramatically. A rough but satisfactory measure of quality of life is per-capita GDP. This is calculated by adding up all the value that is produced and dividing that by the number of people. In principle this gives the average amount of value that a person gets.

The two graphs tell the story of humanity struggling to increase production as a way to sustain larger and larger populations. It is only until recently that the quality of life of people has substantially improved with the onset of the Industrial Revolution.

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4 Note that the y-axis is logarithmic. What does this mean? It means each major horizontal grid line is ten times the previous one. If a linear (regular) scale is used instead, the graph would get steeper and steeper over time instead of looking like a straight line from 5,000 BCE to 1650 CE.

5 This ignores the distribution of value so that GDP per capita is the same whether someone has ALL the wealth or the wealth is shared perfectly equitably amongst everyone.
Agricultural Revolution

From 1650 to 1850 during the Agricultural Revolution, the world population doubled. This was mostly fueled by increased food production as New World crops were introduced across the world. These included turkey, tomato, peanuts, peppers, pineapple, beans, squash, and chocolate. But most importantly were corn and potatoes. These two staples allowed places formerly ill-suited for the production of energy to have access to dense, storable grains to produce low cost carbohydrates that could support large populations. During this period the world-wide food distribution networks developed allowing grains to be shipped throughout the world. Finally, world-wide calorie production increased substantially when the development of the fertile breadbasket of the U.S. began grain production.

Industrial Agriculture

Around 1900 the technological advances of the Industrial Revolution began to dramatically impact agricultural production, methods, and markets. Previous growth in food production had been the result of increasing the extensive margin by increasing acreage, but now the intensive margin was being increased as advances produced more yield per acre. As a result, the world population doubled again.

Can you guess what new technology increased yields per acre the most?
Answer: Synthetic fertilizers

With Industrial Agriculture, food production has changed more in the last 100 years than it did in the previous 10,000 years. Most notably are the efficiency gains already mentioned, lower food costs, capital intensification of production, and a decrease in employed ag labor.

Figure V

Note: Real food prices have declined more than it seems in this graph because over this time period incomes rose substantially.

Characteristics of Modern Agriculture

1. Specialization
Before WWII most U.S. farms were mostly self-contained, diversified farms that produced many crops and completed the first steps of processing. Today monoculture dominates with one crop typically grown on a farm and many of the early processing steps occurring elsewhere.
For example, Beef Supply Chain is broken down into specialized industries

- Breeding and birthing calves
- Raising cattle on pasture
- Growing feed crops
- Storing and transporting grain
- Transporting cattle
- Finishing them in feedlots
- Slaughtering them and processing their meat

2. Simplification

Specialization resulted in routine production processes allowing for production to be more…

3. Mechanized

Increased mechanization is the result of technological advancements that made capital intensive agriculture more efficient. Since 1950 the average U.S. farm has doubled in acreage, but employs only 1/8th as many workers. This has resulted in high levels of unemployment and devastating rural poverty. On the flip side the efficiency gains from mechanization have resulted in huge efficiency gains thereby allowing more mouths to be fed domestically and throughout the world at lower prices.
4. Standardized

Specialized facilities—including farms, feedlots and processing plants—could work together more efficiently by adopting uniform practices and turning out products of uniform size, weight and consistency.

Today a staggering amount of agricultural products are culled due to irregular shape or minor cosmetic blemishes. Outputs must be identical, and varietals are grown as novelties.

Standardization is sought at every stop along the food chain. Chickens are now grown to a uniform size so they can be quickly slaughtered, plucked and processed into meat using
mechanized assembly lines. Fast food restaurants have come to expect uniform cuts of meat that cook evenly, fit between standardized sandwich buns, and meet consumer expectations. As a result of having little to no experience with agricultural production, the vast majority of consumers are reluctant to select any produce that does not meet the standard uniformity that they have come to expect. Furthermore, the number one criteria consumers use to pick a grocery store is perceived produce quality. Supermarkets know that and so offer only produce with the highest eye appeal. As a result oddly shaped products are culled even if they’re good to eat. For example, 75% of culled cucumbers are removed by sorters because “there’s not much eye appeal to them.”

5. Consolidation

Economies of scale have driven a great deal of consolidation in U.S. agriculture. The result is fewer, larger, more efficient farming operations. In 1950 1.15 billion acres were farmed by 5.38 million farms with an average size of 213 acres. By 2000, efficiency gains had allowed less land—only 942 million acres of farmland—to produce more by less than half the number of farms in 1950. The 2.17 working farms of 2000, however, were on average 434 acres: more than twice the size of the average 1950 farm.

Despite accounting for 36% of all farms making it the most common farm format, small family farm operations are no longer economically viable. Small family run farms are at best a luxury (20.7% are “retirement farms”) and at worst a burden to those who operate them. Many families are reluctant to relinquish their farm because it represents their family’s heritage. How do they survive? By getting a day job (see Table).

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6 There are always exceptions.
The median (average) income for a residence farm in 2013 was -$1,375 (-$2,175). That’s right! They typically operated at a loss.

### Principal farm operator household finances, by ERS farm typology, 2013

<table>
<thead>
<tr>
<th>Item</th>
<th>Residence Farms</th>
<th>Intermediate farms</th>
<th>Commercial farms</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of farms</td>
<td>1,160,514</td>
<td>696,780</td>
<td>188,058</td>
<td>2,045,352</td>
</tr>
<tr>
<td>Income, median dollars per household</td>
<td>-2,175</td>
<td>-863</td>
<td>174,185</td>
<td>-1,141</td>
</tr>
<tr>
<td>Farm income</td>
<td>86,366</td>
<td>55,000</td>
<td>47,000</td>
<td>62,500</td>
</tr>
<tr>
<td>Earned Income</td>
<td>70,000</td>
<td>31,481</td>
<td>32,500</td>
<td>40,704</td>
</tr>
<tr>
<td>Unearned Income</td>
<td>20,742</td>
<td>20,742</td>
<td>6,500</td>
<td>20,742</td>
</tr>
<tr>
<td>Total household income</td>
<td>82,800</td>
<td>55,138</td>
<td>231,420</td>
<td>71,697</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Number</th>
<th>Income, average dollars per household</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm income</td>
<td>-1,375</td>
<td>2,485</td>
<td>302,694</td>
</tr>
<tr>
<td>Off-farm income</td>
<td>111,146</td>
<td>58,514</td>
<td>81,344</td>
</tr>
<tr>
<td>Earned Income</td>
<td>85,296</td>
<td>35,264</td>
<td>61,329</td>
</tr>
<tr>
<td>Unearned Income</td>
<td>25,850</td>
<td>23,249</td>
<td>20,015</td>
</tr>
<tr>
<td>Total household income</td>
<td>109,771</td>
<td>60,998</td>
<td>384,038</td>
</tr>
</tbody>
</table>


As you might expect, taking over an insolvent farm is not an attractive option for the children of family farm operators. As a result the average age of small farm operators has been steadily climbing and is currently approximately 60 years old. This demographic cliff portends the further decline of small family farms and greater consolidation as aged operators die.

Other levels in the food marketing chain have seen widespread consolidation as well, albeit for different reasons and different consequences. We will talk about consolidation of manufacturers, wholesalers and retailers later in the course.

Firms may also consolidate in the vertical dimension as well. This occurs when firms that use to have an input-output relationship join to form one firm. In 1960, 13% of farms were vertically integrated; in 1994, 18% were.

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**Average Age of Principal Operator, 1982 - 2012**

<table>
<thead>
<tr>
<th>Year</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982</td>
<td>50.5</td>
</tr>
<tr>
<td>1987</td>
<td>52.0</td>
</tr>
<tr>
<td>1992</td>
<td>53.3</td>
</tr>
<tr>
<td>1997</td>
<td>54.3</td>
</tr>
<tr>
<td>2002</td>
<td>55.3</td>
</tr>
<tr>
<td>2007</td>
<td>57.1</td>
</tr>
<tr>
<td>2012</td>
<td>58.3</td>
</tr>
</tbody>
</table>

Question: What factors have driven the vertical integration of farms?

Answer: Capital intensive manufacturing technology requires high degrees of standardization. This requires a high degree of coordination along the food chain. Many manufacturers find it more cost effective to own farm producers to ensure that they get the exact inputs they need, exactly when they need them.

6. Greater Use of Off-Farm Inputs

Two factors have driven farms to use more off-farm inputs. The first is specialization (see above). For example, instead of farms growing their own grain to feed cattle, they typically purchase it now.

The second is greater use of materials that are infeasible to produce on-farm. These include synthetic fertilizers, chemical pesticides, antibiotics, hormones, and fossil fuels. Use of these off-farm inputs results not only in higher yields, but also remove uncertainty against many of the risks that have historically been associated with farming.

Monoculture requires greater use of synthetic fertilizers and chemical pesticides. From 1948-2008 agriculture chemical use quintupled. Remember, this is despite total agricultural acreage decreasing.

Normative and Positive Perspectives

Throughout this course we will often have discussions about touchy controversial topics. Expressing genuine disagreement is highly encouraged. That’s how you learn from others, expand your world view, and come to understand and appreciate personal differences.

However, there are two different ways that you may disagree. The first is normatively. This is when you disagree about the way the world should be. For example, here is a normative question:

Normative Ethical Question: The foregoing discussion hinted at some negative aspects of industrial agriculture. What are these? Do the positive consequences of industrial agriculture outweigh the negatives?

The second way you may disagree is positively. This is when you disagree about the way the world is (i.e. facts). This can get complicated in marketing because often we will be talking
about how other people think the world ought to be. For example, here is a positive question about other people’s norms:

*Positive Marketing Question:* The forgoing discussion hinted at some negative aspects of industrial agriculture. Some of these depend on your preferences, values, attitudes, and lifestyle. Whether or not you see them as negatives, what are some aspects that consumers might see as negatives?

Being mindful of this distinction will help avoid discussions that go nowhere as one person makes a normative argument and the other makes a positive argument. Most of the course will be interested in a positive approach, but we will have normative discussions as well.

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**Pause to Reflect:** Answer the normative and positive question above.

*Answers*

1. Answers: Environmental degradation
2. Loss of food quality
3. Vulnerability to disease and pests
4. Animal Welfare
5. Food waste
6. Rural poverty
7. Overconsumption, obesity, and metabolic syndrome
8. Lack of variety
9. Loss of flavors
10. Consumer disconnect from producers and food

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**Industrial Ag Problems are Food Marketing Opportunities**

Many of the hottest trends in food marketing and consumer demand are responses to (real or perceived) problems with industrial agricultural production. *Can you come up with any examples?*

- Organics
- Health
- Higher quality
- More labels (health, nutrition, environment, etc.)
- Locavore movement
- Convenience
• Heirloom varieties
• Demand for regularly shaped produce
• Low carb foods
• GMO free
• Food Safety
• Gluten free
• Low fat diets (esp. saturated fat and omega-3’s)
• Folksy family farm motifs
• Freshness
• Higher calorie consumption / desire for less consumption
• Obesity
• Sustainable agriculture
• Green
• “Natural”
• Free Trade

**Takeaways for the Food Marketer**

So far in this lesson we have used history, nutrition science, economics, and other disciplines to identify changes in consumers’ relationship to food. This has helped us identify “problems” that represent mismatches between what consumers want and what they get (unmet needs). This is a method for identifying marketing opportunities. In fact

*Much activity in food marketing are attempts at solving old problems and fulfilling fundamental consumer needs.*

For example, we saw that many of our diet-based health issues are related to a mismatch between the hunter gatherer diets and our modern ag-based diets. This manifests itself as disconnect between what people want for health reasons and what their bodies’ tell them to eat. This contradiction provides opportunities for food marketers.

Similarly, many of the trends in food marketing are driven by consumer reactions to what consumers see as problems associated with industrial agriculture.

It is fair to ask: If agriculture-based diets and industrial agricultural production have been around for so long, why are consumers only now so interested in products that are solutions to their associated problems? There are many reasons, but there is one that stands out more than the others:

7-Later we will call these “unmet needs.”
We’ve solved the quantity problem, it’s all about quality now

Today we face a problem that would have seemed absurd just 100 years ago: we have too much food. While price will always be important, today’s food consumers are willing to pay more for their calories if they get something else in return. Successful food marketers find that “something else,” and create brands that offer it.

Special Aspects of Food Products

Many of you may wonder, I am taking a regular marketing class, why should I take a food marketing class too?

Food products are special in many different ways that make their marketing different than other food products. All the marketing techniques and insights you find in a standard marketing textbook are applicable to marketing Blu-Ray players, but many of them would not work for a marketer of baby carrots.

The following are special aspects of food.

1. **Nondurable**
   Nondurable goods are used quickly after purchase and are gone once they are used. As a consequence repeat purchasing is a very important concern for food marketers.

2. **Perishable**
   The perishability of food has many far reaching consequences. First, it allows products to be differentiated according to their shelf-lives. As a result you can choose between fresh, frozen and canned peas.

   A food product’s deterioration rate limits the extent to which consumers can stockpile. Stockpiling—the practice of buying a lot of a product at a reduced price to avoid paying a higher anticipated price—is a major concern of food marketers.

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**Food Deserts**

Food deserts are characterized by a lack of access to healthful foods such as fresh fruits and vegetables, and poor health outcomes such as metabolic syndrome. Starting in 2014, $400 million dollars in funds are being distributed in the form of grants, loans, and other support for the development of grocery retailers in underserved areas. The problems of food deserts would likely not exist if it weren’t for food perishability.
considering promotional pricing. With highly perishable foods, such as fresh spinach, this is not a concern. But it’s a big concern with nonperishable foods such as frozen spinach.

The flip side of this is producers, warehousers, and retailers can’t store highly perishable foods either. As a result sellers have no choice but to sell their perishable products at the market price no matter how low it is because it will all go bad if they hold out for a higher price. This means the short-term supply of perishable food is inelastic.

Warehousing highly perishable foods is very expensive. Part of the solution to this problem is sophisticated inventory management and distribution systems. We’ve grown accustomed to being able to eat strawberries any time of the year, but in the 1950’s before such sophisticated systems, strawberries were only seasonally available.

The perishability of food also limits how often people need to go shopping. In an alternative world where food lasts forever, it would be feasible for food retailers to be spread out over great distances with consumers making highly infrequent trips and stocking their pantries with, say, a month’s worth of groceries. In our world, food retailers are relatively densely packed.

3. Scalability
Food is scalable. When you choose to buy a food product, you not only choose what, but also how many or how much. Two of units of food is roughly twice as useful to consumer as one. This affects how products are made, and is another dimension on which products can be differentiated.

The scalability of food also allows for quantity discounts (aka “second degree price discrimination) at the consumer level. This is the reason you won’t see a “Buy 2 Get 1 Free” promo for Blu-Ray players, but you will for microwavable burritos.

4. Usage Variant

Once you purchase food, you then decide how quickly you will consume it. This means marketers can induce higher consumption rates using clever tricks to increase long-term demand. For example, larger format containers induce higher per-ounce consumption rates. It’s amazing how quickly you go through that big bag of chips, isn’t it?

5. High Frequency

Consumers typically go to a large format grocery once or twice per week. They also make trips to consume food away from home frequently. When they’re not making purchasing decisions they’re making consumption decisions almost continuously. In fact
People make 227 food decisions per day

Think about that…

I bet one of the things you’re thinking is, “That’s too high. What are we calling a ‘food decision’?” Good question. 59 of those decisions were concerned with “what.” The rest are concerned with where, when, how, and with whom.8

If you don’t think you make that many food decisions per day, that’s the point! We make so many food decisions that we are unaware of them because we make most of them with very little thought.

This has big consequences to marketing food because instead of conceptualizing consumers as fully informed calculating machines making economically optimal decisions to maximize their utility, it is better to conceptualize food consumers as having bounded rationality.

**Bounded Rationality**—when an economic agent is unable to make a fully informed decision because they do not have the time or ability.

Instead, food consumers use simple heuristics, or rules of thumb, to make choices. The most common heuristic is to simply buy the same thing over and over again to avoid the repeated high burden of thinking critically about every little purchase. This is in stark contrast to how you probably would go about purchasing a TV.

This makes getting consumers to try and get in the habit of purchasing your product more important because they start buying your product they are likely to continue in the future. This heuristic behavior also gives first movers a potentially large advantage.

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**Pause to Reflect:** In 1998 U.S. households made a grocery purchase on average once every 4.7 days. In 2009 they made a purchase on average once every 6.3 days. This is a huge change over a short time period. *Why do you think households are shopping less frequently?*

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8 Experiment participants clicked a handheld device whenever they made a food decision.
6. Necessary Good

As food consumption levels approach zero, consumers’ marginal utility of food approaches infinity. In words, if you have nothing to eat, food becomes the most important thing in your life and you would trade a fortune for a morsel of bread.

Of course, people can live without any one brand. However, food being a necessary good guarantees that food markets will always be big. Furthermore, food markets will always be in proportion to population levels.

Every society is three meals away from chaos.

- Vladimir Lenin

7. Nutrition and Health

There is no other class of consumer products that have the same impact on health as food products do. Food is literally what we’re made of.

The demand for food is often recast as demand for nutrients. This decomposition allows foods to be combined into special diets that meet metabolic requirements. Many food pairings that typify cuisines evolved to their prominence because of they are nutritionally complimentary to each other. For example, grain and bean pairing, such as in the Three Sisters of corn, squash and beans of Native Americans, form a complete set of amino acids needed for a complete diet. Consumption of those foods in isolation from one another would not provide a complete diet.

8. Hidden Attributes

Many of the attributes that we want in our foods cannot only be detected before we make the purchase, but cannot even be ascertained after we eat them. For example, I challenge you to “taste” the magnesium in your apple!

When important attributes are not observable to consumers in this way, they are called credence attributes because consumers the value of information about those attributes requires credible informers.

Health and nutrition attributes are good examples of credence attributes. Production practices such as organic farming and animal welfare are as well.

With so many food attributes being credence attributes, and with producers often having disincentives to be honest, markets will fail without a credible authority to regulate food markets. That is why government agencies such as the FDA and USDA heavily regulate food markets.
9. Inputs to Household Production

You go to the store, make food purchases, bring your food home, and then what? In most cases you need to do something to your food. You combine foods in complicated ways using gadgets and machines using technologies called “recipes.” This requires a significant amount of labor in the form of your time, variable inputs such as energy, and fixed capital such as an oven and knives. When you are done you have a consumable product. Your house is a factory.

Marketers of products that are commonly altered before consumption must be mindful of opportunities to gain competitive advantages by better fitting into household production technologies.

Pause to Reflect: How does lettuce sold in clamshell packaging gain a competitive advantage? What types of households will be more willing to pay extra for this form? How can this be explained in terms of household production technologies?

8. Cultural Significance

Food is meaningful to people. All of us have foods that have special significance to our families whether it’s mom’s goulash or lazy summer evening ice cream. Popcorn represents movies; Cracker Jack, baseball games. More generally, certain flavors are important to entire societies.

How important can certain foods be? Poor Indian migrants with incomes so low that they do not consume sufficient calories to maintain body weight do not change their food choices in response to lower prices of less familiar foods in the destination markets. If they did, they could afford 7% more calories! Or do you think household production plays a role?

9. Seasonality

Biological systems’ dependence on the sun drives seasonal patterns in food markets. Prices typically follow a wavy sinusoidal pattern with one year frequency. This creates problems for producers and retailers because customers easily get turned off by volatile prices.

Seasonality also creates problems when comparing food prices at various times of the year because a low January price may seem high when compared to summer prices. For this reason, the Bureau of Labor Statistics (BLS) published both raw and seasonally adjusted price indexes.
Pause to Reflect:

*Why are producer tomato prices more volatile than consumer tomato prices?*

![Producers Price Index for Tomatoes](image)

![Consumers Price Index for Tomatoes](image)

10. Food Commodities Are Undifferentiated

An apple is an apple is an apple. Then how are you supposed to get people to choose *your* apple? This is a fundamental problem in food marketing that other markets simply don’t have. As a result of raw agricultural food commodities not being differentiated, those industries are notoriously competitive and in fact are used as the canonical example of “perfect competition.” What does this mean? It means no profit.

It also means that one of the major challenges of food marketers to differentiate their products from competitors. This can be done even if the physical attributes are otherwise identical to competitors’ through branding.
“Vermont Maple Syrup” can fetch a higher price than generic “Maple Syrup” even if they’re the same.
References

1 This is a Yiddish idiom that will pop up later in the course.


