Building Integrated Agriculture

- BrightFarm Systems LLC

BrightFarm SYSTEMS

BrightFarm Systems

- A design and engineering consultancy
- Specializing in agricultural and environmental engineering
- Designing rooftop, hydroponic greenhouses

The Challenge

- Very high CO2 emissions from food production & transportation
- High dependence on oil
- In urban areas: low quality / high produce prices + food deserts

The Opportunity

- Vegetables grown within 10 miles of consumer
- Fresher vegetables, stable prices
- Very low carbon emissions

Greenhouses

- Year-round production
- No pesticide use

Recirculating Hydroponics

- Light weight & modular
- Very high yields
- High water efficiency / no agricultural run-off

Building Integrated Agriculture

- Uses hydroponic greenhouses on urban roofs
- Captures building waste heat to reduce operating cost & C02 emissions
- Plus: solar panels for power + rainwater catchment system

The Science Barge

- Designed in 2006, operated on Manhattan's west side, 2007-2008
- An urban farming research & demonstration project
- World's first ever carbon neutral hydroponic greenhouse

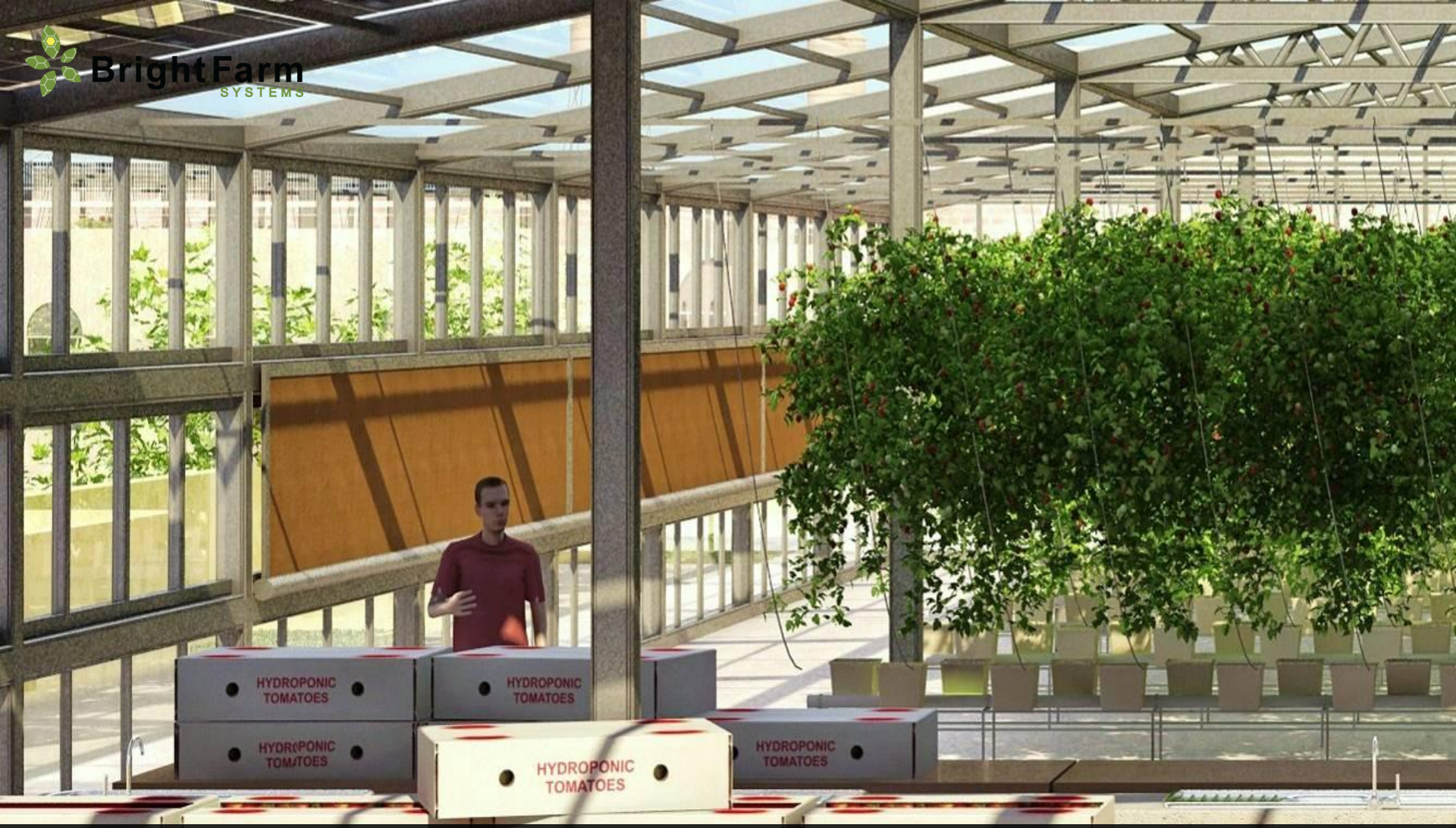
Whole Foods Market, New Jersey

- Hydroponic, carbon neutral, herb production
- Fresh, in store herb production for prepared food department
- Designed & built: 2008

Blue Sea Developments, South Bronx, NY

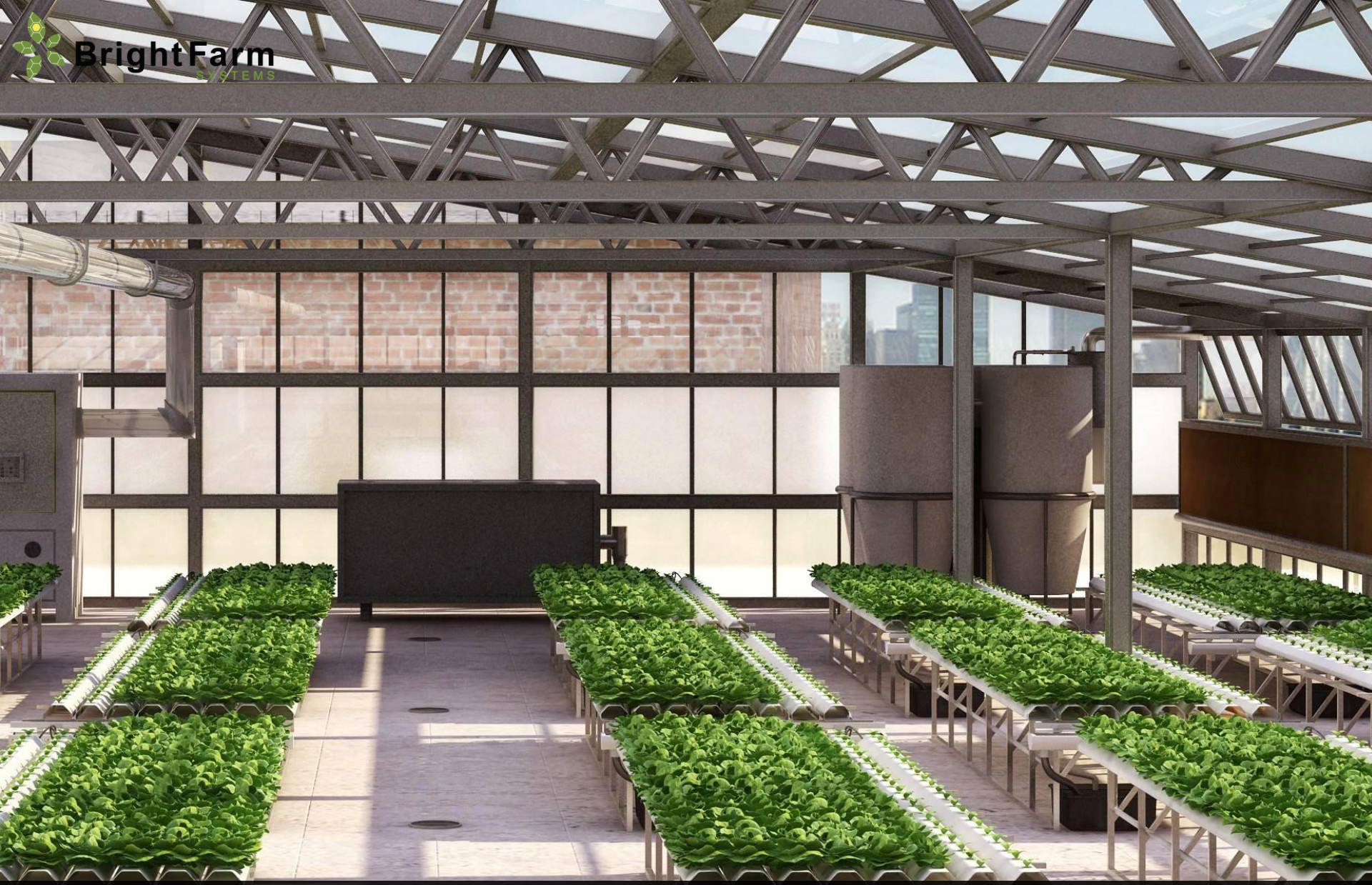
- Affordable housing development with building integrated farm
- Carbon neutral vegetable production for distribution to The Bronx
- Design 2009; Build 2010

➲ Hydroponic lettuce production



A 10,000 sq ft rooftop greenhouse facility

- Produce 100,000 lbs of vegetables a year - requirement of 400 people
- With retail value of $400,000
- Mitigating 80 tons of carbon dioxide emissions a year



- Greenhouse heated with waste heat from the building
- Power by solar and irrigated with captured rainwater

The Sunworks Center, Manhattan School for Children, New York City

- State of the art, rooftop greenhouse & environmental education center
- Teaching of environmental science, core sciences, food & nutrition
- Design 2009; Build 2010

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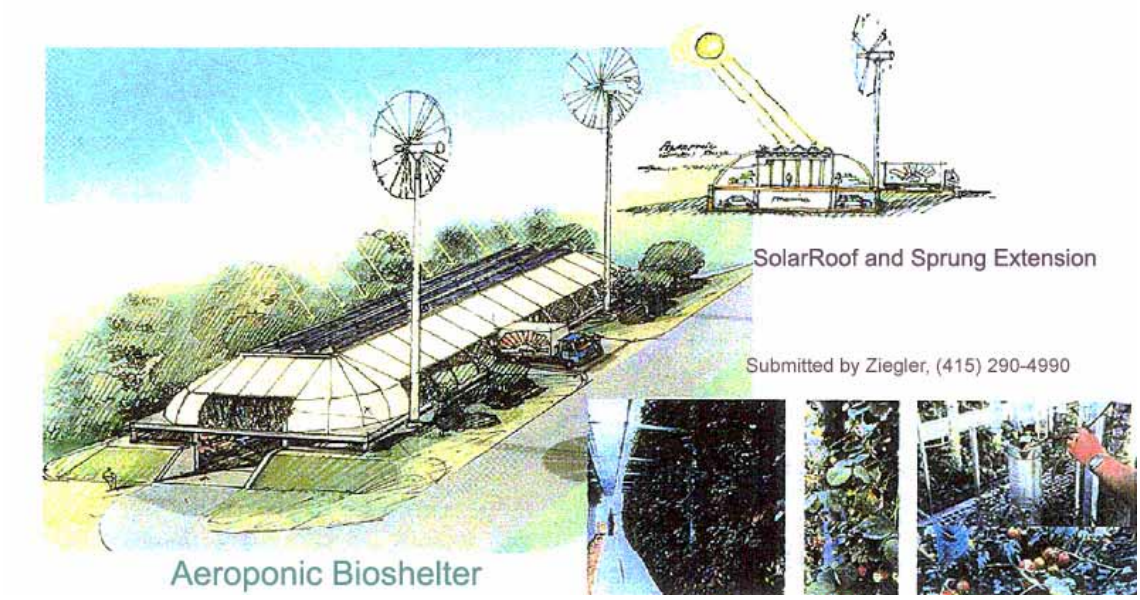
BrightFarm SYSTEMS

The Vertical Aeroponic Growing System



We are developers of a new agricultural growing system developed in Italy, the state of Hawaii and California. The system is a growing environment housed in an enclosure called a BIOSHELTER ®. Within this Bioshelter is a highly efficient growing system utilizing many vertical aeroponic growing tubes. Pumps powered by solar energy and monitored by a computer pumps water and nutrients to thousands of the growing tubes. These Bioshelters have 6 to 7 times the output of conventional greenhouses. Typical products include garden vegetables, berries, flowers, and specialty plants.

We are in the process of seeking investors who are interested in developing highly productive farms, and to distribute this high-tech growing system all over the world.

For further technical information and licensing agreements contact:

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The Aeroponic Growing System:

The principles of Aeroponics are based on the possibility of cultivating vegetables whose roots are not inserted in a substratum (the case with hydroponics) or soil, but in containers filled with flowing plant nutrition. In these containers roots can find the best condition regarding oxygenation and moisture. These conditions allow for better plant nutrition assimilation in a more balanced way, with consequential faster development of the cultivated plants.

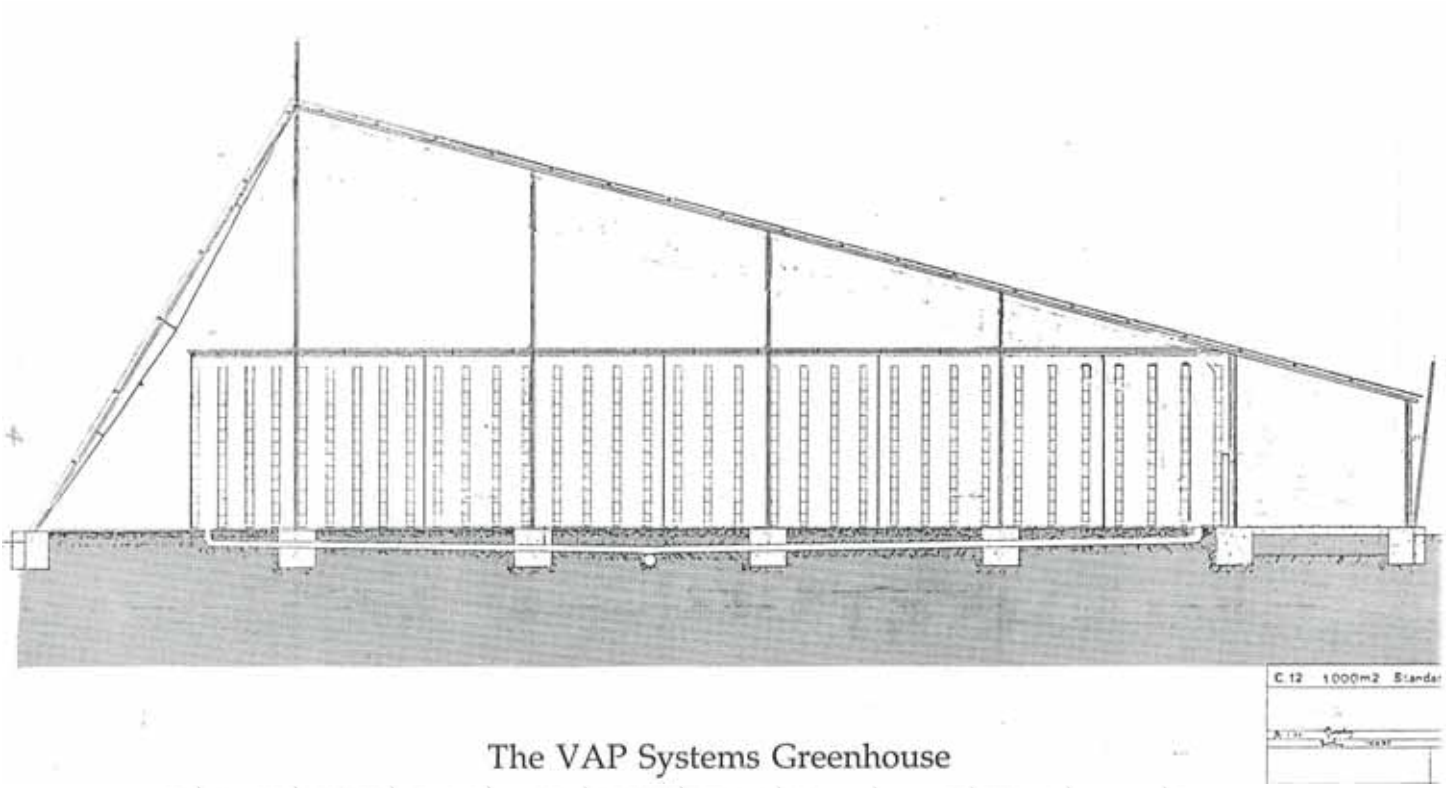
Plant containers can be mounted on top of one another and because they are light and handy, they can be easily moved according to agricultural needs. Numerous plants are mounted in vertical columns within a greenhouse or shade house space. Nutrients are allowed to trickle down through the growth columns.

Most agricultural plants need a direct exposure to the sun during the first vegetative development. Afterwards this direct exposure is no longer relevant. Based on this observation, plant containers are periodically displaced. Young plants are placed at the highest level of the growth column. Afterwards they are progressively lowered utilizing a rotational mechanical system. With the rotation periodically repeated, this permits constant production without any interruption. The Aeroponic system is agriculture with a non-stop production cycle.

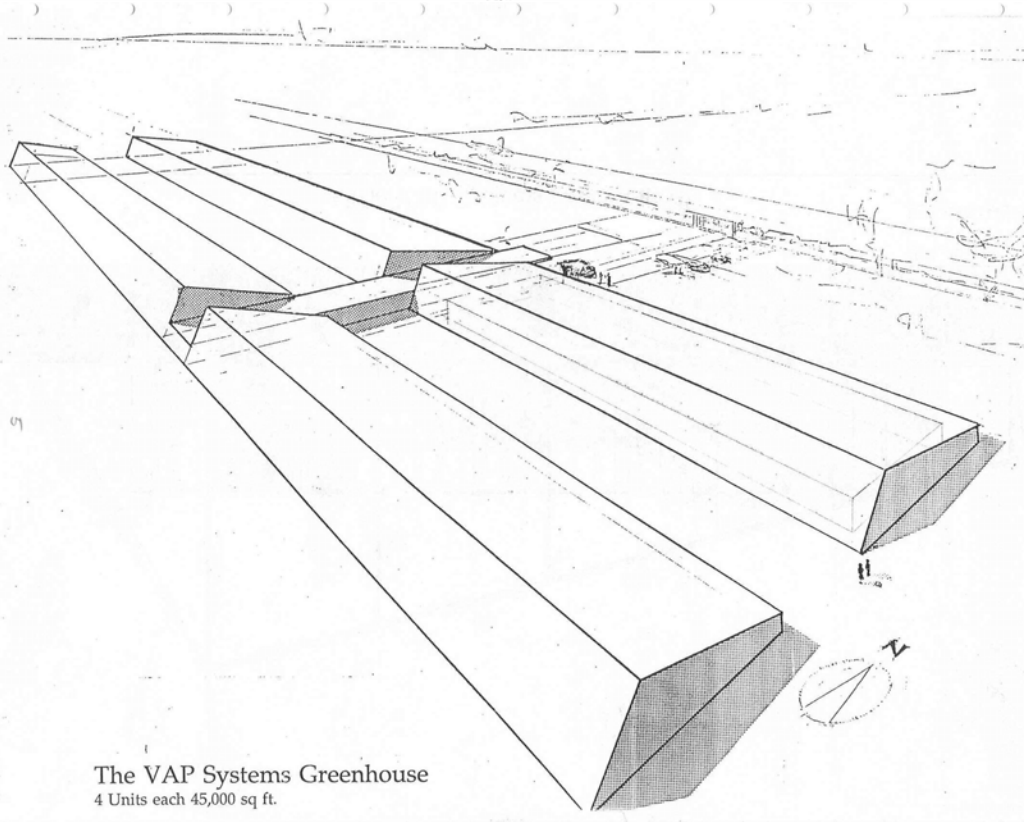
Plant nutrition is supplied into a closed circuit. Consumption is consequently limited to only the quantities absorbed by the plants, allowing for substantial water savings. For example: to produce a kilogram of tomatoes using traditional land cultivation requires 200 to 400 liters of water, hydroponics requires about 70 liters, aeroponics utilizes only about 20 liters.

Because the aeroponic system is a continuous-cycle in an enclosed space it reduces the agricultural labor into a series of mechanical routine operational tasks which are carried out daily and throughout the year. This enables workers to acquire considerable skill within a short period of time—a few months. In traditional agriculture commercial production is obtained only with skilled workers qualified by many years of experience.

The aeroponic equipment is sheltered within greenhouses or anti hail-storm coverings according to the latitude. Climate controls within the greenhouse ensure optimal growing conditions, assuring high yields.



The VAP Systems Greenhouse



The VAP Systems Greenhouse
4 Units each 45,000 sq ft.

The VAP Vertical Aeroponic Growing System

ON LAND WHERE NOTHING GROWS WE CAN WITH THE VAP SYSTEM GROW VEGETABLES, FRUITS, AND FLOWERS.

The basic local requirements to achieve this are:

a. Sunshine

b. A level area of land which is not shaded by mountains or high buildings. The area should be accessible by road.

c. Water of suitable quality for agricultural use. The quantity required is only 10% of that required for normal greenhouses.

d. A small amount of electric power. If necessary this can be provided by solar electric means.

If these requirements can be met a VAP System Bioshelter can be erected on the land, and within it cultivation of vegetables, fruits and flowers.

The VAP System Bioshelter will produce:

a. Annual crop yields of at least thirty times that of normal agriculture and six times that of a normal greenhouse.

b. Produce of quality and taste, equivalent to normal agriculture.

c. Produce which contains the minimum amount of fertilizer.

d. Crops all year round. There are no growing seasons in a VAP System Bioshelter.

e. A substantial annual operating profit.

Advantages of the Aeroponic Growing System:

In comparison with the traditional agriculture the most relevant advantages are the following:

1. Limited water consumption. This system has had commercial success in desert areas such as Saudi-Arabia and Israel.

2. Agricultural success independent of land and soil quality. Soil composition is not relevant because soil is never used in the process.

3. Intensive food production on a limited land surface area. The 3-dimensional growing system has the highest output per square foot of land per year of any system known.

4. The growing system can be constructed near consumers. The greenhouse can be constructed near urban centers and markets, with consequent reduction of freight costs and offering consumers freshly-cropped products.

5. Yields are independent from any seasonal adversity. This includes cold, hot windy, or dry weather, etc.

6. Non-stop production cycle ensures a constant market supply with more price stability.

7. Automation of most agricultural operations with a limited necessity of farm-labor and farm equipment investments. The simplicity and reliability of the mechanical system permits the employment of unskilled labor and the partially handicapped. It therefore possible to produce on a commercial basis in areas without any agricultural tradition.

8. Higher organic qualities of the products. Examination of “plateau” states of growing stock has shown a higher salt percentage of up to 30 %.

9. Social reevaluation of agricultural work which in the aeroponic system is planned. This agricultural scheme follows an industrial model: daily fixed working-hours, no more unsuitable back-breaking work in the environment but sheltered from the weather, no more seasonal or occasional work but uninterrupted activity during the whole year.

More Advantages of the Aeroponic Growing System:

The VAP System is a modern method of cultivation particularly suited to desert areas and island communities where land and fresh water is limited. Although the term "greenhouse" is used to describe the building in which the VAP System operates, by no means does the efficiency of a normal greenhouse compare with that of VAP System Bioshelter. The main advantages of a VAP System Bioshelter over a normal greenhouse are as follows:

- The annual yield per square foot of a VAP System Bioshelter is six times that of a normal greenhouse. Therefore; a VAP System Bioshelter of 5,000 sq. ft. is equivalent to a normal greenhouse of 30,000 sq. ft

- The VAP System Bioshelter is really independent of the seasons and will produce on a year-round basis. The environment of the interior is as near to a natural state as possible. In a normal greenhouse year-round production can only be achieved with full air-conditioning which, in fact produces a completely artificial environment. The necessary investment and operating costs make this a totally uneconomical proposition.

- The water consumption of a VAP System Bioshelter is only 10 % of that required for a normal greenhouse. With the VAP System there is no water wastage as the supply is contained within a closed circuit which permits recycling. The only water used is that taken by the plants.

- In a VAP System Bioshelter, the necessary nutrients for cultivation are contained in solution in the closed circuit water supply system referred to above. The composition of the nutrients is controlled automatically. The roots of the plants absorb only as much of the nutrients as they require. The resulting produce, therefore, contains the minimum of fertilizer and is consequently of the highest quality.

- In a VAP System Bioshelter fertile soil is not required. The nutrient solution is made of "compost tea" Any normal greenhouse requires large quantities of fertile soil.

- The personnel requirements of a VAP System Bioshelter are very low. For example a production bioshelter of 45,000 sq. ft. requires only 2 technicians and 6 unskilled workers. An equivalent size normal greenhouse of 270,000 sq.ft. would require at least 30 workers.

The VAP System is designed on a module of 12 ft x 6 ft x 10 ft. and can be supplied in multiples of this module. The minimum practical size, commercially viable, would be 10,000 sq. ft.

The VAP System: Vertical Aeroponic Planting System: Crop Yield:

The crop yield varies for each type of plant and is a function of the cultivation cycle of the particular plant in the Planting Tubes. For example;

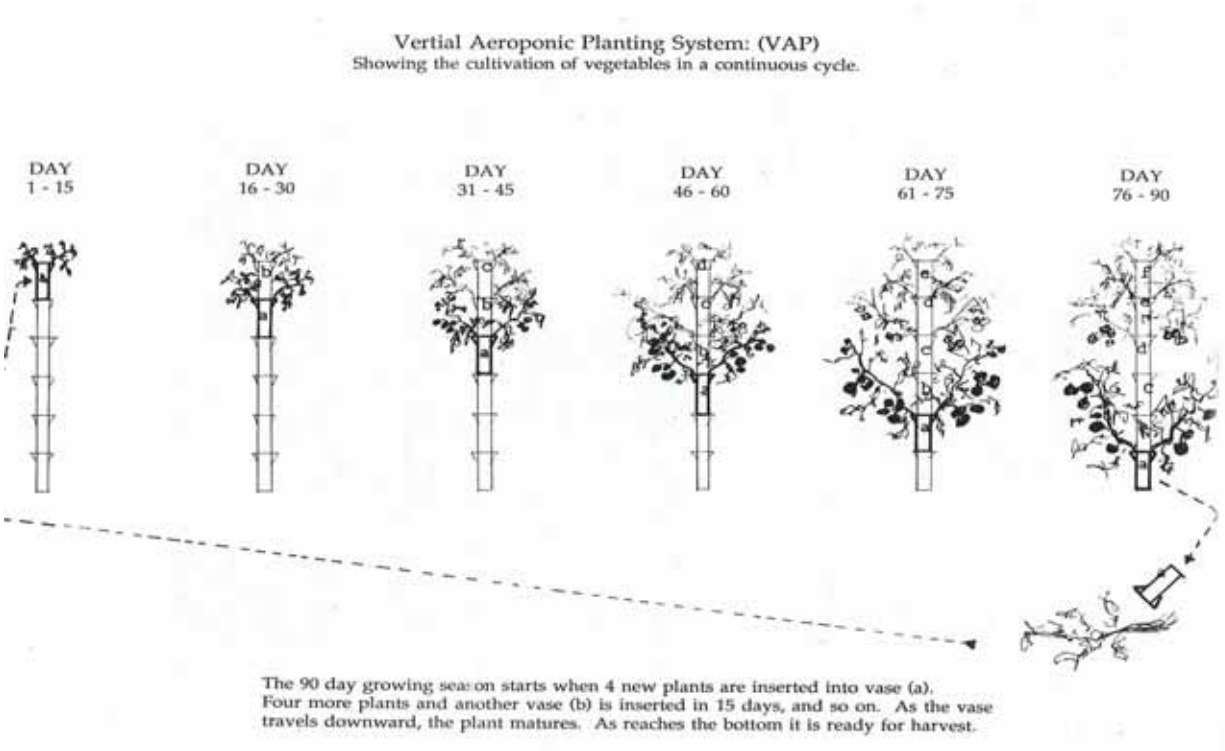
Production - Tomatoes
Density of planting Tubes is one every square yard of covered surface.
Each Tube has 6 cultivation levels - each with 4 plants.
The cultivation cycle is 90 days and in one cycle the average production is 3.3 lbs/ plant.
Therefore the crop yield is:

3.3 lbs x 4 plants = 13.2 lbs/level x 6 levels = 79.2 lbs/tube/cycle x 4 cycles/year
= 316.8 lbs/year/square yard
= 35.1 lbs/year/square foot

Examples of other plants with different cultivation cycles are:

Egg Plants *	77.4 lbs/sq.yd./year
	8.6 lbs/sq.ft/year
Cucumbers *	430.1 lbs/sq.yd./year
	47.9 lbs/sq.ft./year
Peppers *	152.5 lbs/sq.yd./year
	16.9 lbs/sq.ft./year
Strawberries *	77.4 lbs/sq.yd./year.
	8.6 lbs/sq.ft./year

* Note: These production figures are based on the European experience.



VAP: The Vertical Aeroponic Planting System

Technical Description:

1.1 Bioshelter Structure.
- Typical Covered Area - 10,000 sq. ft. modules
- A Membrane Stress Structure:
  - With 80% translucent ceiling membrane and netting side panels for cross ventilation.
- Internal precast concrete pathways or full slab

1.2 VAP System Equipment.
- Plastic plant holding pots forming planting tubes 96” high and fitted with vertical rotation equipment.
- Grid-Beam Support Structure
- Number of planting tubes - 1,250

1.3 Nutrient Solution Distribution System.
- Underground storage tank, capacity - 500 gallon
- Electric peristaltic pump, delivery and recovery piping.
- Flexible nutrient distributors and collectors fitted to each planting tube.

1.4 Environmental Control.
- Fixed ventilation extractor fans - 4 typical.
- Natural cross ventilation by means of netted walls.
- Optional Shading nets can provide 50% shade over roof area.

1.5 Electrical System.
- Central control panel with command and control equipment, visual and acoustic alarm signals.
- Internal wiring and cabling.
- Photovoltaic power system available for remote power application.
- Electrical energy required: 5 KW/ 10,000 sq. ft. Bioshelter.

1.6 Ancillary Areas.
- Storage and distribution of phyto medicines.
- Storage of fertilizer, tools, spare parts, etc.
- Offices, toilets, changing rooms, etc.
- Packing and shipping area.

1.7 Exterior.

Access road within site boundaries
Loading Bay
Parking area
Security Provisions

1.8 Construction Cost

Bioshelter and Ancillary Area structure (10,000 sq. ft.)	$135,000
Foundations, Pathways, Slabs, Drainage	$ 10,000
VAP System Equipment Nutrient Solution Distribution System	$ 25,000
Environmental Control Equipment	$ 10,000
and Solar Electric Power	$ 20,000
TOTAL:	$200,000

1.9 Annual Production Costs.

1 Technician x 12 months x $3,000
2 Workers x 12 months x $2,000
Fertilizer & Nutrients
Nursery Stock
Electrical Power
Water
Tools and Maintenance
Sales Costs:
Packing
Transport
Promotion
General Miscellaneous

TOTAL: $100,000

2.0 Site Requirements.

The following are general requirements for the installation of a VAP System Bioshelter of 10,000 sq. ft.

- Area of land — 15,000 sq. ft.
- Flat and level site, not shaded by mountains or high buildings, and not subject to air pollution.
- Soil conditions are not important except the soil should be uncontaminated and salt free. Clean desert sand or lava basalt is ideal.

The Vertical Aeroponic Planting System:

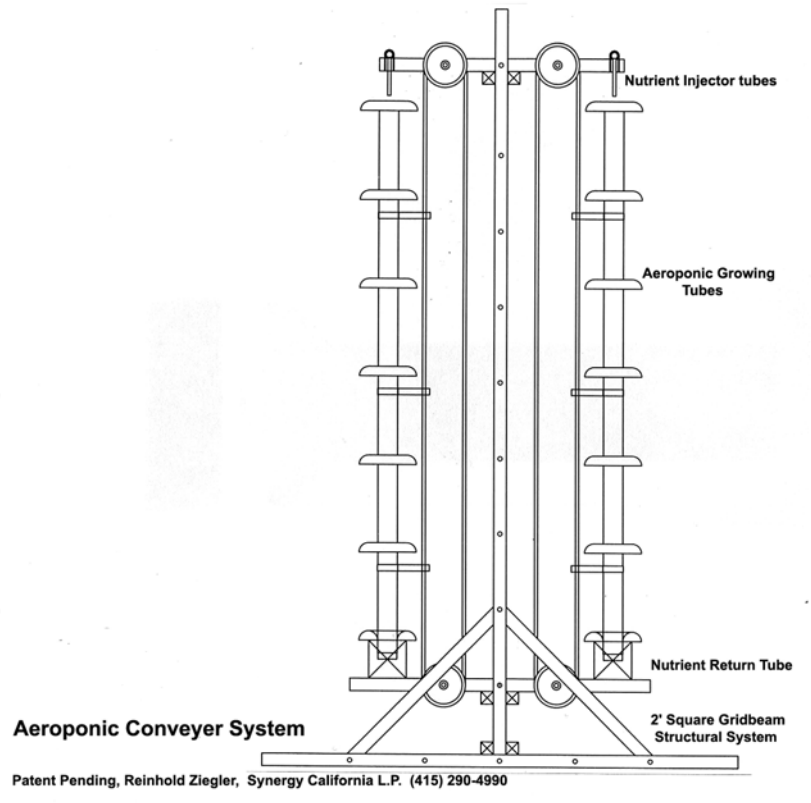
Production Income:

The income is directly related to the type of produce that is grown.

This business projection utilizes a 10,000 sq. ft. Bioshelter.
The dollar value is for 10,000 sq. ft of tomatoes, egg plant etc. respectively.

	Yields lbs/sq.ft./year:	**Wholesale** $/lb	**$ Value** 10,000 sq. ft.
Tomatoes	35.1	$ .75	$ 263,250
Egg Plant	8.6	$1.59	$ 129,000
Cucumbers	47.9	$ .40	$ 273,030
Japanese	47.9	$ .70	$ 335,000
Peppers	16.9	$ .63	$ 106,470
Strawberries	8.6	$ .80	$ 68,800

Note:
Vegetables will be mature for picking and distribution 90 days after beginning and continuously thereafter.

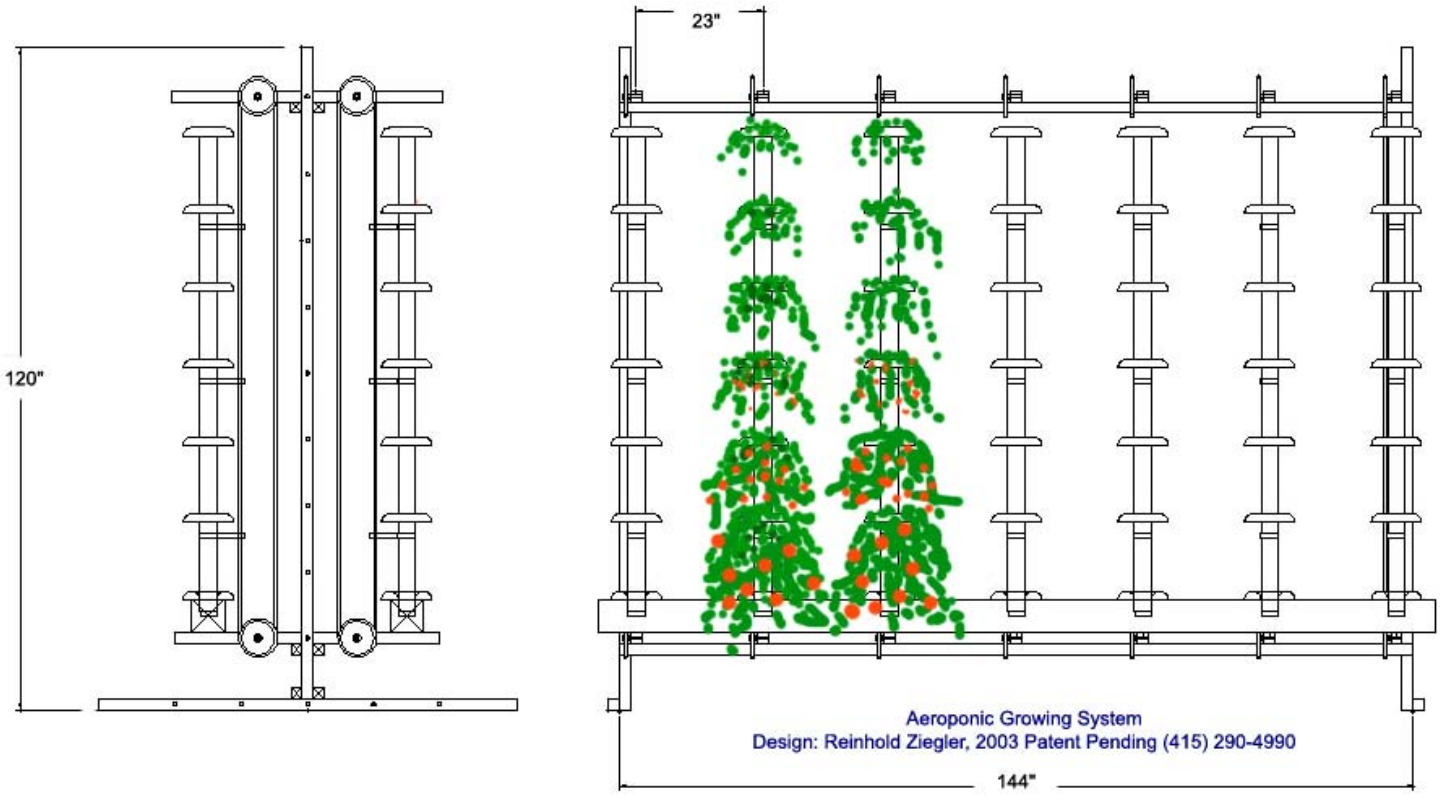


Cultivation of Tomatoes: Day One in the production cycle
Note the 4 lips in the growing vase.

Cultivation of Tomatoes: Day 90 in the production cycle.
Wire supports carry the extensive harvest.

Strawberries: Production in a continuous cycle

Romain Lettuce:



Please contact us for further information.

AeroFarms™ HVAC Unit Estimation Chart

Construction is:	No air RH modification	In arid climates	In humid climates	Recommended turns per hour
Loose	$5.00/cfm	$10.00/cfm	$12.00/cfm	6
Average	$3.50/cfm	$8.00/cfm	$10.00/cfm	8
Tight	$2.00/cfm	$5.00/cfm	$8.00/cfm	10

Note: Because CO_2 must be maintained, there are more turns in a tight building. Indeed, it is recommended that the typical CO_2 HVAC sensor be reversed to ensure near ambient CO_2 levels inside.

Process to calculate:

Note: The estimate does not include the installation costs (freight and taxes, electrical, architectural, and structural)

To calculate:	Example:
Determine construction type	Average air tightness
Determine cubic feet to be conditioned	10,000 sq. ft.
Determine Cubic Feet per Minute (CFM) [Space times turns divided by 60 minutes/hour]	10,000*8/60 = 1,333 CFM
Determine base cost	$3.50*1,333 = $4,666.67
Determine add for arid or humid climates[1]	Humid - $10*1,333 = $13,333.33
Total	$13,333.33 + $4,666.66 = $18,000

[1]An arid climate will require humidification and a humid climate will require dehumidification for typical buildings and uses.

Courtesy: C&S Companies, Syracuse, NY.

AGL 21 SHORT TERM LEASING PROGRAM

Program intent:

This leasing program is not a substitute for purchase of a leafy green growing system. It is intended to support exploration of market potential, demonstration to investors and vendors, and learning by the user. Aero Farm Systems, LLC (AeroFarms™) will make every effort to ensure that the lessee is successful in these purposes over a typical period of up to three months. This program is currently only good in the U.S., Canada, and Mexico

Lessee agrees to:

- Pay freight to and from Marathon, NY unless location is directed otherwise
- Pay $1,000.00 per month lease
- Provide a $500 security deposit with signed lease returned upon successful deliver to next location
- Provide all production management
- Provide means to wash and dry cloth flats
- Provide power and water for machine operation
- Provide space for machine – approximately a 20’ by 20’ (6 x 6 m) floor space with 9’ (2.75 m) ceilings
- Provide an insurance bond prior to delivery for the machine in the amount of $15,000 payable to Aero Farm Systems for fire, theft and casualty
- Provide pH down or up and associated safety equipment
- Release the machine when requested
- Return any failed parts immediately
- Provide necessary unloading and loading equipment for machine

Lessor agrees to:

- Supply a working AGL 21 unit easily assembled
- Operating instructions
- Apply up to 3 monthly lease payments toward purchase of a system if machine purchase occurs within nine (9) months of lease start date
- Return $500 deposit less any damage (beyond normal wear and tear or covered by insurance)
- Support lessee with phone service from 9 AM to 6 PM EST
- Replace failed parts free of charge unless due to lessee’s error or caused failure
- Supply the following inputs:
  - Fertilizer
  - Seeds for Arugula and one salad mix (note: lessee may wish to experiment with other seed mixes at their own expense)
- Loan of the following instruments:
  - pH/EC meter
  - Meter pH calibration packets
  - CO_2 monitor
  - Cloth flat root and stem removal tool and scraping table
  - Seed sprayer, gram scale, and harvest guide

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AGL 21 Machine Specifications

Number of Units High	2	
Dimensions:		
Height:	83 in	2.1 m
Width:	60 in	1.5 m
Length:	120 in	3.0 m
Minimum installed clearances:		
Sides:	add to each 3 ft	0.9 m
Ends:	add to each 5 ft	1.5 m
Ideal room size:	25’ x 25’	7.6 x 7.6 m
Reservoir Capacity:	250 gal	950 l
Weight:		
Dry Weight	950 lbs	431 kg
Water Weight	2,000 lbs	907 kg
Max Plant Wt.[1]	120 lbs	55 kg
Total Max Wt.	3,020 lbs	1,370 kg
Maximum Floor Loading:	40 psi	275 kPa
Electrical:		
Voltage:	230 VAC	
Current:	30 amps	
Phases:	single phase	
Lighting type:	white LEDs	
Production capacity:		
Growing Surface	91 sq ft	8.5 m^2
Production Cycle[1]	18-20 Days	
Production rating[1]	12-17 lbs/wk	5.5 -7.7 kg
Nutrient Supply mode:	Constant Aeroponic	
Environmental Requirements:		
Temperature[1]:	68 – 80 °F	
Humidity	< 60% RH	
CO2 level	> 360 PPM	

Materials

(2) 10’ foot seamless HDMW drip pans
Leveling feet & casters
AeroCloth growth medium
All aluminum frame construction

[1]Are leafy green variety dependent

Estimated input needs per month:

Water:	122 gal	462 l
Nutrients:		
Hydrosol	.84 lbs	380 g
$CaNO_3$	.84 lbs	380 g
pH down		as required
Seed:	5 ozs	142 g

Note: The above are estimates and depend considerably on growing climate, seed variety decisions, and attention to pH and EC.

This machine is the smallest size sold. Larger machines can be made by adding length in 10 foot (3 m) increments until reaching an 80’ (24.4 m) unit length. Units can be stacked up to seven high provided ceiling heights are sufficient.

Stacked Units	Height in / m
1	60 / 1.5
2	83 / 2.1
3	112 / 2.9
4	140 / 3.6
5	169 / 4.3
6	197 / 5.0
7	226 / 5.8

The weights, electrical consumption, and productivity for a specific system can be supplied upon request.

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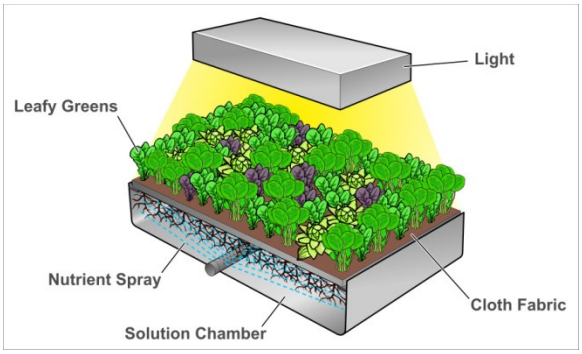
Corporate Overview

About AeroFarms™

AeroFarms is a full-service provider of aeroponic growing systems. Its aeroponic growing system is a controlled environment designed for old or vacant warehouse-type buildings. This enables *local growing all year round and in any location*, reducing transportation costs and emissions and improving product shelf life. The end product is pesticide-free and clean upon harvest, with a longer shelf life than conventionally grown greens.



	Conventional	Greenhouse	AeroFarms
Market Freshness	>1 week old	Fresh – 3 days	Fresh
Pesticides	Often	Occasionally	Never
Seasonality	Seasonal	Extended season at a cost	Year round
Growth Cycle	35-70 days	25-50	18-21 days
Washing Required	Yes	Yes	No
Labor Time	Hours	Minutes	Minutes
Water Use	High	Low (30-50% less than conventional)	Low (50% less than conventional)
Land Requirements	High	Medium (not stackable)	Low (vertically stackable)
Location	Limited (Needs arable land and abundant water)	Limited (Needs frequent sun and moderate temperatures)	Any location
Climate / Region	Limited	Most	All
Weather Susceptibility	High	Medium – High (Intervention expensive)	None
Prices	Variable	Consistent	Consistent
Food Safety	Difficult	Medium	Easy
Yield Predictability	Low	Medium	High

Aero Farm Systems LLC | 1114 Hanshaw Rd. | Ithaca, NY 14850-2744 | (607) 279-3383

www.aerofarms.com

AeroFarms™
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Opportunity

Today, produce growers face a number of challenges including rising transportation and labor costs, seasonality and weather vulnerability, pest and disease threats, and land and water scarcity. Despite all of these challenges, the industry continues to employ the same centuries-old, soil-based growing techniques. AeroFarms has developed technology to usher this industry into the 21st century.

For the Entrepreneur

- ✓ Profitable venture with typical payback of 3-4 years
- ✓ Low level of training required
- ✓ Reduced transportation costs and emissions
- ✓ Consistent production all year round
- ✓ No sun, soil or pests
- ✓ Requires less water and less land than conventional growing

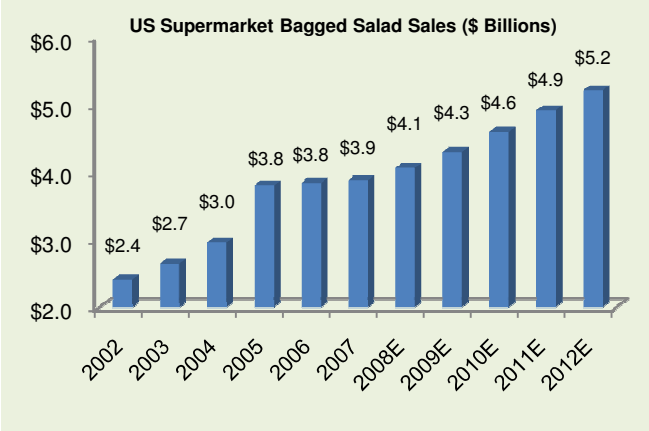
For Foodservice & Grocers

- ✓ Consistent availability of produce
- ✓ Consistent quality of produce
- ✓ Fresher, longer-lasting local products
- ✓ Pesticide-free and safer products
- ✓ Clean and dry upon harvest
- ✓ Easily supports private labels

For the Consumer

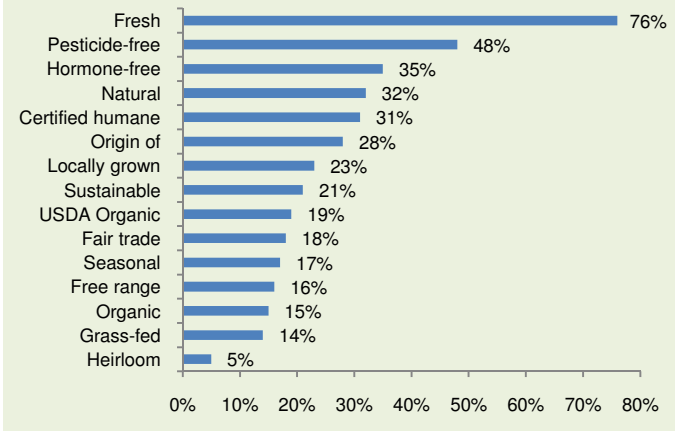
- ✓ Available all year round
- ✓ Fresher, longer-lasting local products
- ✓ Pesticide-free and safer products
- ✓ Clean and dry upon harvest, no washing required
- ✓ Healthy and flavorsome food
- ✓ Improved sustainability footprint through reduced water and land use

Large and Growing Bagged Salad Market



Source: Mintel Group, July 2008

Most Important Food Label for Consumers



Source: Organics 2008 Report (Hartman Group)

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Understanding 'Green' Consumers

Photo copyright iStockphoto.com/jml5571

BY CHRISTINE M. BRUHN

Consumers want foods that are sustainable but are unsure of its meaning. This uncertainty presents an opportunity to develop a science-based approach to sustainable food production.

Sustainably produced, "green" products have captured the attention of an increasing number of shoppers. While consumers are not sure exactly how sustainability is measured or determined, they embrace the concept of caring for the environment and preparing for future generations.

A December 2008 online survey by Strategy One found three-quarters (75%) of adults surveyed agree that *eating green or sustainable foods will help me lead a life that is good for my body and the environment.* A majority of consumers say they purchase more sustainably produced food now than they did a year ago (Borra, 2009). Forty-five percent reported that they continue to buy green products and services today, even when faced with higher costs and an economic downturn.

The typical green shopper in the United States tends to have higher income and more formal education than average. However, interest in green and sustainable is demographically diverse, spread across income ranges, age categories, educational levels, and household size (Bearse et al., 2009). Sustainable issues drive or influence more than half of the consumers interviewed for a GMA-commissioned study. While a minority of consumers are willing to pay more for sustainable products, most want price and performance parity for sustainable products because this characteristic is not the dominate factor that drives purchase. When other factors are comparable, consumers may select the item viewed as more sustainable. If a sustainable product meets expectations, it is likely to be purchased again, building brand loyalty.

Green is a Gray Area

For American consumers, the concept of *green* is not clearly defined. The Hartman Group found that the term *sustainable* is nebulous. The concept includes purchase of locally grown products, support of practices with a small carbon footprint, organic production, use of minimal packaging, and overall corporate responsibility (Demeritt, 2008). The concept of green is not limited to environmental responsibility, but also encompasses human ethics and social responsibility. Businesses are expected to treat their employees well in terms of safety and fairness. People say they will support these values with their pocketbook. Nearly two-thirds (65%) of consumers would purchase products from companies that maintain safe working conditions for employees, 62% from companies that strive to reduce and minimize waste and pollution, 51% from companies that offer good wages and benefits to employees, and 50% from companies that strive to reduce and minimize the environmental impact of production. In contrast, 40% of U.S. consumers report that they have stopped buying from companies they believe acted unethically (Curry, 2007).

Product packaging is one component of environmental responsiveness consumers believe they can assess easily. People believe that packaging has a major impact on the environment. Generation X and mature consumers are most likely to say they evaluate packaging and choose products based upon environmental friendliness. Younger consumer segments view the environment as important, but are more likely to be influenced by price than environmental impact (Raymond, 2009). Despite interest in packaging, consumers are unaware of the sustainability nuances of the various types of packaging material. They view "hard packaging" and over-packaging as environmentally destructive. On the other hand, consumers respond positively to companies that use packaging that is recyclable.

While many Americans recognize the importance of green and sustainable food products, they appear to be unaware of where to find information to guide their purchases. Only about half have spoken to a family, friend, or

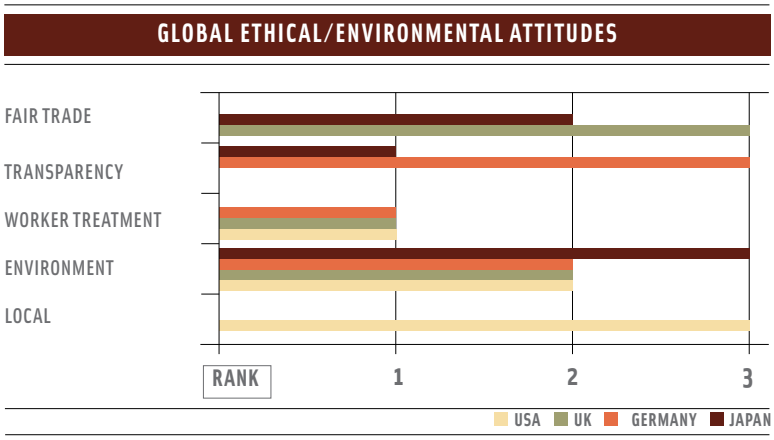

Figure 1. Rankings of a list of ethical and environmental business practices *that consumers around the globe support through product purchases.* From Curry, 2007.

health professional about green or sustainable food issues (Borra, 2009). Further, only about half have used an online source such as a media, government, or food company Web site to gather information about sustainability.

Interest in green and sustainable is not limited to the United States (See Figure 1). When consumers around the globe were asked to rank a list of ethical and environmental business practices that they support through product purchases, survey respondents from the U.S., UK, and Germany selected *actively treat workers well* as their top ranking. *Actively improve the environment* was ranked second by consumers in the U.S., UK, and Germany, and third in Japan. *Transparency* was ranked No. 1 by Japanese consumers and No. 3 by German consumers, and *fair trade* was ranked No. 2 by Japanese consumers and No. 3 by UK consumers (Curry, 2007).

ENERGY USE IN TRANSPORTATION

METHOD	TRAVEL MILES WITH EQUAL ENERGY USE
SHIP	3,800
RAILROAD	2,400
HIGHWAY TRUCK	740
AIRPLANE	43
CAR WITH 5 KG OF PRODUCE	1

Figure 2. Comparisons of energy transportation costs *by car, airplane, highway truck, railroad, and ship.* From Thompson, 2009.

In a recent article in the American Dietetics Assoc. newsletter *ADA Times*, nutritionist Jackie Newgent states, "Eating healthier and eating greener are not two separate approaches to eating, but rather approaches that go hand-in-hand" (Geagan, 2009). The author contends that Americans have a big carbon footprint because we rely heavily on processed and packaged foods, which take basic food and add many more steps (e.g., processing, refining, packaging, transportation, storage) which require fossil fuels. The author states that the Environmental Protection Agency estimates that 30% of landfill content is packaging waste, much of which comes from food.

Green shopping can appeal to a broad market segment, not just hard-core environmentalists. Many shoppers are open to the concept of green and environmental responsiveness, and many look for green products when shopping. In their 2009 survey, GMA/Deloitte found that there is an unfulfilled latent demand for green products that could be realized through increased product development and communication (Bearse et al., 2009). Consumers don't know how to identify sustainable products but respond to in-store communication and information.

Lack of Data and Science

Claims of sustainability, however, may lack a scientific basis. A *Wall Street Journal* article points to the need for government oversight on green claims (Bounds, 2009). Opinion Research found about 33% of consumers don't know how to tell if green claims are true (Anonymous, 2009), while the Hartman Group (2009) found that 75% of consumers do not know which products or companies are truly sustainable.

Lacking clear definitions, consumers make assumptions as to what products and production methods are green. Although the dominate reason for selecting organic foods appears to be concern about pesticide residue in conventional products, 63% of consumers believe organic production is environmentally friendly and 28% say they buy organic to protect the environment (Hartman Group, 2008). This perception may not consider the entire impact of production. For example, transportation expenses of manure is 15 times greater than transportation of more concentrated urea nitrogen and total product yield of organic farming may be less than conventional production if weeds are not controlled (Thompson, 2009).

In short, without data examining energy input, product output, and environmental impact, it is unwarranted to conclude that organic production is always greener or more sustainable than alternatives such as conventional production or use of integrated pest management. Further, organic production prohibits use of novel agricultural methods such as biotechnology or genetic modifications, approaches documented to use less pesticides and herbicides, produce higher yield, and be suitable for low or no-till farming (Council for Agricultural Science and Technology, 2002; Lemaux, 2009). Indeed, the data would support use of sustainable or green claims for genetically modified products, yet none have appeared in the marketplace.

Consumers also perceive that purchasing local is a green or sustainable practice (Hartman Group, 2008). About one-third (35%) of consumers report that they buy local because of the high environmental impact of transportation (Food Marketing Institute, 2009). Comparisons of transportation energy cost, however, indicate that transportation by personal truck has a significantly higher per ton energy cost than transportation by highway truck, railroad, or ship (Thompson, 2009). One mile by personal car is equivalent to 740 miles by highway truck, 2,400 miles by railroad, and 3,800 miles by ship (See Figure 2). Since *local* may mean anywhere from within 50 miles or within the state, local transportation costs could be substantial. If the local climate requires higher costs in production, such as use of a greenhouse, a locally grown product could be more costly from an energy perspective than a product transported efficiently from another location.

Establishing Sustainability Standards

Some popular writers as well as some widely recognized health professionals have criticized the food industry for its failure to fully embrace health and environmental

responsibility. The Strategic Alliance for Healthy Food and Activity Environments—a California-based coalition of nutrition and physical activity advocates—has launched an initiative called "Setting the Record Straight: Nutritionists Define Healthful Food (Sim, 2009). Professionals are urged to endorse a definition stating that healthful food "comes from a food system where food is produced, processed, transported, and marketed in ways that are environmentally sound, sustainable, and just." This group defines healthful food as minimally processed, and without artificial colors, flavors, or unnecessary preservatives. Workers and natural resources should not be exploited, and animals should not be treated cruelly. Further, the industry is asked to "stop using deceptive health claims and green marketing to blur the lines between wholesome food and highly processed food products." Clearly, the food industry faces a communications challenge, not just with the public, but with individuals having professional credentials.

Groups are organizing to address the complex questions of sustainability and green production. The Stewardship Index for Specialty Crops project, for example, is a multi-stakeholder initiative to develop a system for measuring sustainable performance throughout the specialty crop supply chain. The group developing this index consists of nine environmental and public interest groups, nine grower, supplier, and trade organizations, 11 buyer and trade associations, and one university expert (Stewardship Index for Specialty Crops, 2009). Research-based or scientific data should be used to establish this index, but a quick review of the group's Web site suggests that the research-based organizations such as university collaborators could be strengthened. The Council for Agricultural Science and Technology (CAST) is preparing a research-based publication on the sustainability of U.S. soybean production that will compare conventional, transgenic, and organic production systems. The Food Marketing Association will host a 2.5-day Sustainability Summit in San Francisco in mid-August.

The Institute of Food Technologists could play a leading role in defining the parameters of sustainability, and developing a science-based approach to measure and communicate sustainable practices. Components of sustainable practices may include energy use in production, processing, and transportation, indicators of carbon emission, and use of renewable resources.

Consumer communication may be facilitated through the use of an icon that represents different dimensions of sustainability. For example, a clover with three leaves could symbolize

production, processing, and transportation sustainability. Different levels of sustainability could be indicated by light, medium, or dark green leaves. The icon should provide sufficient flexibility to be useable by the food processing, retail, and foodservice industries. Consumer research should develop and refine the communications program, which can be monitored and modified as needed.

The food industry can respond to environmentally conscious consumers by leading in the development and communication of the concept of environmental sustainability. Criteria based on sound science can advance societal goals while allowing the food industry to respond to consumer demand.

The industry also needs to take a more active and public role in communicating social responsibility. This can include good corporate citizen initiatives such as support for local and national youth or community projects appropriate for brand and corporate identity. Marketing and communication plans should be integrated to highlight socially responsible actions while supporting and defining brand identity.

We have an opportunity to set the standards for environmental and social responsibility and develop the means to communicate these standards to the public. While an effective program can advance a brand, an industry-wide, science-based initiative can advance the entire food industry. **FT**

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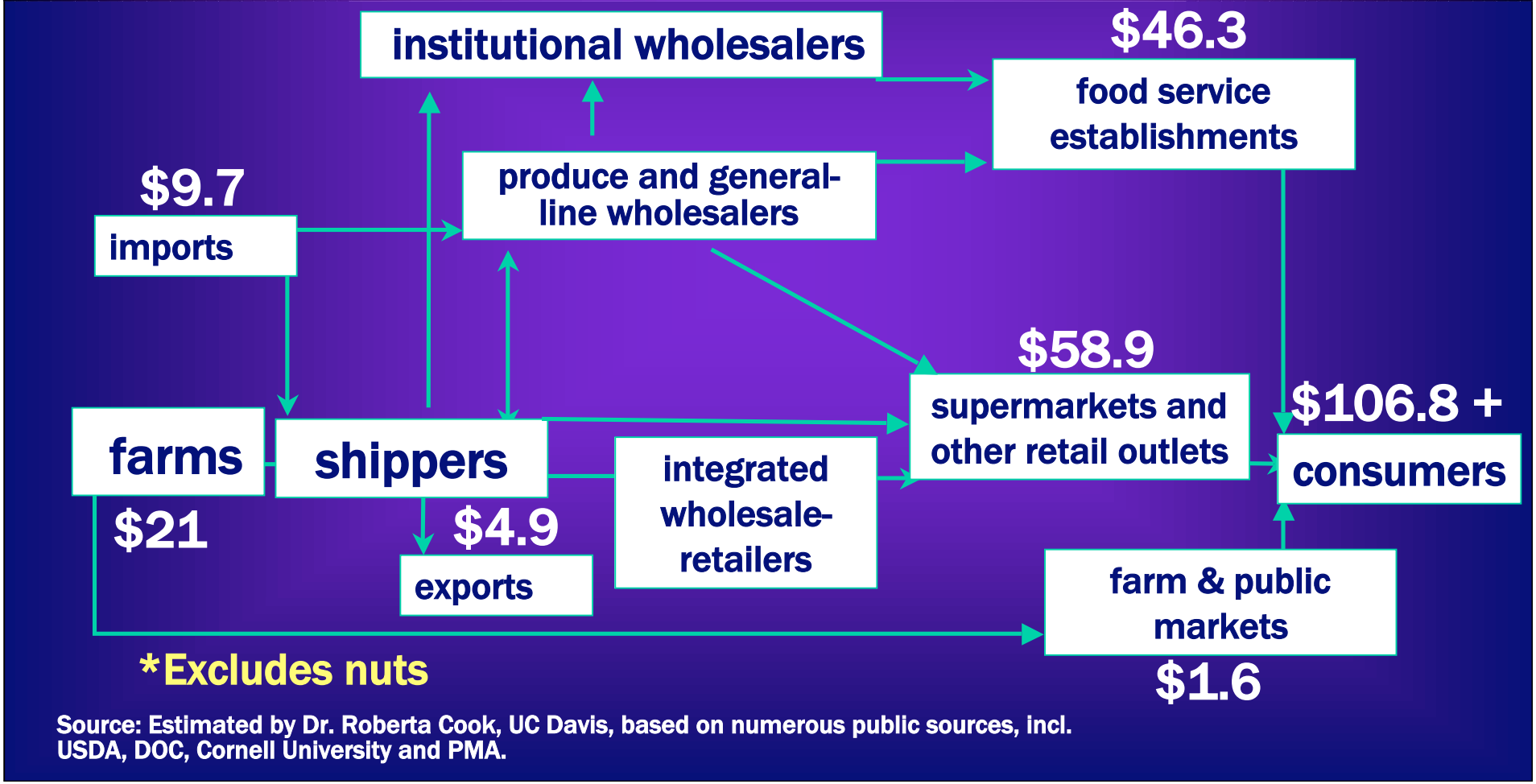
Trends in the Marketing of Fresh Produce and Fresh-cut Products

DR. ROBERTA COOK
Dept. of Ag and Resource Economics

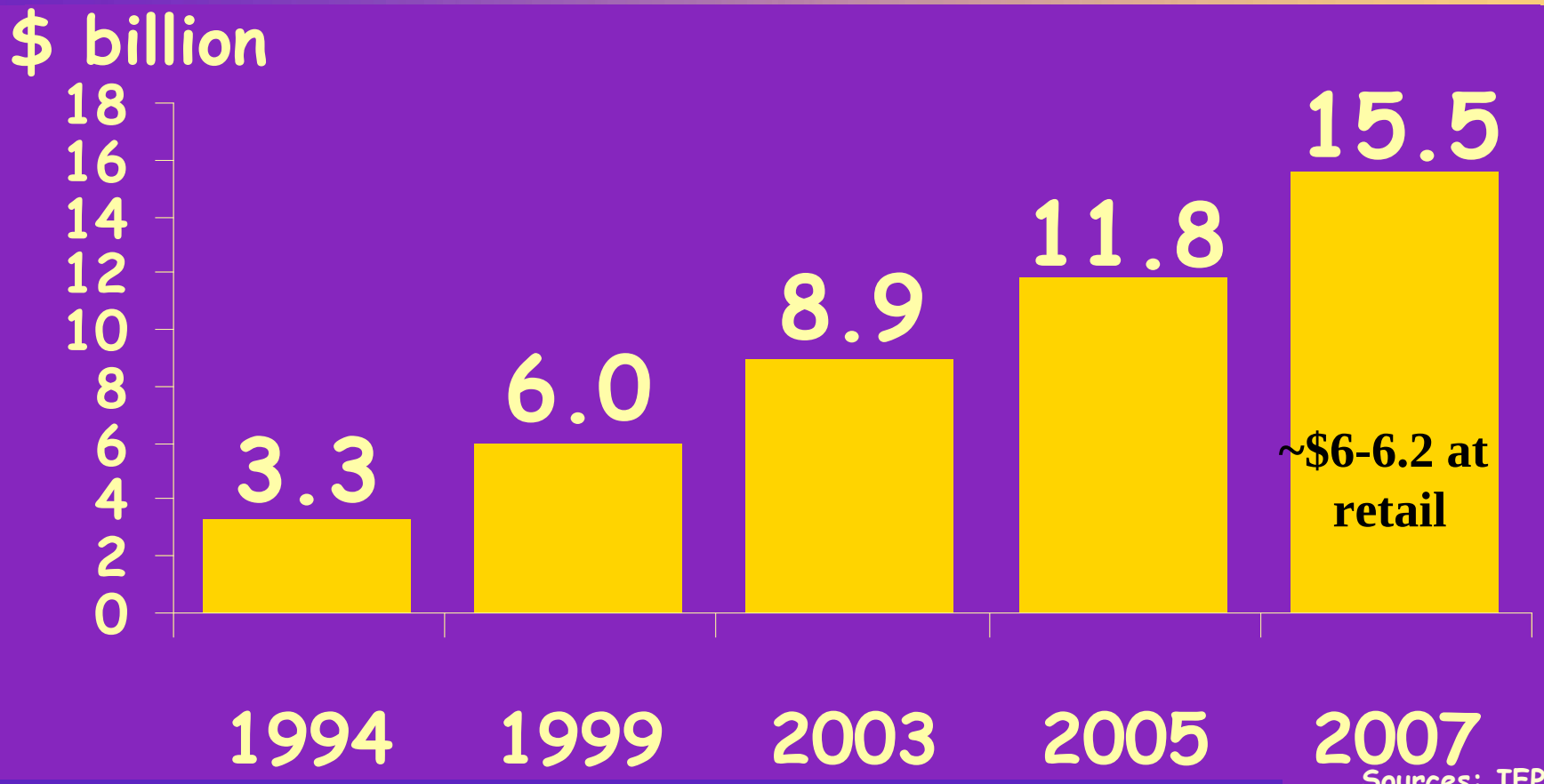
University of California Davis
September 2008

U.S. Fresh Fruit and Vegetable* Value Chain, 2007 *Estimated* Billions of Dollars



Source: Estimated by Dr. Roberta Cook, UC Davis, based on numerous public sources, incl. USDA, DOC, Cornell University and PMA.

US *Estimated* Fresh-Cut Produce Sales, All Marketing Channels, $ Billion

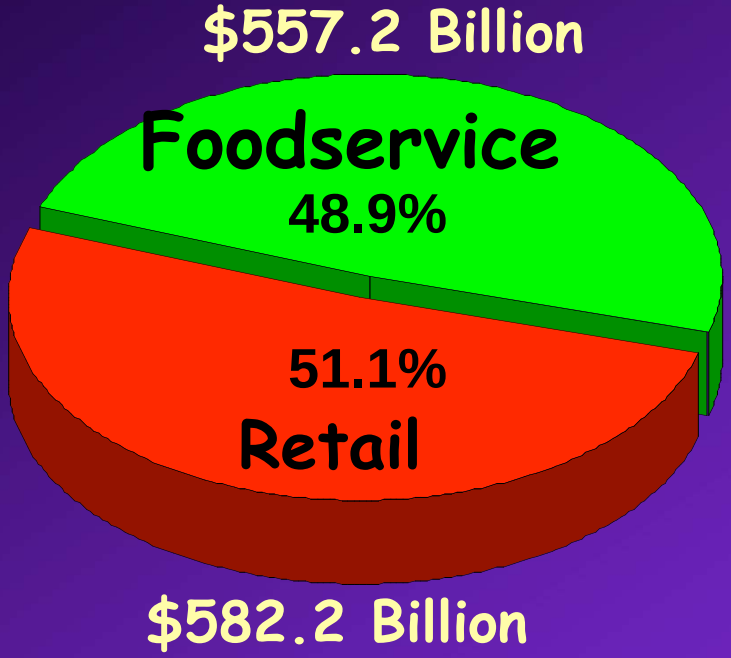


Around 55-60% estimated to be sold via foodservice channels.

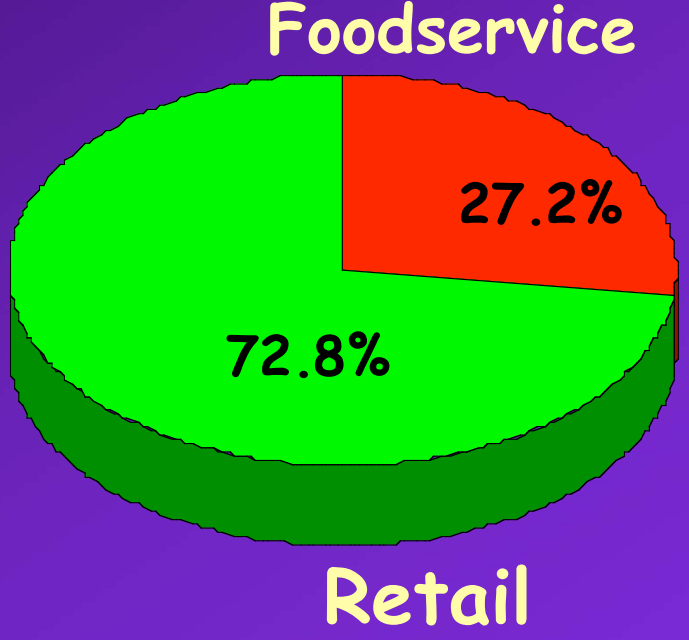
Sources: IFPA, IRI, AC Nielsen; 2007 estimated by Cook

2007 USA Food Sales: $1,139.4 Billion Retail Sales Equivalent, and Channel Shares, Quantity and Value

Dollar Sales



Quantity Sold



Source: USDA for dollar sales and dollar share, 2007; Technomic, Inc. for share of quantity sold, 2006.

Fresh produce not getting its "fair" share of the rapidly growing foodservice channels

- USDA estimated that only around 10% of fresh fruit and 20% of veggie tonnage is purchased in foodservice channels (lettuce, tomatoes and potatoes are big exceptions).
- Seasonality, perishability, supplier size are obstacles.
- Now is the right time for all segments of the foodservice industry to increase fresh produce use, CSR propels action and consumer health and wellness trends support it.
- Everyone must differentiate to successfully compete, fresh produce is a great way – color, "new" products, low plate cost, great flavor, e.g. roasted artichokes on Cheesecake Factory menu
- Race to innovate!; including for retailers who are developing foodservice as HMR option (HEB, Publix, Wegman's).

Crispers
FRESH SALADS AND SUCH

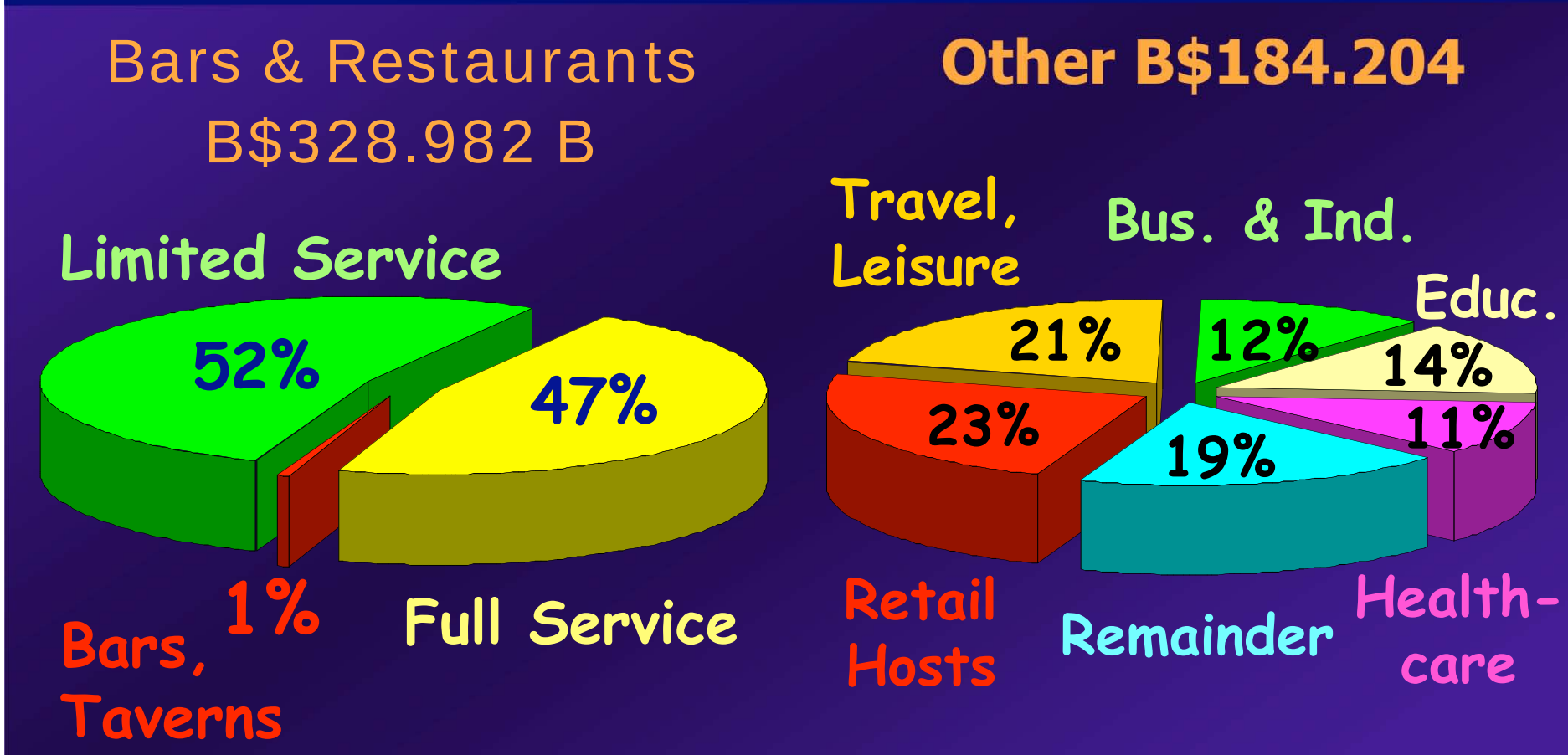
Drenched Blueberry Cake

A moist cake drenched in three sweet milks, layered with blueberries, blueberry mousse and topped with delicious cream. Sprinkled with fresh blueberries this cake offers you a little something special from south of the border.

Sunshine Blue Chicken Salad Conewich

It's our own homemade chunky chicken salad drizzled with blueberry shallot dressing, surrounded by fresh blueberry fruit salad and topped with toasted almonds. We layer it all into a blueberry conewich for a chicken salad creation like you've never had before.

Total US Food Service $513.186 Billion,
Forecast, July 2007, share of dollar sales



Source: *Industry Size July 2007*, Technomic Inc.

Unusual Salad Offerings: LSR Chains

Panera Bread / St. Louis Bread Co.

Fuji Apple Chicken* $5.69
all-natural citrus-herb chicken, field greens, Romaine lettuce, tomatoes, onions, pecans, Gorgonzola, and apple chips with white balsamic Fuji apple vinaigrette

Source: *2007: The Salad Category Report*, Technomic Info. Services, 2007.

Incentives More Aligned Between Grower-shippers and Foodservice - but Challenges Remain

- Shipper structure more consolidated today – marketing alliances – helps better understand and serve foodservice
- Fresh-cut helps reduce labor use and provide greater value to foodservice and reduces food safety risk at the operator level
- Special cold chain challenges in foodservice (including operator storage capacity and facilities)
- Food safety is a challenge, especially for produce without a kill step, risk mitigation responsibilities exist at all levels of the supply chain, and there needs to be a willingness to pay on the part of foodservice buyers for investments in food safety infrastructure and practices made at the grower-shipper level – breakeven grower costs are increasing in order to provide a higher level of safety assurance

New Trends in the US Fresh Produce Industry

- Wal-Mart is changing its fresh produce procurement model: including more opportunity and local buys, rather than using a supplier-assigned DC approach now there are "dollar value assignments," taking into account food miles
- Newer entrants such as Tesco from the UK offer potentially exciting but uncertain outlooks, private label focus, Trader Joe's already succeeded
- Marketing to children, 41 million kids have buying power of >$40 billion and influence $146B of expenditures; Disney Garden, other character-driven programs, National Mango Board, Mango Fandango, Jango Mango, HEB school programs
- Greater shipper emphasis on brands and consumer marketing (especially using websites as a vehicle for direct consumer communication) changes dynamics
- Branding vs. private label, both hinge on understanding what represents value to consumers – creating genuine customer value

Sales and Store Numbers in Major US Grocery Channels, by Key Format, 2007, Excluding: Membership Clubs, C-Stores, Grocery Stores with Sales <$2M/Yr., and Dollar Stores

Format	# of Stores	% of Total Stores	Sales, Million $	% of Total Sales
Total	34,256	100.0%	$568,839	100.0%
Supermarkets*	27,485	80.2%	$405,892	71.4%
Supercenters**	2,957	8.6%	$135,956	23.9%
Combined ltd assort and fresh/natural formats	3,814	11.1%	$26,991	4.7%

*Conventional supermarkets and super warehouse formats.
**Sales of supermarket-type items only (food and non-food grocery).

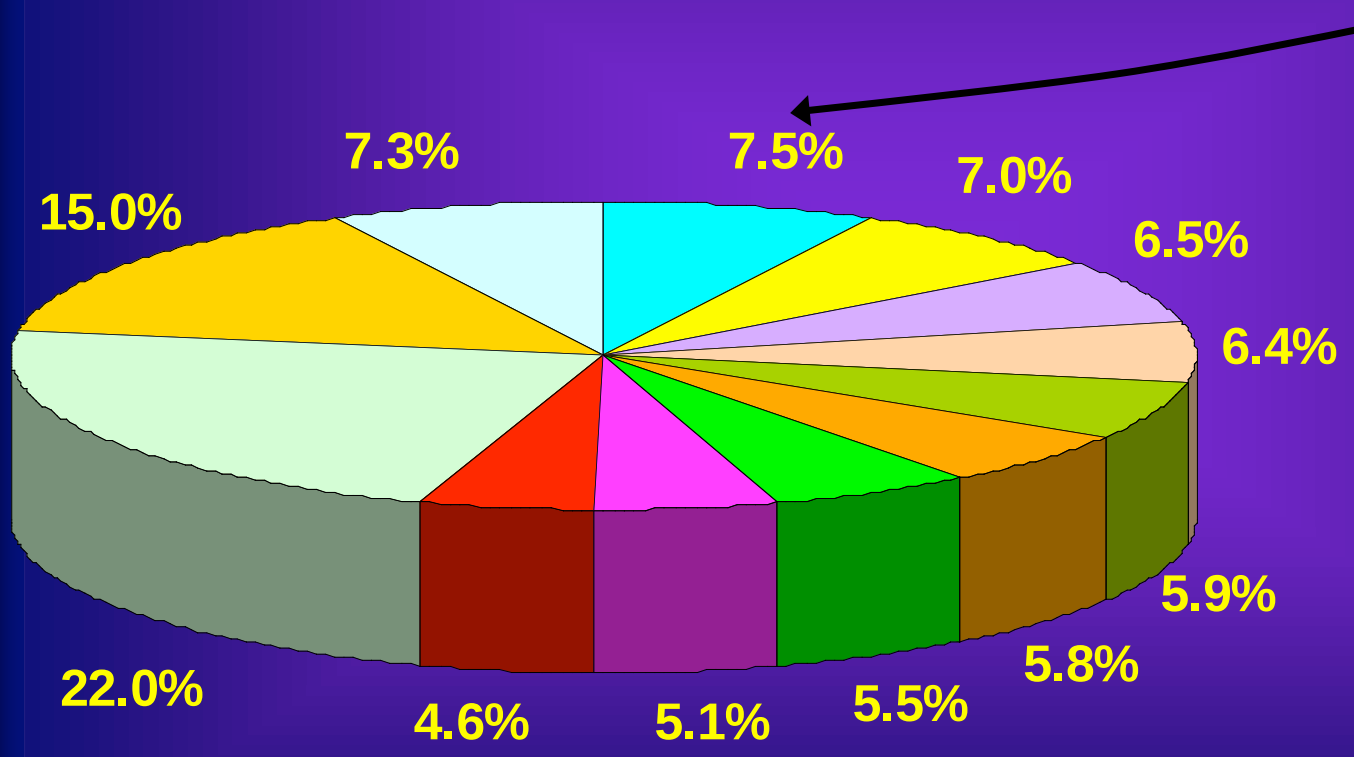
Source: Calculated by Roberta Cook based on data in The Future of Food Retailing, Willard Bishop, June 2008.

Despite differences between fresh produce and CPG's*, produce is being asked to conform to the protocols of CPG's:

- **Fresh-cut shows the way, including brands**
- **Channel captains, category champions emerge**
- **Contract pricing between shippers and buyers (both foodservice and retail)**
- **Longer-term relationships less focused on short-term price instability**
- **Slotting and other fees, rebates – cost to play grows**
- **Services - data-based sales and marketing support as well as food safety gatekeeper function**

***Consumer packaged goods**

US Supermarket Fresh Produce $ Sales, by Key Item, excludes Club stores and Supercenters, 2007*



Bagged Salad
Tomato
Berries
Apples
Potato
Grape
Banana
Citrus
Cooking Veg
Other Veg
Other Fruit
Other produce

Source: Perishables Group FreshFacts® powered by Nielsen;
*52 week sales ending June 30, 2007.

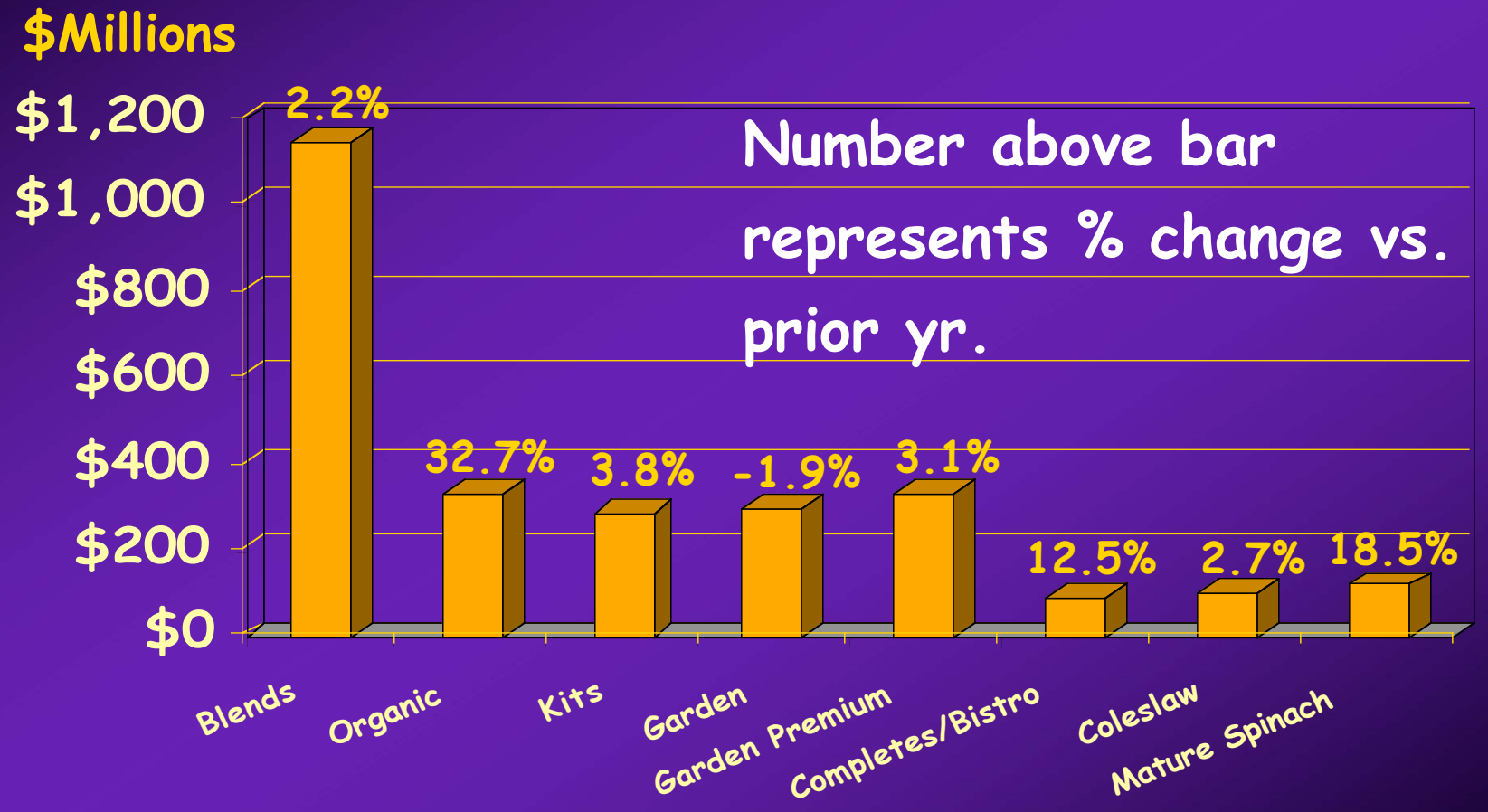
U.S. SUPERMARKET BAGGED SALAD SALES, Million $, excludes club stores and supercenters

Sources vary by year and may not be directly comparable:
IRI; ACNielsen.

Supermarket Growth Rates for US Fresh-Cut Segments, 52 week $Sales ending Aug. 24, 2008, excludes Mass Merchandisers

Source: IRI

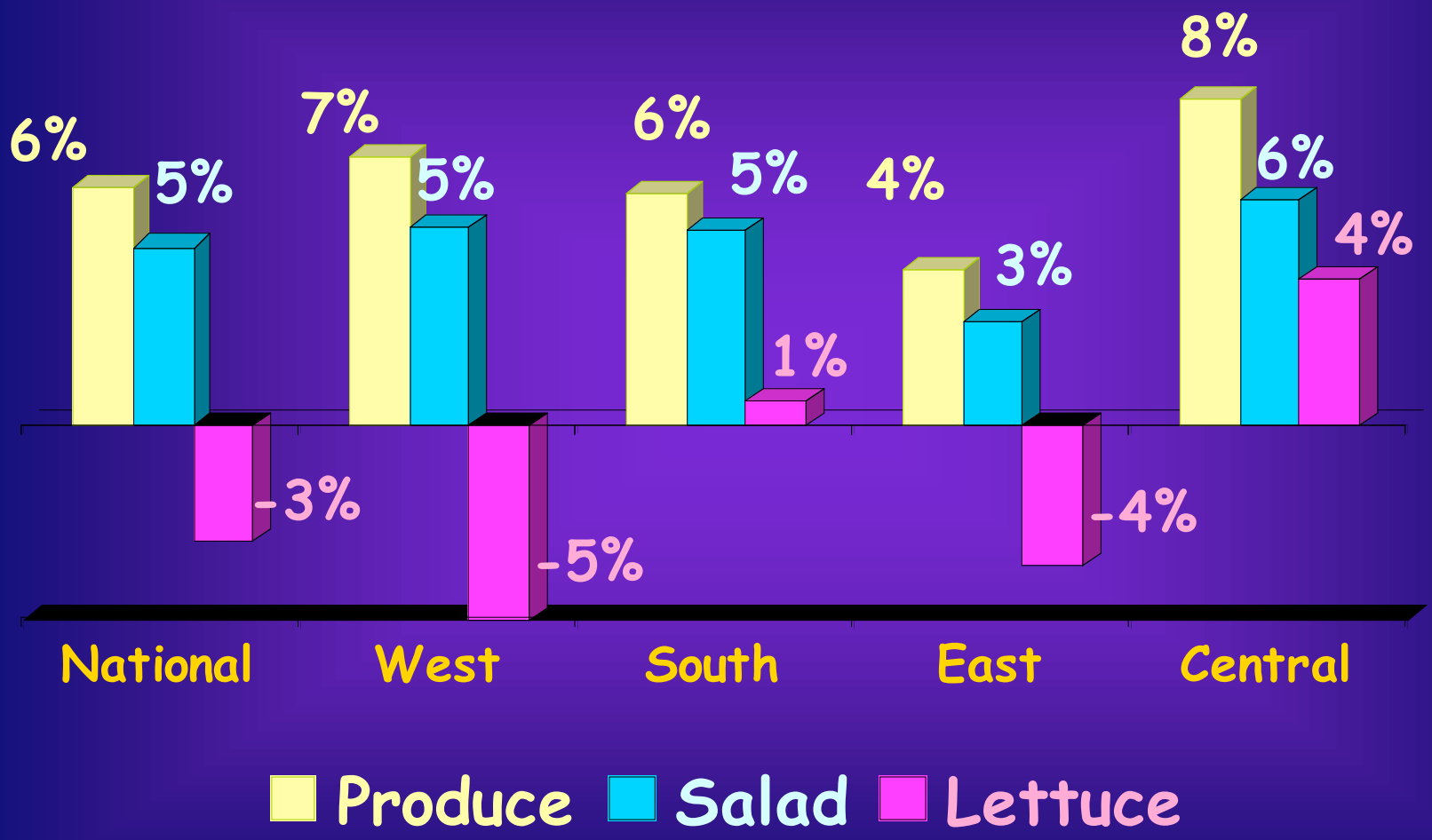
US Supermarket Bagged Salad Key Segments: $ Sales and Annual Growth Rates %, 2008*



Source: IRI; *52 weeks ending 08/24/08.

Total bagged salad sales $2.7 billion.

Average US Supermarket Sales Growth Rate for Total Fresh Produce, Packaged Salads, and Lettuce, 2007/2008*



Source: *Produce Merchandising*, July 2008; *52 weeks ending Feb. 23, 2008.

US SUPERMARKET BAGGED SALAD CATEGORY MARKET SHARES, BY KEY FIRM, (% of Total $ Sales) 2008 vs. 2006*

	2008	2006
Fresh Express	43	41
Dole	28	31
Private label	15	12
Ready Pac	5	8
Earthbound	5	6

***52 weeks ending Aug. 24, 2008; 52 weeks ending Oct. 8, 2006.**

Source: IRI

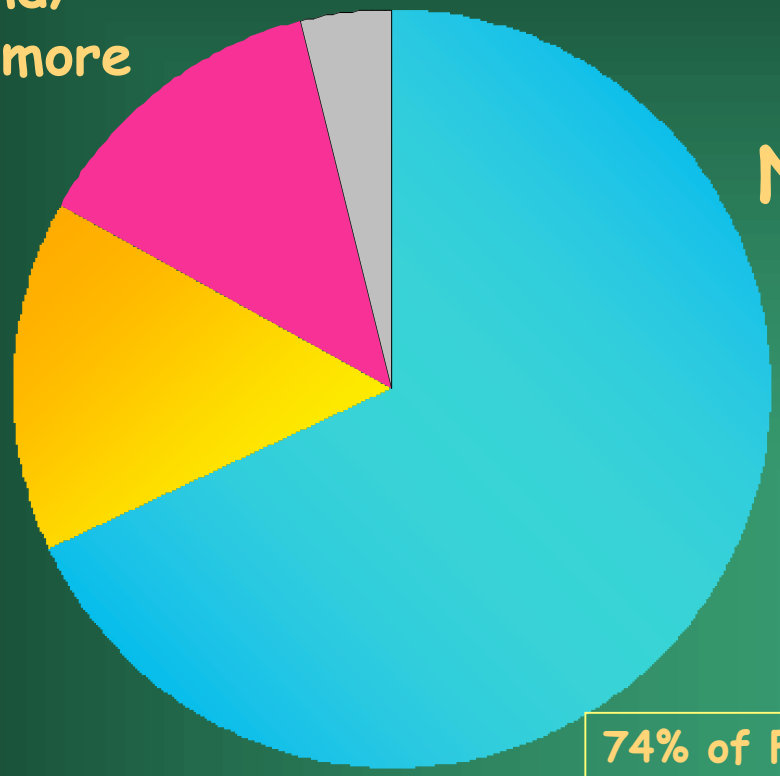
U.S. Supermarket Bagged Salad Market Shares, Top 5 Firms and Private Label, Share of Dollar Sales

Source: IRI

Private Label Sales in Supermarkets, 2006: Top 10 Private Label Categories by Dollar Volume: Fresh Produce Becoming Important

Source: The Food Institute's Food Industry Review, 2007.

Branded Importance to US Consumers of Fresh-Cut Fruit



74% of Fresh-Cut Veg Consumers Have No Preference

Source: "Fresh Summit 2007 Ripe for the Picking," Perishables Group, Oct. 2007.

US FRESH-CUT VEGETABLES CATEGORY* MARKET SHARES, BY KEY FIRM, (% of Total $ Sales) 2008**

	2008
Private label	22.7
Mann's	7.7
Apio	5.0
Dole	3.9
Grimmway	3.4
Ready Pac	2.3
All other	55.0

**52 weeks ending Aug. 24, 2008.

Source: IRI

*Excludes PLU, random weight, and retailer processed.

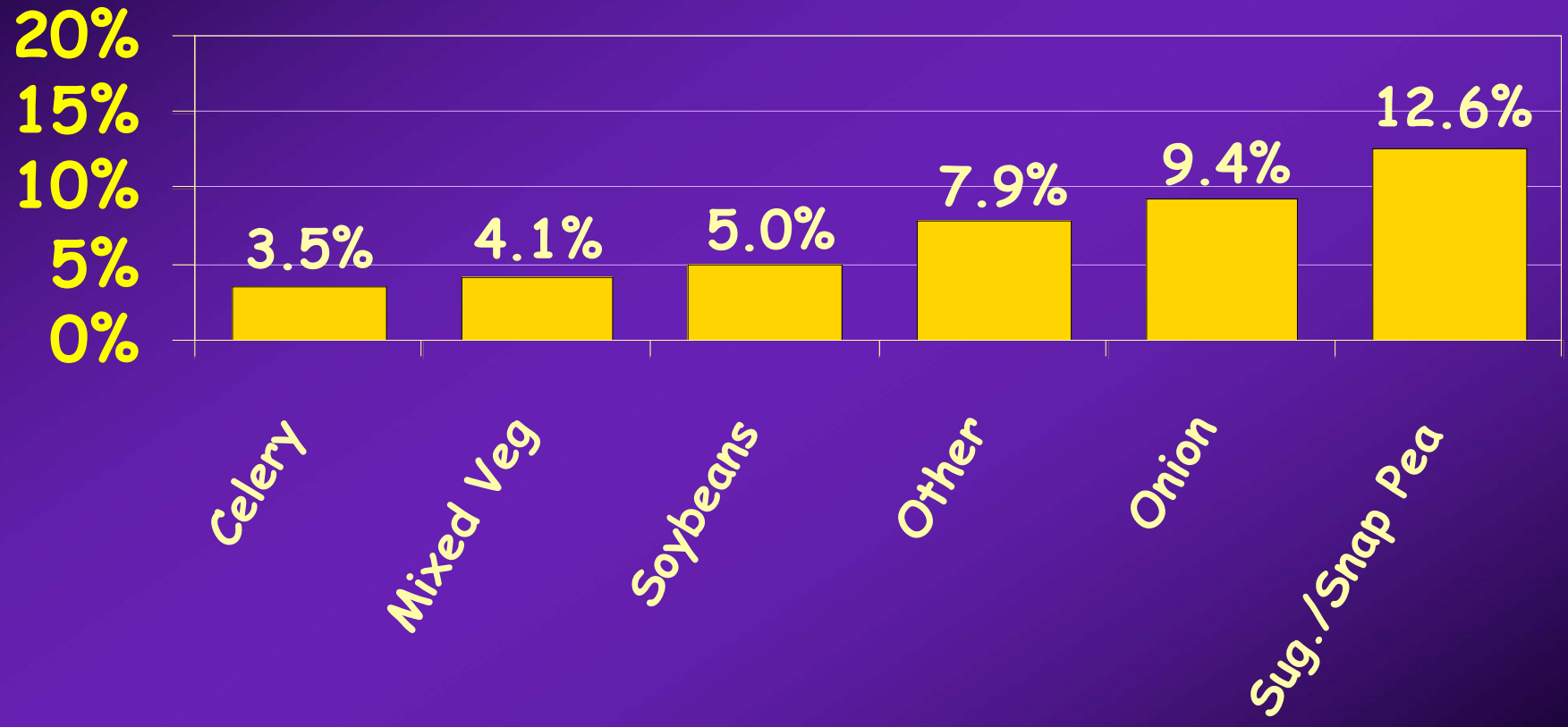
US FRESH-CUT VEGETABLE CATEGORY* MARKET SHARES, BY KEY ITEM, (% of Total Fresh-cut Veg $ Sales), and GROWTH RATES, 2007/2008**

Item	Share, %	$ Sales % Chg YAG
Side Dish Veg	70.8	3.0
Meal Prep Veg	20.8	9.5
Snacking Veg	8.4	(6.8)
Total	100.0	3.3

Source: IRI **52 weeks ending Aug. 24, 2008.

*Excludes PLU, random weight, and retailer processed.

Growth of Fresh-Cut Veggies by Type, in Quantity Sold in US Supermarkets, 2007*



Source: Perishables Group FreshFacts® powered by Nielsen; *52 week sales ending June 30, 2007.

US FRESH-CUT FRUIT CATEGORY* MARKET SHARES, BY KEY FIRM, (% of Total Dollar Sales) 2008**

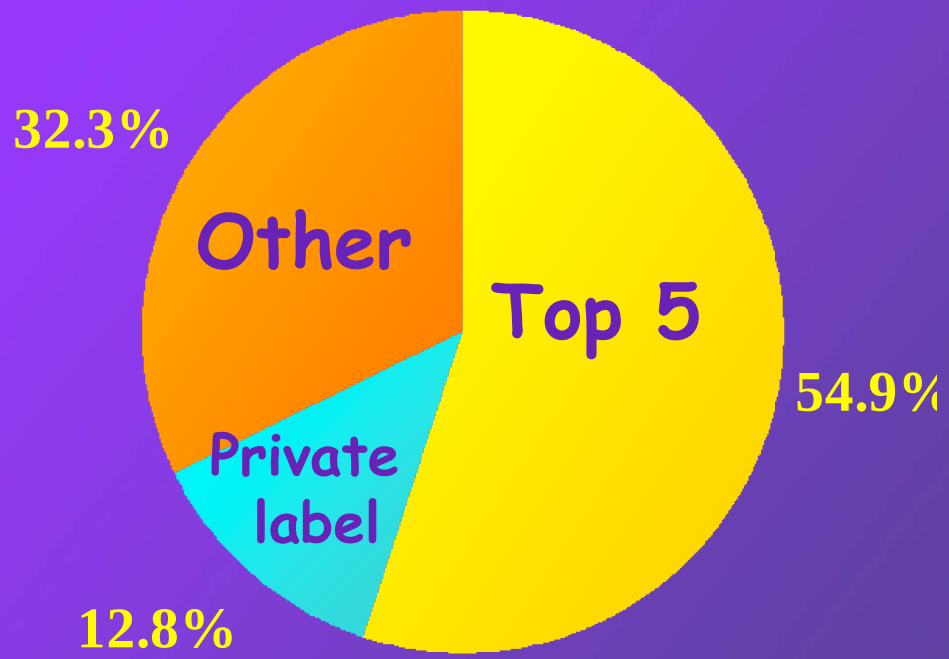
	2008
Ready Pac	20.1
Del Monte	12.9
Private label	12.8
Chiquita	12.3
Garden Highway	5.2
Country Fresh	4.4
All other	32.3

**52 weeks ending Aug. 24, 2008.

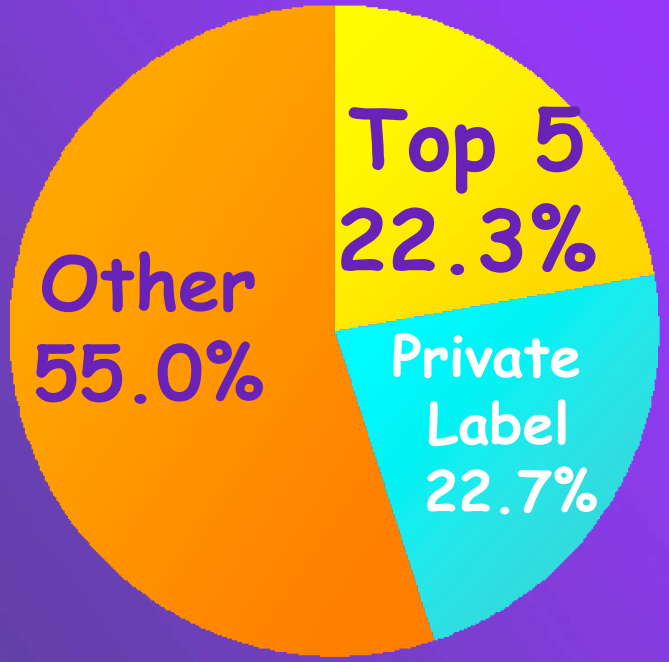
Source: IRI

*Excludes refrigerated jarred fruit, overwrapped fruit, PLU and random weight, and retailer processed.

U.S. Supermarket Fresh-Cut Fruit and Vegetable* Market Shares, Top 5 Firms and Private Label, Share of Dollar Sales, 2008**



Fruit



Veggies

Source: IRI **52 weeks ending Aug. 24, 2008.

*Excludes PLU, random weight, and retailer processed.

US SUPERMARKET FRESH-CUT FRUIT CATEGORY* MARKET SHARES, BY KEY ITEM, (% of Total Fresh-cut Fruit $ Sales), and GROWTH RATES, 2007/2008**

Item	Share, %	$ Sales % Chg YAG
Fruit Mix	21.3	(19.0)
Melons	26.3	17.7
Apples	19.1	13.8
Mango	3.1	3.5
Pineapple	17.9	(5.6)
Fruit Trays	10.2	(13.0)
Other	2.0	(4.0)

**52 weeks ending Aug. 24, 2008.

Source: IRI

*Excludes refrigerated jarred fruit, overwrapped fruit, PLU and random weight, and retailer processed.

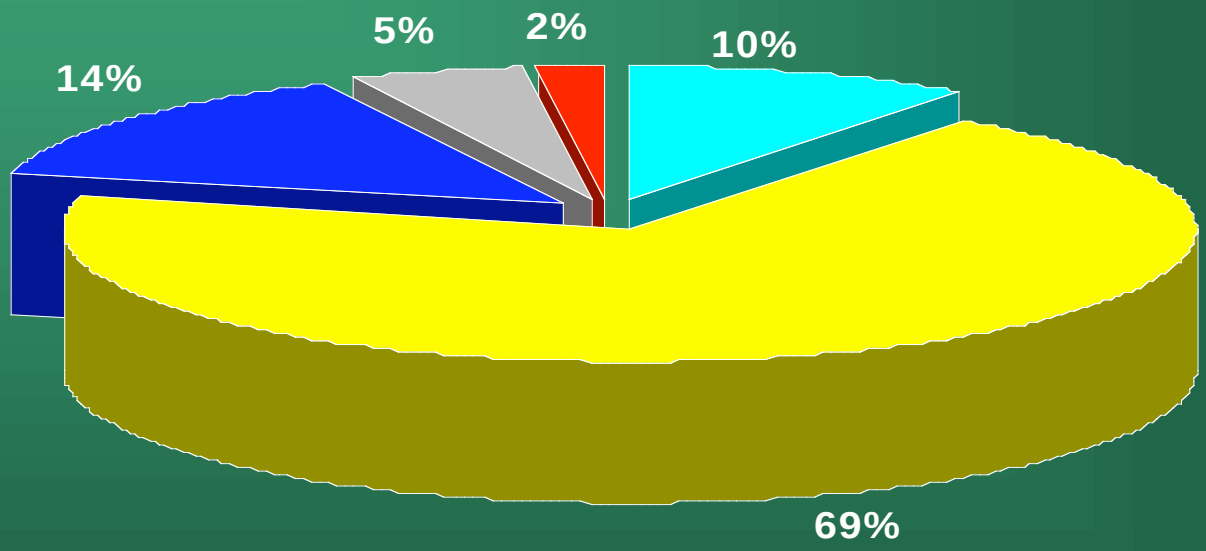
US Value-Added Fruit Facts

- 33% of consumers bought fresh-cut fruit in 2007 vs. 55% for fresh-cut vegetables, *excluding bagged salads*, (Perishables Group PMA Oct. 2007 presentation).
- 68% of consumers say that price is #1 barrier to buying fresh-cut fruit (Perishables Group).
- Fresh-cut fruit category growth is expected to continue to slow due to the economic downturn.

Eating Patterns

- According to the Hartman Group, over 90% of consumers believe that freshness is the key to health
- There is no longer any need to trade-off freshness for convenience and fresh-cut benefits
- Consumers seek a consistent flavor experience applied to relevant flavor trends, available in a convenient form – explains the success of Trader Joe private label products, Muir Glen, Annie's, etc.
- Taste/quality matter more than ever after years of consumers seeking higher quality/taste experiences at the right price point, which depends not only on the consumer and the product but on the eating occasion.
- However, most consumers say they are not willing to pay a lot more for "better tasting" produce – hard to cut thru the marketing clutter – and people "want it all."

In general, how much extra would you be willing to pay for better-tasting fresh fruits and vegetables?



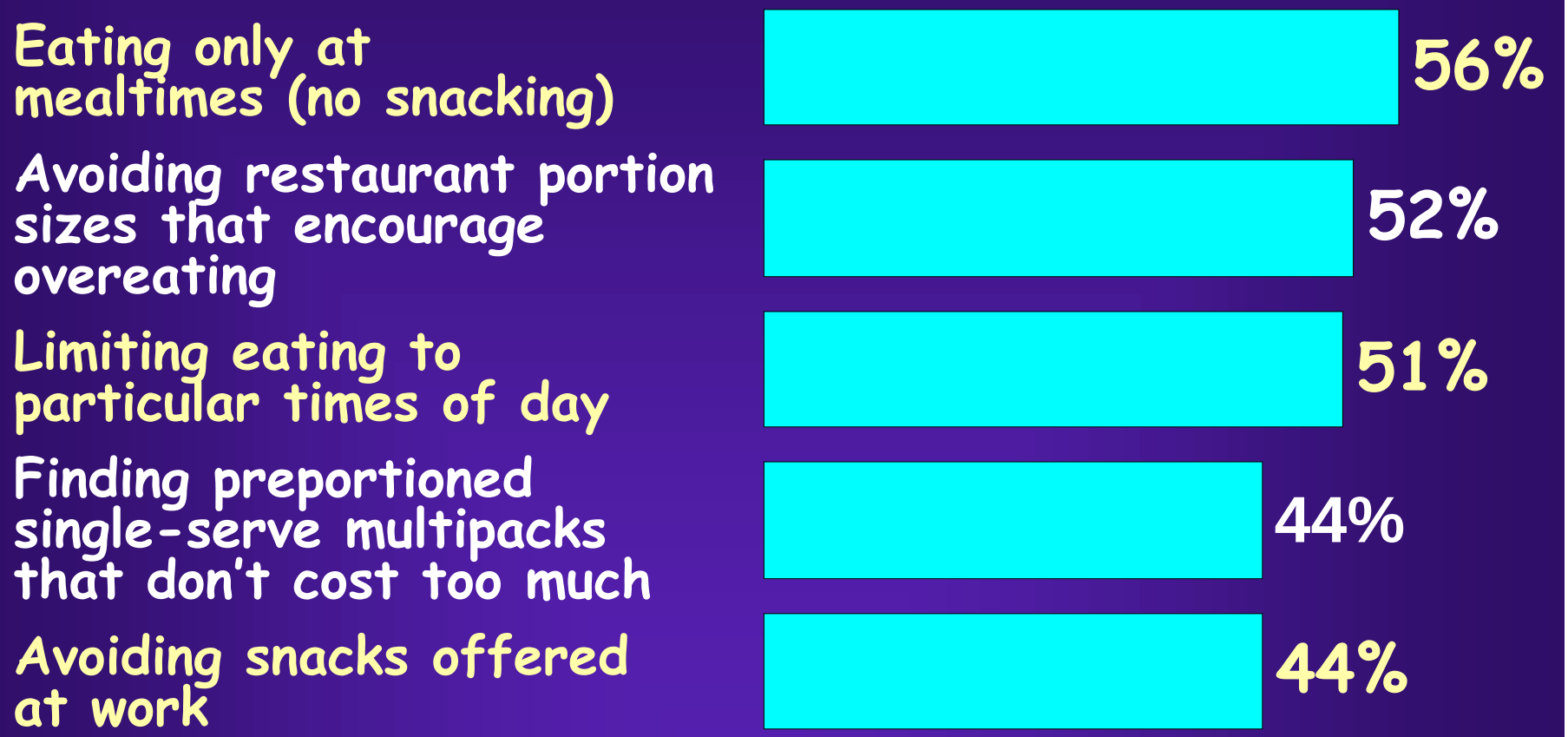
Source: PMA Consumer Perceptions on Flavor and Taste, April 2007

US Shoppers' Eating Habits - 2008

Percent of Shoppers	3+ times weekly	1-2 times weekly	1-3 times mo'ly	< than once a month
Eat home-cooked meals at home	82	11	3	2
Dine out at full-service restaurants	3	18	39	37
Eat meals at home that aren't prep'd at home - takeout/delivery	5	15	36	37
Eat out at fast-food rest.'s	3	15	36	36
Ethnic meals at home or out	5	16	36	30

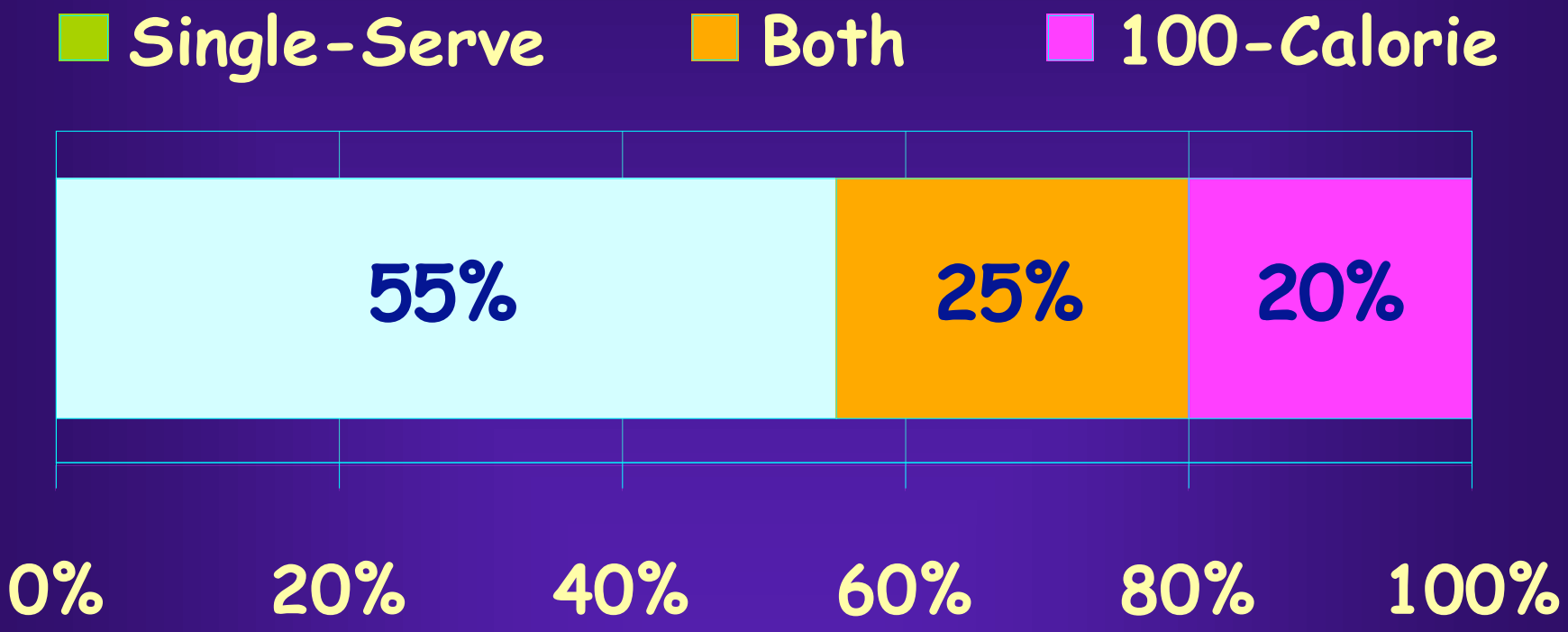
Source: FMI US Grocery Shopper Trends 2008

What task related to managing food portions do you find most difficult to do?



Source: *Portion Control: Minimize Me, Please!* The Hartman Group, 2007.

Single-Serve Packaging vs. 100-Calorie Packs, "This type of packaging helps my children eat less.": Opportunities for Fresh-cut



Source: *Portion Control: Minimize Me, Please!* The Hartman Group, 2007.

Income and price matter: apple example

- The 2008 Fresh Trends illustrates that 94 percent of households with an income of $100,000 or more are likely to buy apples, versus 76 percent of households with less than $25,000.
- Apples remain the 2nd most purchased fruit in the USA, 2008, so it is logical that fresh-cut apples hold market potential.
- Apple dippers are one of the fresh-cut fruit products that can help mom's encourage healthy eating, both purchased at retail for in-home consumption, and via purchase in fast food restaurants.
- These may have the potential to reach across income segments.

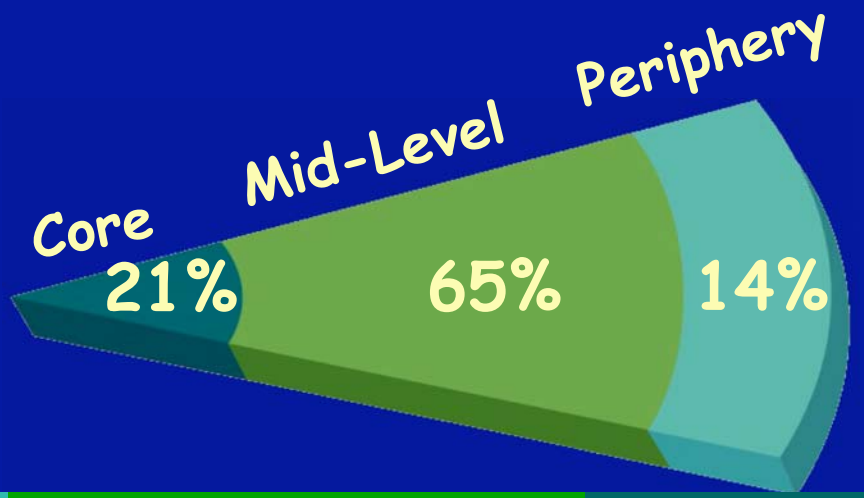
Consumers Reporting Diet "Could Be A Lot Healthier," by Household Type and Income, At vs. Away From Home, 2008

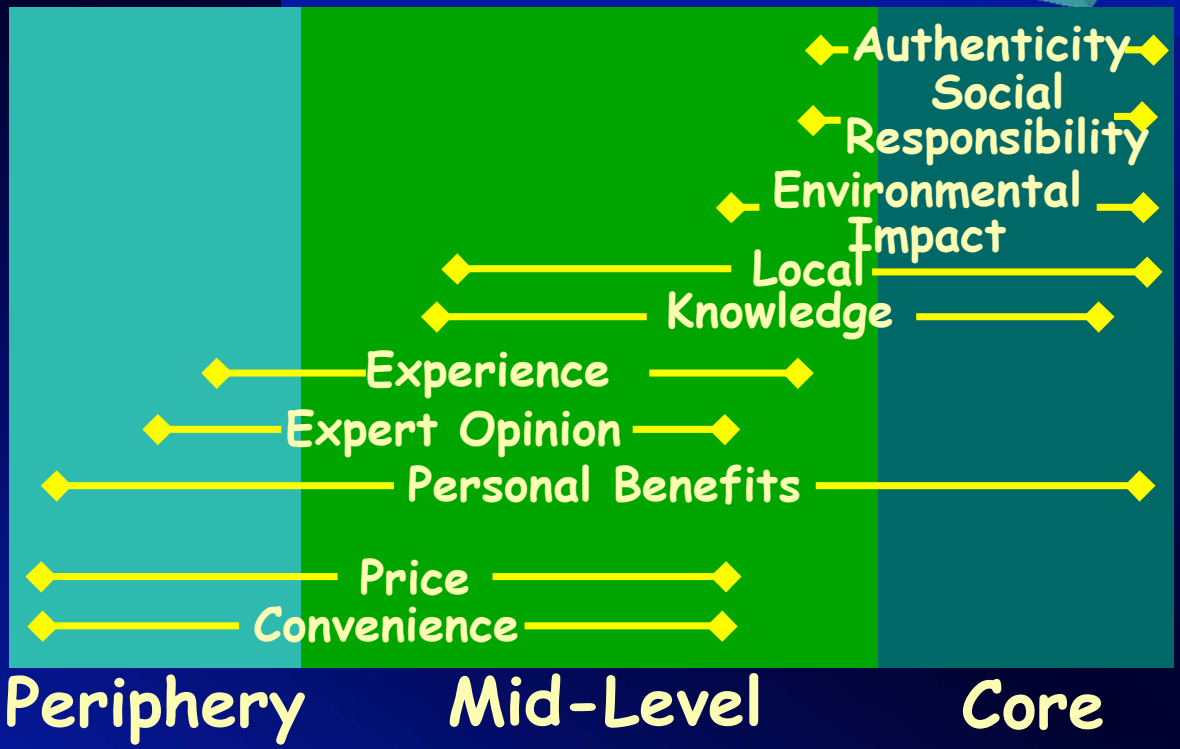
Food	At Home	Away
Household Type		
Children	13%	33%
No children	11	26
Income Level		
$35-49.9K	12%	31%
Over $100K	6	21

Source: *U.S. Grocery Shopper Trends 2008*, FMI, 2008.

Hartman Organizes the World of US Organic Consumers, of the 69% that are users, 2008

- Consumption of organic foods and beverages
- Importance of organic vs. nonorganic when shopping for produce
- Knowledge and concern about how food affects health and the environment





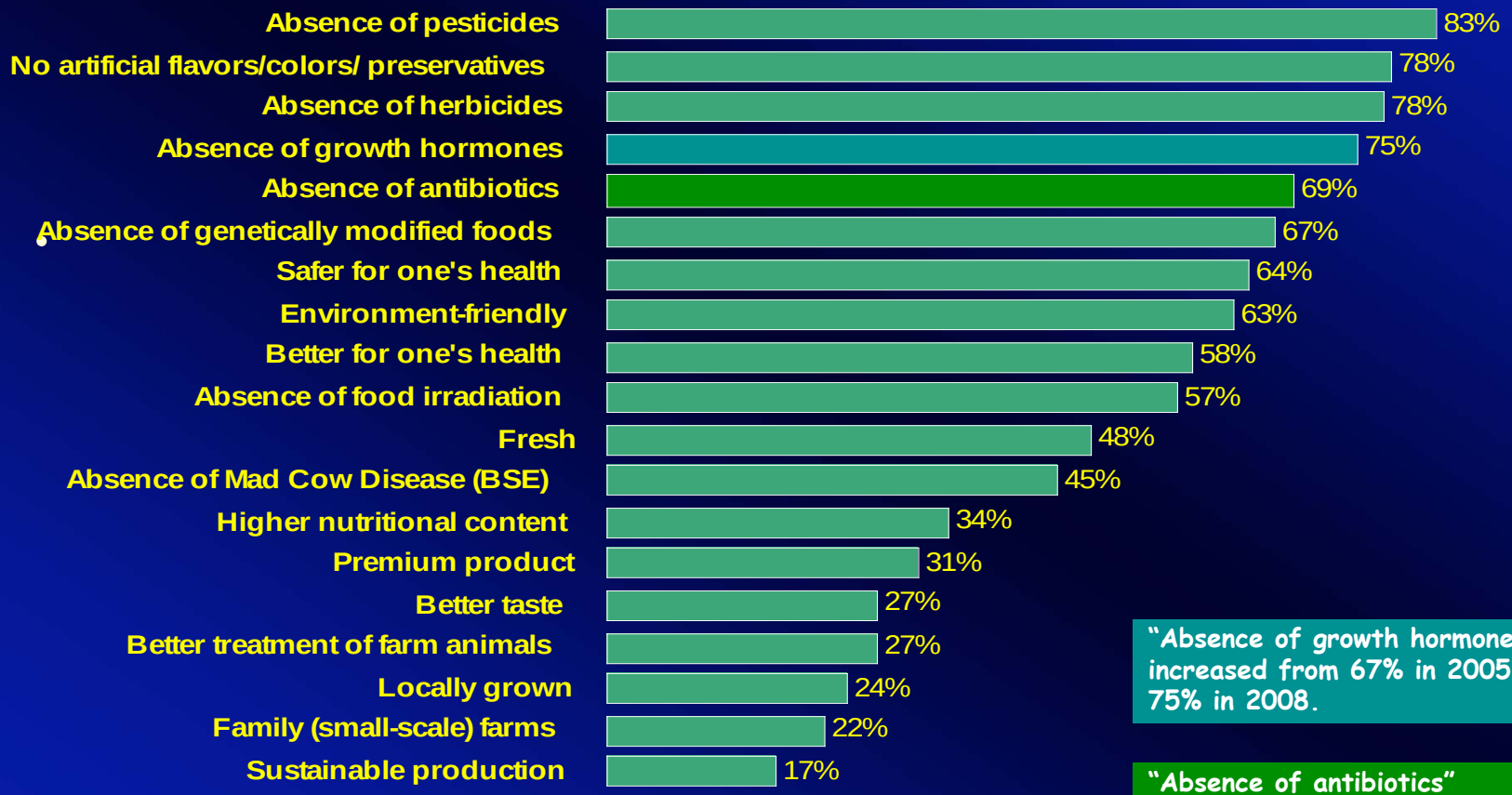
Source: Organics 2008 Report, Hartman Group

Dimensions of Consumption: Hartman Organizes the World of Organics

- **Core organic consumers are 14% of all US consumers – (and they are opinion leaders)**
- **45% of US consumers are Mid-Level organic users**
- **and 10% of US consumers are Periphery organic users**

Source: Organics 2008 Survey, The Hartman Group

Properties Suggested by "Organic" (Increasingly Defined as the Absence of)



"Absence of growth hormones" increased from 67% in 2005 to 75% in 2008.

"Absence of antibiotics" increased from 49% in 2005 to 69% in 2008.

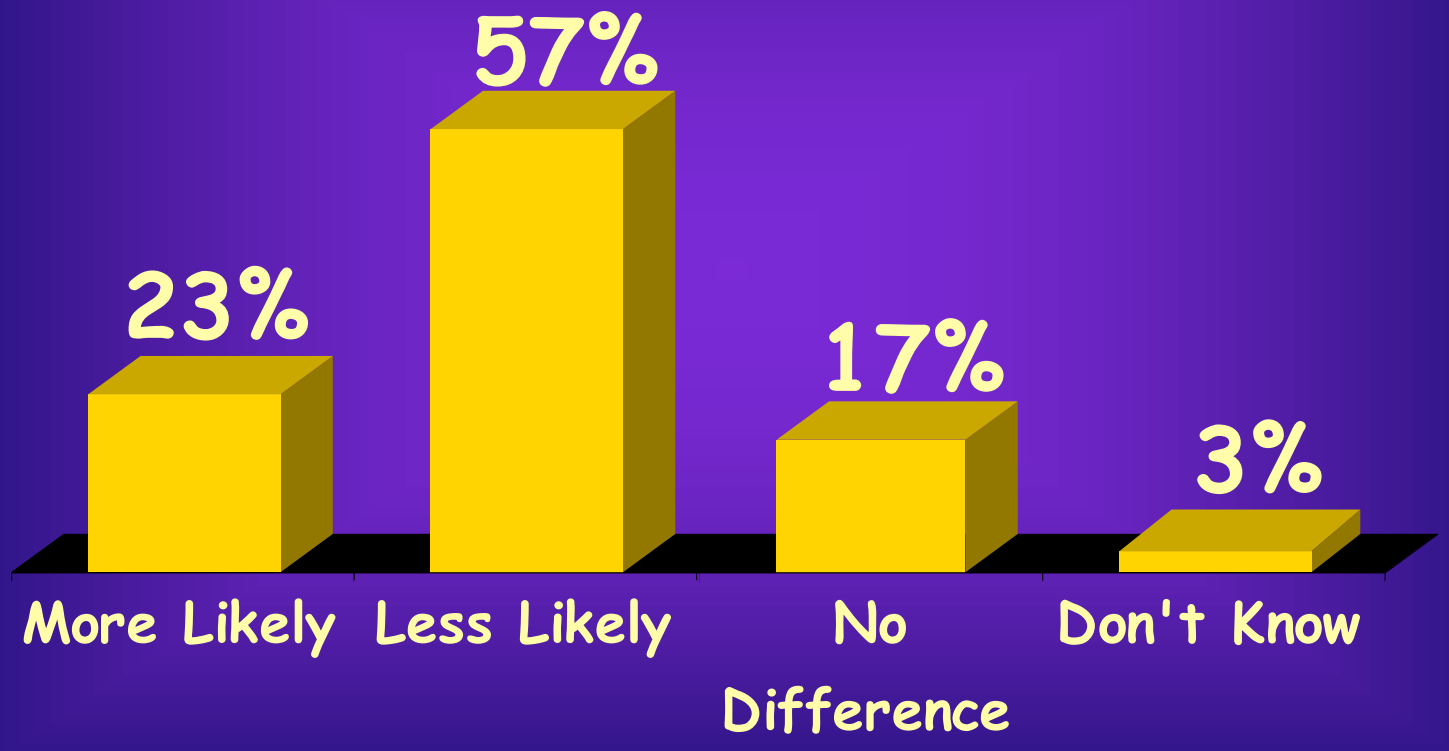
Source: Hartman Group, 2008

Why consumers choose to order an organically grown fresh fruit or vegetable menu item

Healthier	46%
Taste	24%
Overall nutritional value	24%
Environmentally friendly	20%
Less use of chemicals	5%
Recommended by friend / family	3%
Local origin / Home grown	1%
Other / Don't know / Refused	4%

Source: *The Dining Out Menu: Consumer Thoughts about Produce*, PMA, 2006.

If the organically grown fruit or vegetable menu item cost 20% more than a conventionally grown item, would you be more or less likely to order the organic item?

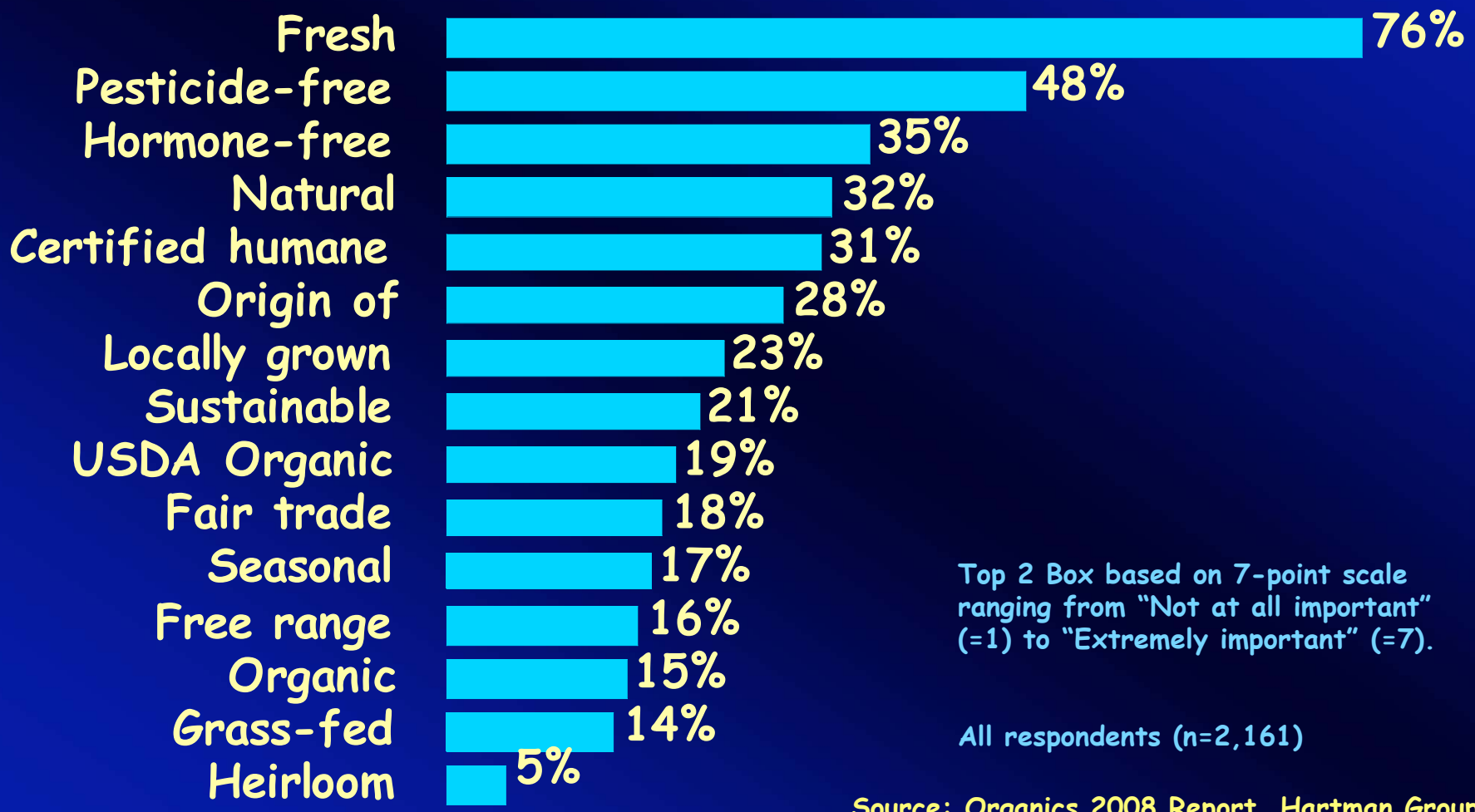


Source: *The Dining Out Menu: Consumer Thoughts about Produce*, PMA, 2006.

Where do organics fit in foodservice?

- Organic is mainstreaming and plateauing as consumers become more selective about the product categories where they see value
- Fresh produce is key point of entry for consumers into world of organics, where they begin to learn more about food, health and environmental issues
- Taste and freshness are key perceived attributes among many users of organic fresh produce, often shorter time to market improves flavor, and organic producers grow specialties – differentiation!
- Consumers typically think indulgence when eating away from home and the only two foodservice categories important for organics are schools and fine dining – cues for health, and quality/taste/freshness, respectively
- Consumers with household income >$100,000 are dominant among core organic users – so high end restaurants align better with organic
- Households with kids are higher organic users and a key entry point, but often in select categories only, like milk and fruit

When selecting foods and beverages to purchase, how important are the following *labels or phrases* to you?



Top 2 Box based on 7-point scale ranging from "Not at all important" (=1) to "Extremely important" (=7).

All respondents (n=2,161)

Source: Organics 2008 Report, Hartman Group

Sustainability Definitions

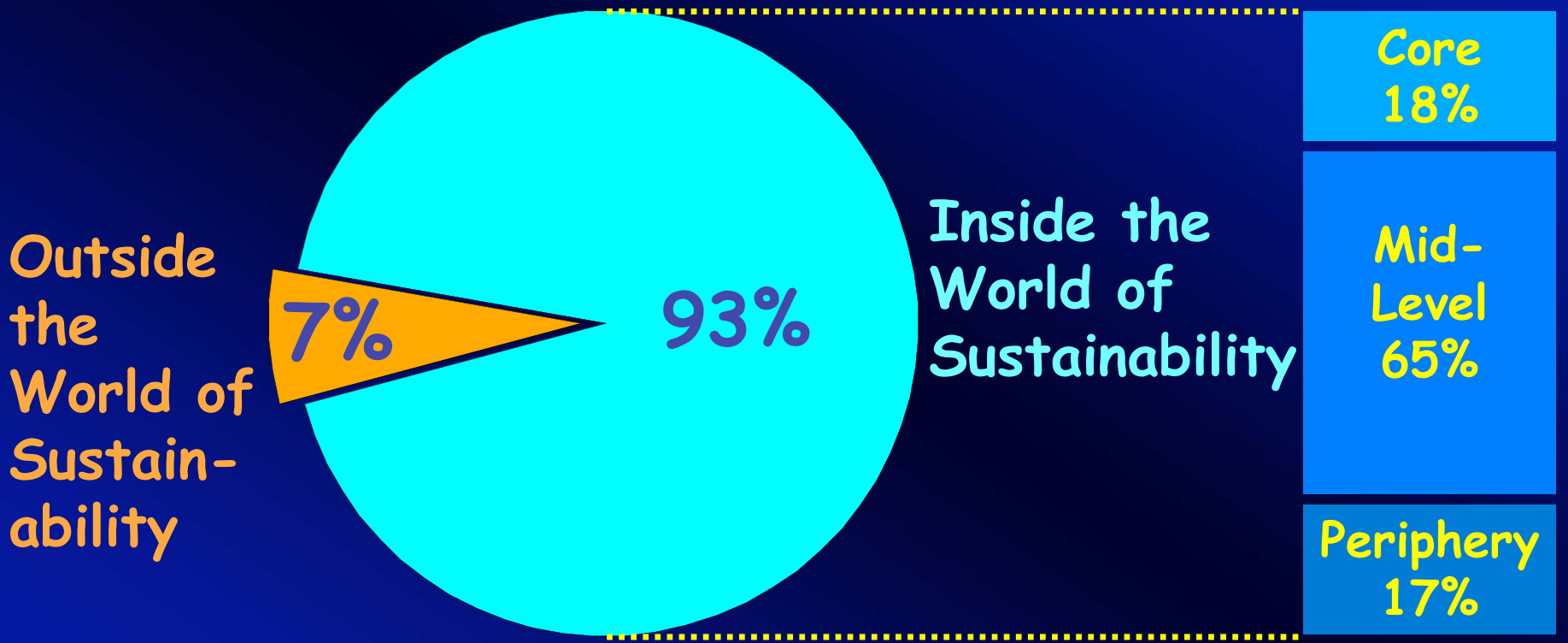
www.EPA.gov/sustainability:

"Sustainable development is development that meets the needs of the present without compromising the needs of future generations "

-- Brundtland Report, 1987 (World Commission on Environment and Development)

- The Three E's
  - Environment, Economics, Equity
- The Three P's
  - Planet, Profit and People

The Consumer World of Sustainability



Source: The Hartman Group Report on Sustainability: Understanding the Consumer Perspective, 2007, Sustainability Survey (n=1,606)

"Sustainability" Trend from the Consumer Vantage Point

- Most consumers have very limited understanding or usage of the concept of sustainability
- In general, food terms as used by the food industry are not understood: functional foods, IPM, food miles
- Sustainability is an umbrella term for health, wellness, organics, environmental consciousness, fair trade, simple living, buying local, etc.
- Personal sustainability linked to environmental sustainability for some
- Consumers evolving from "earth-sustainable" products in the 80's (which were not top of mind in purchasing decisions and only embraced by 7% of consumers) to how products affect health and wellness

Changing US Culture of Food

What about safe? That used to be taken as a given for fresh produce.

Source: Hartman Group, adapted and expanded by Roberta Cook

How confident are you that the food in your supermarket is safe?

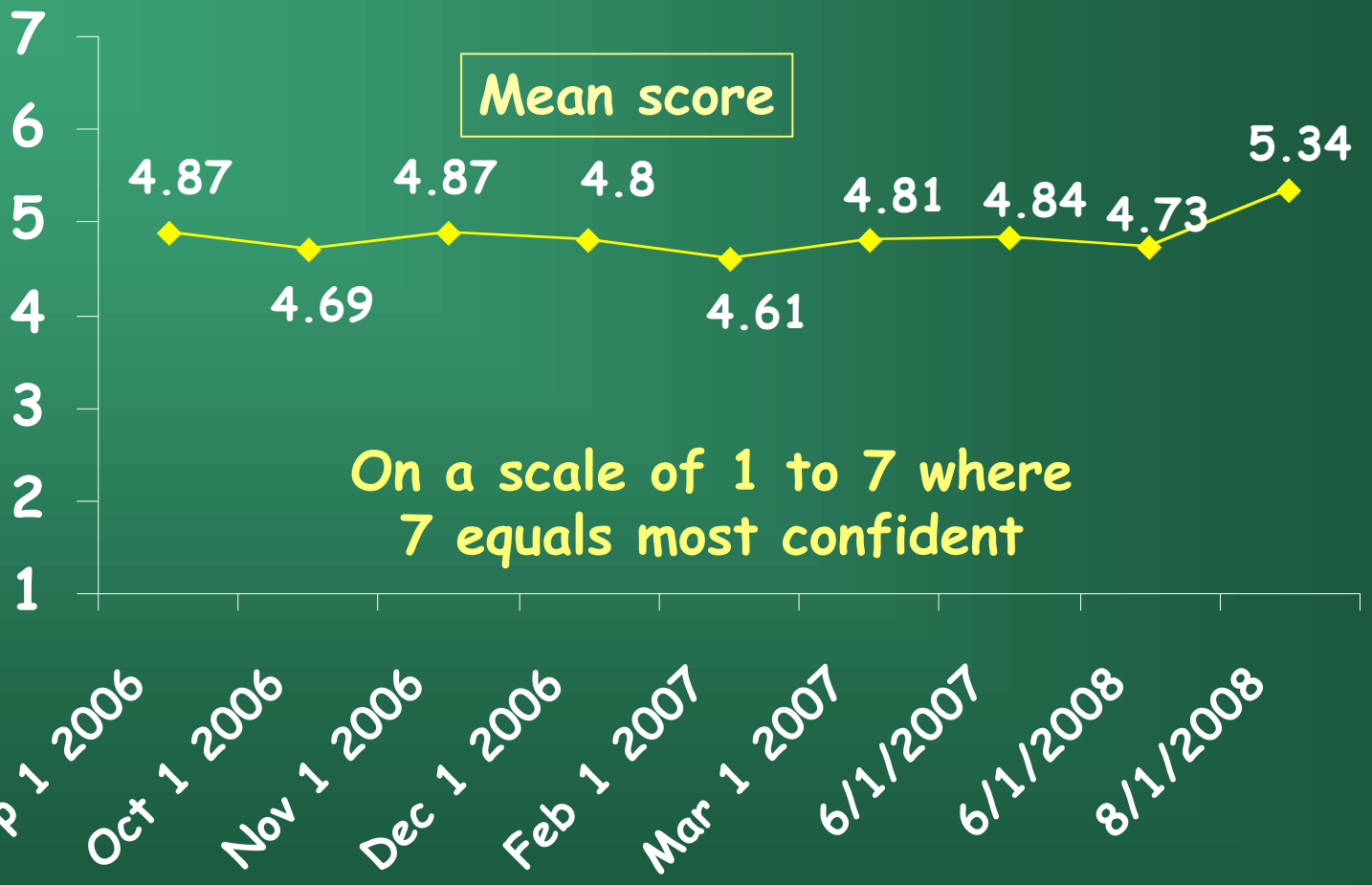
Source: FMI US Grocery Shopper Trends, various years

Which food-related items constitute a serious health risk?

	'08	
Bacteria or germs	53%	
Product tampering	46%	
Avian Influenza	38%	
Terrorist tampering	46%	
Residues from pesticides	43%	Declining since 1992
Antibiotics/hormones in livestock	27%	
Food handling in supermarkets	18%	
Foods produced by biotechnology	20%	Declining since 1992
Irradiated foods	21%	Declining since 1992

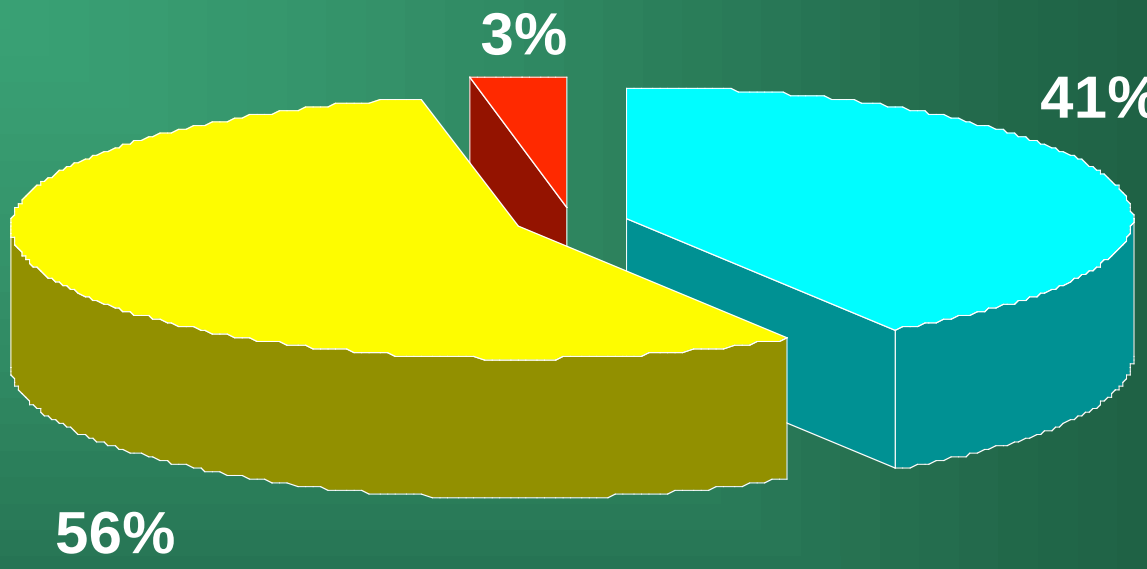
Source: FMI US Grocery Shopper Trends 2008 and other issues

How confident are you about the overall safety of the nation's fresh produce?



Sources: PMA National Consumer Surveys on Food Safety Issues, various.

Are there certain types of fresh fruits and vegetables you don't buy? (in March 2007)



(Leafy greens mentioned by 40% as item don't buy now, followed by 6% for bagged produce and turnips/turnip greens and 5% for onions/green onions.)

Source: PMA National Consumer Survey on Food Safety Issues, March 2007

Consumer attitudes about the safety of fresh spinach in Sept. 2006, and fresh tomatoes in June 2008

- More than twice as many consumers say they will purchase fresh tomatoes (from the areas potentially affected with *Salmonella saintpaul*) right away (34%) than said the same thing about spinach after the *E.coli* incident in 2006 (14%).
- While 26% said they would never buy spinach again only 8% take the same view about tomatoes.
- In June 2008, 18% of consumers think tomatoes are "not safe at all" vs. 50% for spinach in Sept. 2006; and the mean safety score for tomatoes is 4.0 vs. 2.58 for spinach in 2006 and 4.73 for all fresh produce in June 2008, on a 7 point scale .

Source: PMA Tomato Food Safety Issues Consumer Survey, conducted June 13-19, 2008, just after FDA cleared tomatoes from most production areas. Caveat: As of July 7, 2008 tomatoes were no longer the primary suspect, with no tomato samples testing positive for *Salmonella saintpaul* during the outbreak.

In the past 12 months, have you stopped purchasing any food product because of safety concerns?

Percent "Yes"	2005	2006	2007	2008
All Shoppers	11%	9%	38%	26%

Source: FMI US Grocery Shopper Trends 2008

2008: What food products did you stop purchasing in response to food safety concerns

Percent "Yes"	2005	2006	2007	2008
Beef / Poultry	53	64	15	20
Seafood	13	5	2	2
Fruit / Veg - Net	12	8	84	34
Spinach	NA	NA	74	25
Lettuce	NA	NA	16	6
Bagged Salad	NA	NA	9	6
Green Onions	NA	NA	4	NA
Other	24	21	5	51

Source: FMI US Grocery Shopper Trends 2008

In the mind of the consumer, where are food safety problems most likely to occur?

	2005	2006	2007	2008
Process./Manuf. Plants	30%	32%	45%	30%
Restaurants	20	18	9	11
At Home	18	16	11	20
While Stored in Warehouses	11	10	6	1
During Transport	5	4	9	18
In Grocery Stores	5	9	3	5
On the Farm	1	1	3	5

Source: *U.S. Grocery Shopper Trends 2008*, FMI, 2008.

2008:

Of those who said food safety problems are most likely to occur in the Processing / Manufacturing plants:

Mature/60+	64%
Boomers	56%
Generation X	48%
Generation Y	35%

Source: *U.S. Grocery Shopper Trends 2008*, FMI, 2008.

Conclusions: The supply chain is becoming more market- and consumer-oriented as intense competition forces innovation and differentiation

- Quality is being redefined, consumers are becoming more sophisticated and while more are focusing on health it is NOT at the expense of pleasure
- Healthy-eating, organic and local are increasingly more secondary experiential attributes within the pursuit of "authentic quality eating experiences"
- Locale may trump local, if it is premium and has a story, e.g., Frog Hollow Farm summer fruits, Hood River pears; but this is not fully exploited by produce
- Health and wellness evolving to quality experiences and "living the good life" – mind, body, spirit
- Economic slowdown likely to retard "trading up," but effect should be temporary


Taste . . .
appearance . . .
price . . .
"feeling" . . .
lifestyle . . .
Wellness!

Supplemental Information

Leading US Fresh Market Vegetable States in 2007: Geographic concentration of production (due to climate) limits local sourcing potential, yet it is growing in the summer/fall

Area Harvested		Production		Value	
State	% of Total	State	% of Total	State	% of Total
CA	46	CA	50	CA	54
FL	9	FL	8	FL	12
GA	8	AZ	8	AZ	8
AZ	7	GA	6	GA	5
NY	4	NY	4	NY	4

Source: NASS/USDA, Vegetables 2007 Summary, January 2008

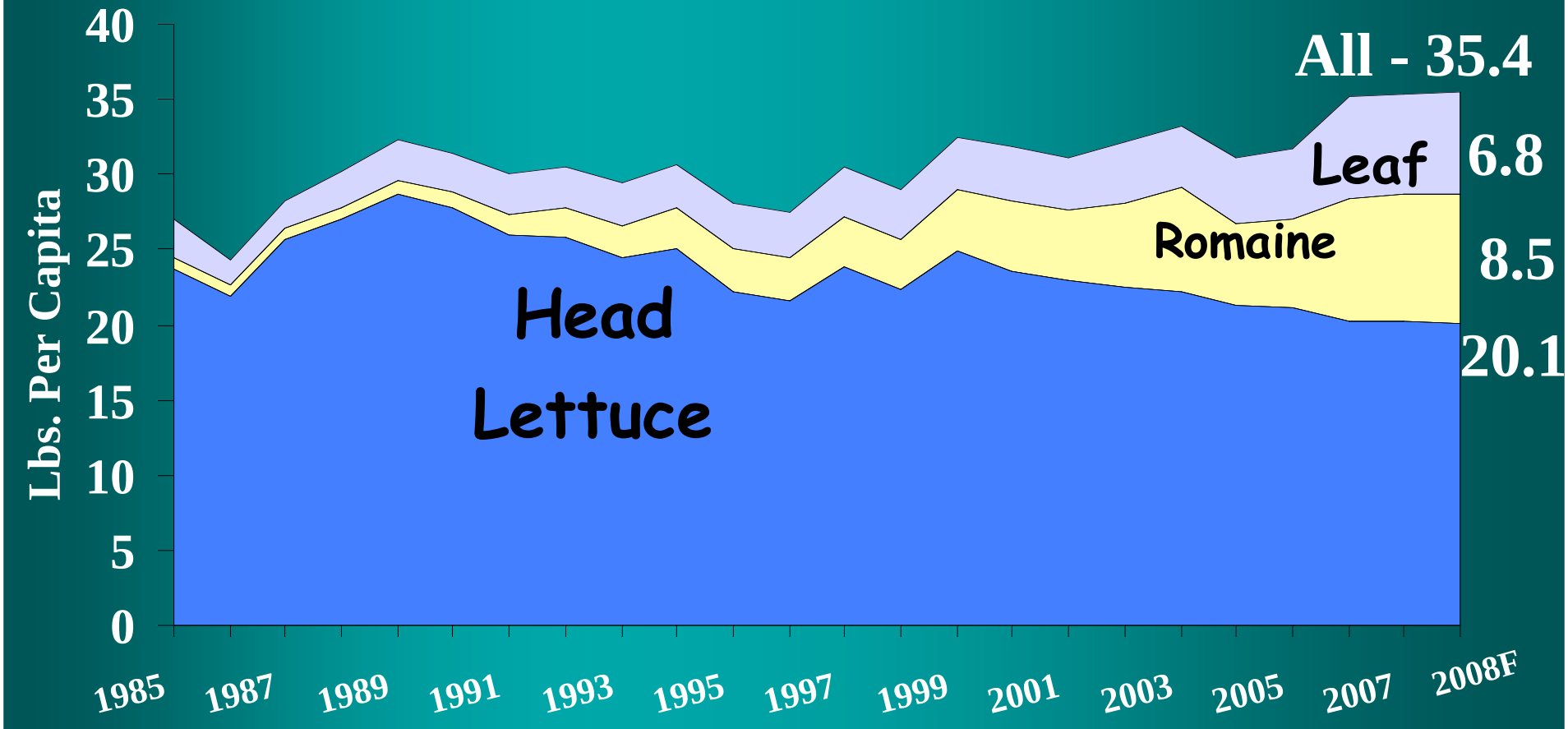
Monterey County Head Lettuce Shipments 1990 vs 2007

Product Form	Million Cartons*		Percent Share	
	1990	2007	1990	2007
Bulk to Process	6.9	18.50	15%	38%
Wrapped	14.2	22.43	30%	46%
Naked	26.1	7.95	55%	16%
TOTAL	47.2	48.88	100%	100%

* 50 lb carton-equivalent units, may not sum to 100 due to rounding

Source: Monterey County Ag Commissioner

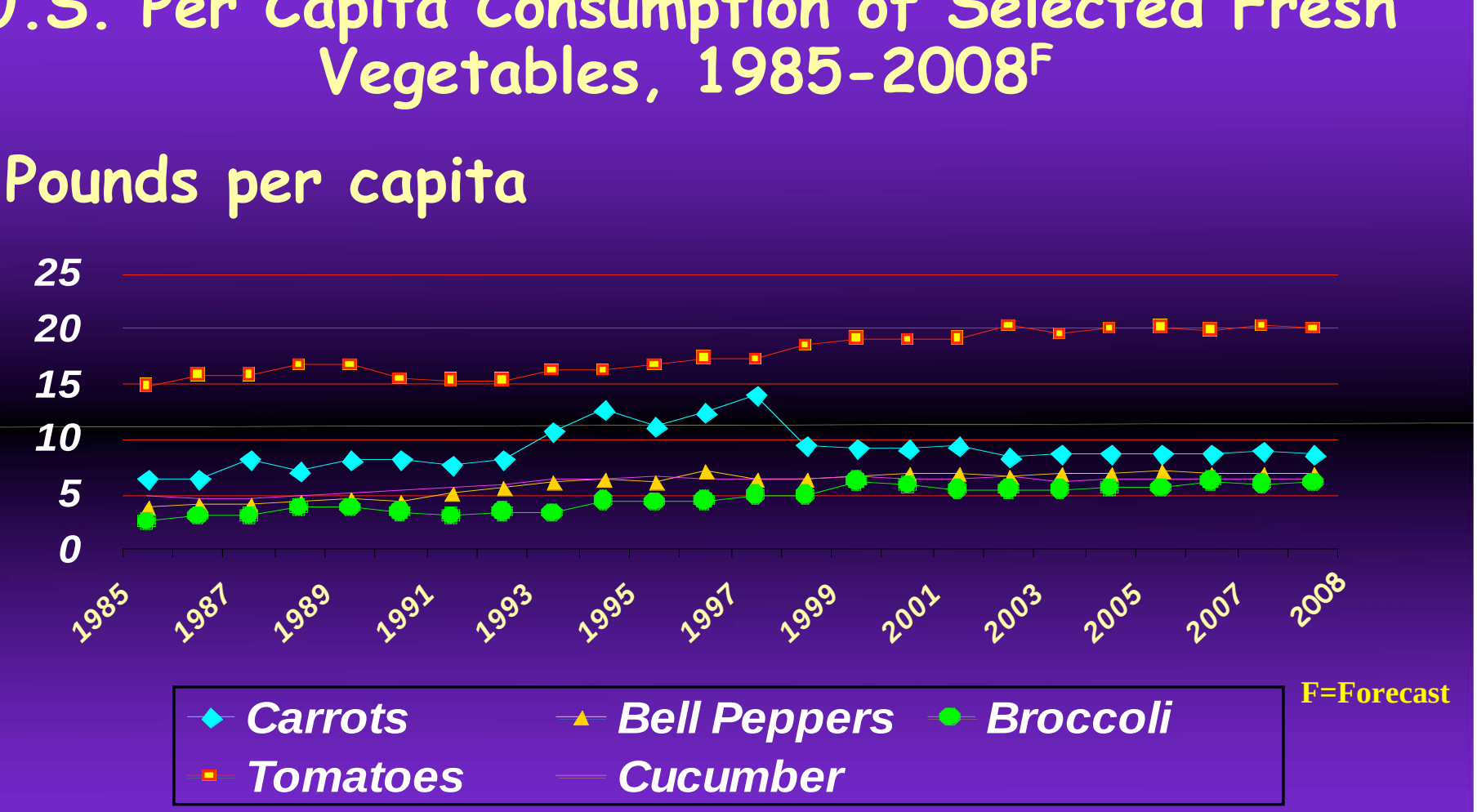
U.S. Per Capita Utilization/Consumption of Lettuce, by Type, 1985-2008F



Source: USDA/ERS, June 2008

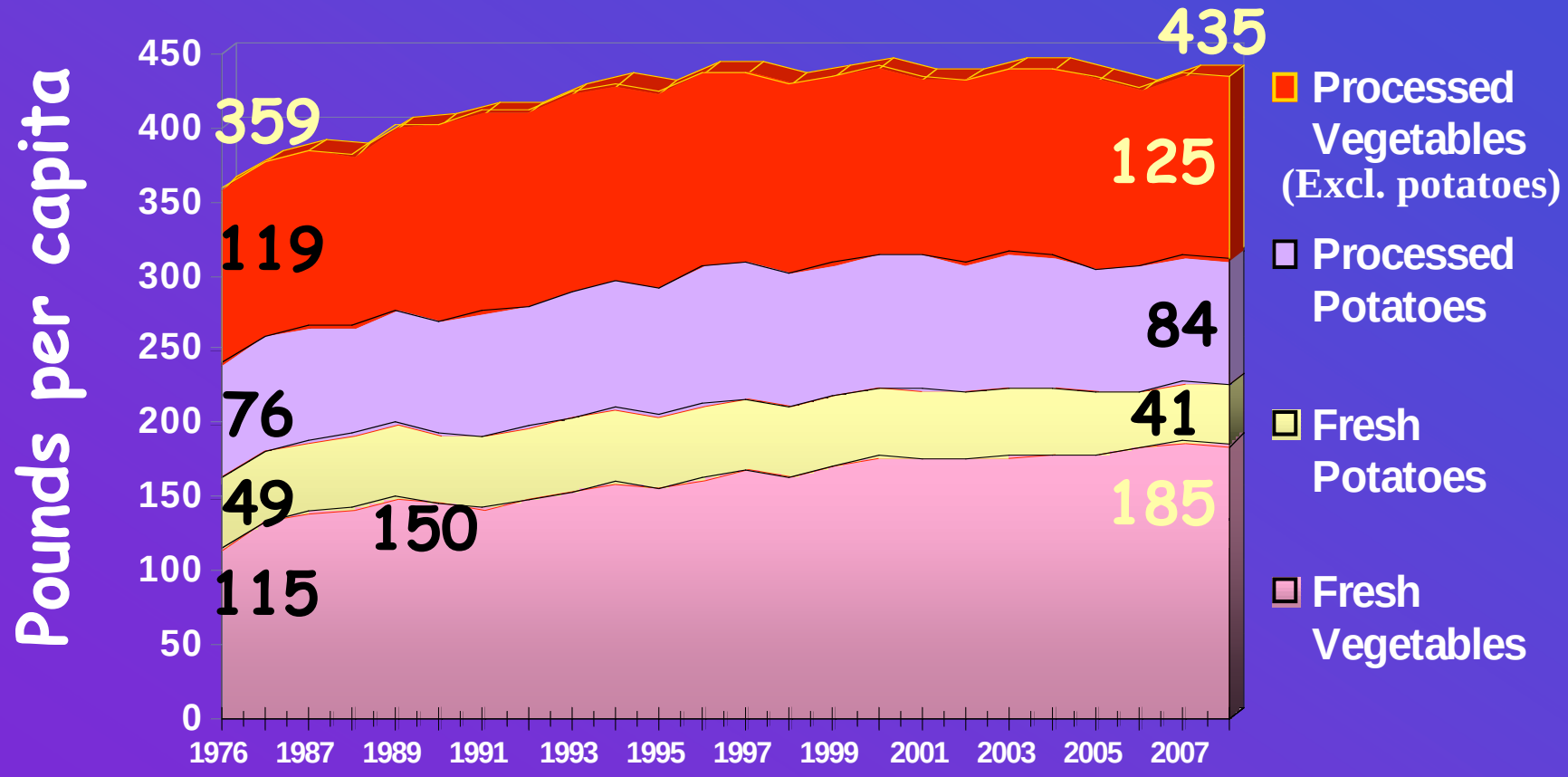
F=Forecast

U.S. Per Capita Consumption of Selected Fresh Vegetables, 1985-2008F



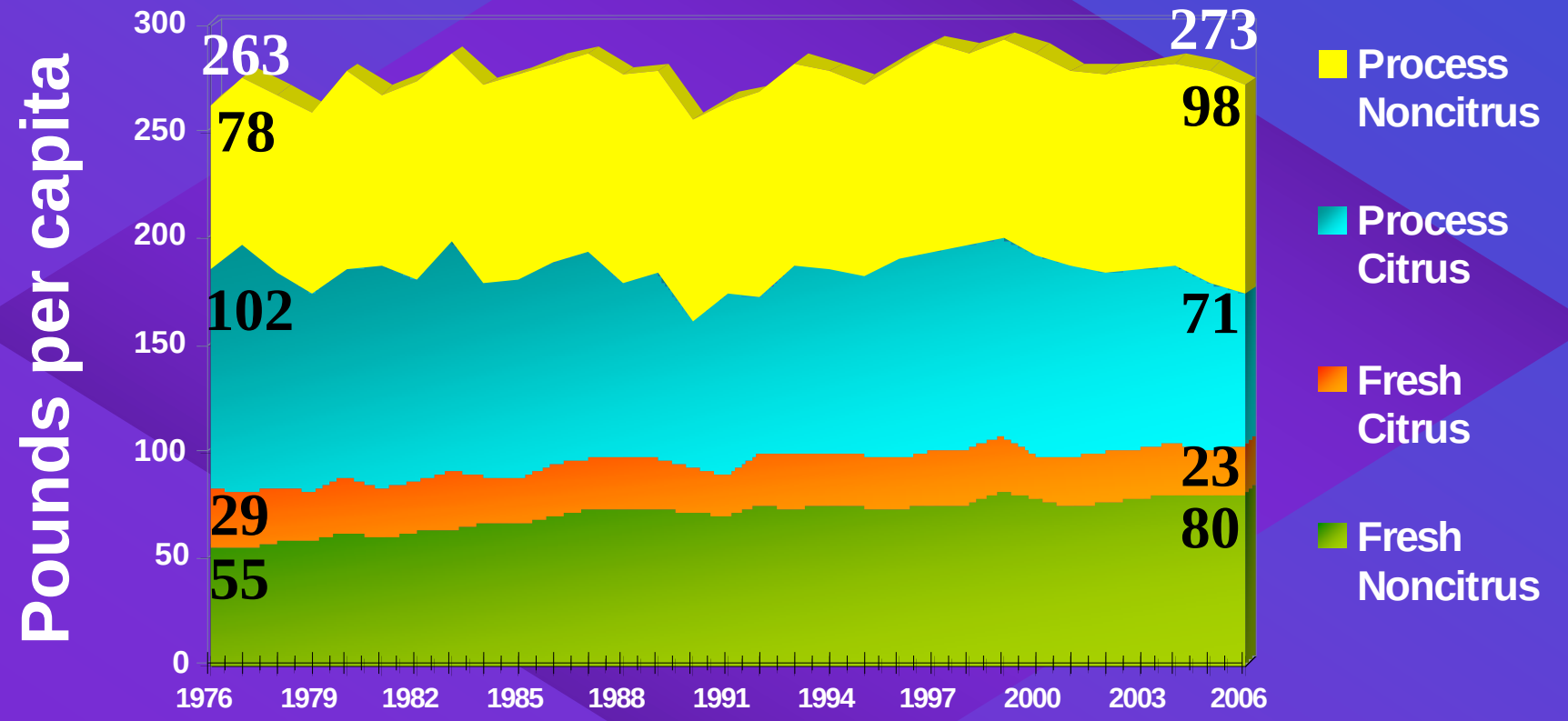
Source: USDA/ERS, Vegetables and Melons Situation and Outlook Yearbook, May 2008

US PER CAPITA VEGETABLE CONSUMPTION, POUNDS, 1976-2008F



Source: USDA/ERS, Vegetables and Melons Situation and Outlook Yearbook, May 2008

US Per Capita Fruit Consumption, Pounds 1976-2006



Source: USDA/ERS, Oct. 2007