

The Impacts of the Panama Canal Expansion on World Cotton Trade

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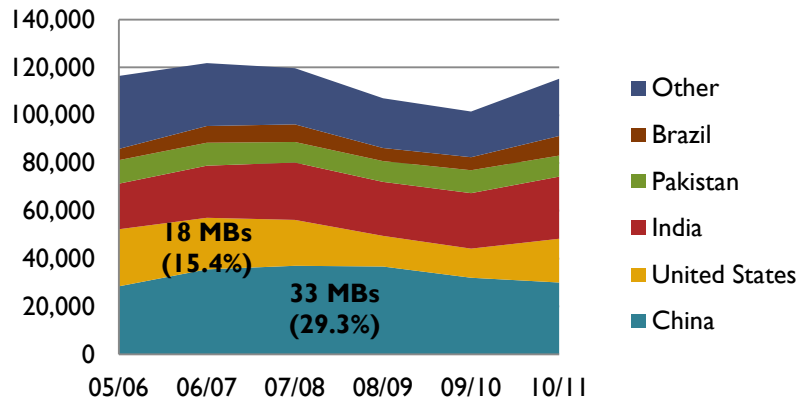
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Background

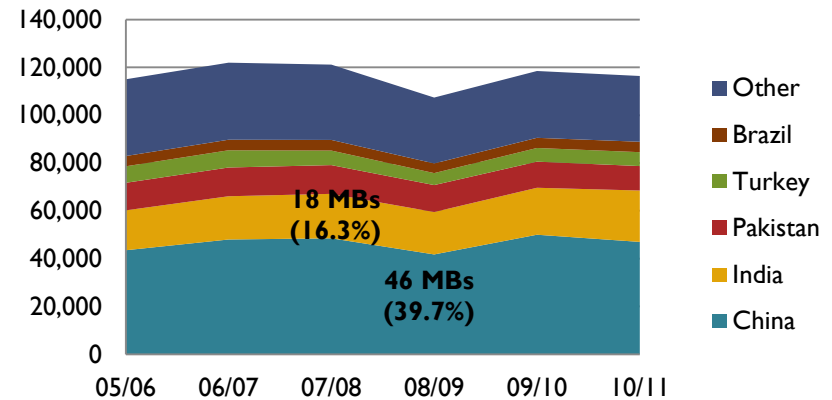
Global Cotton Distribution

The major players in the world are China and the U.S., FAS, USDA

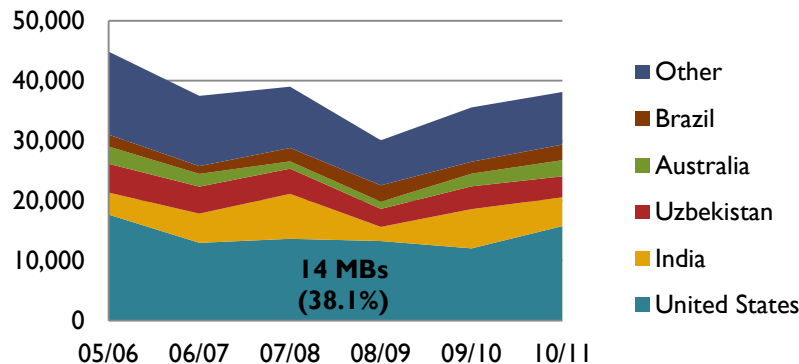
Production (1,000 480 lb bales)



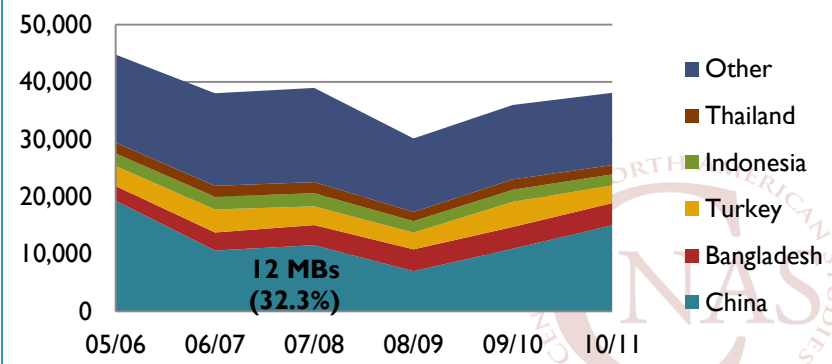
Consumption (1,000 480 lb bales)



Exports (1,000 480 lb bales)



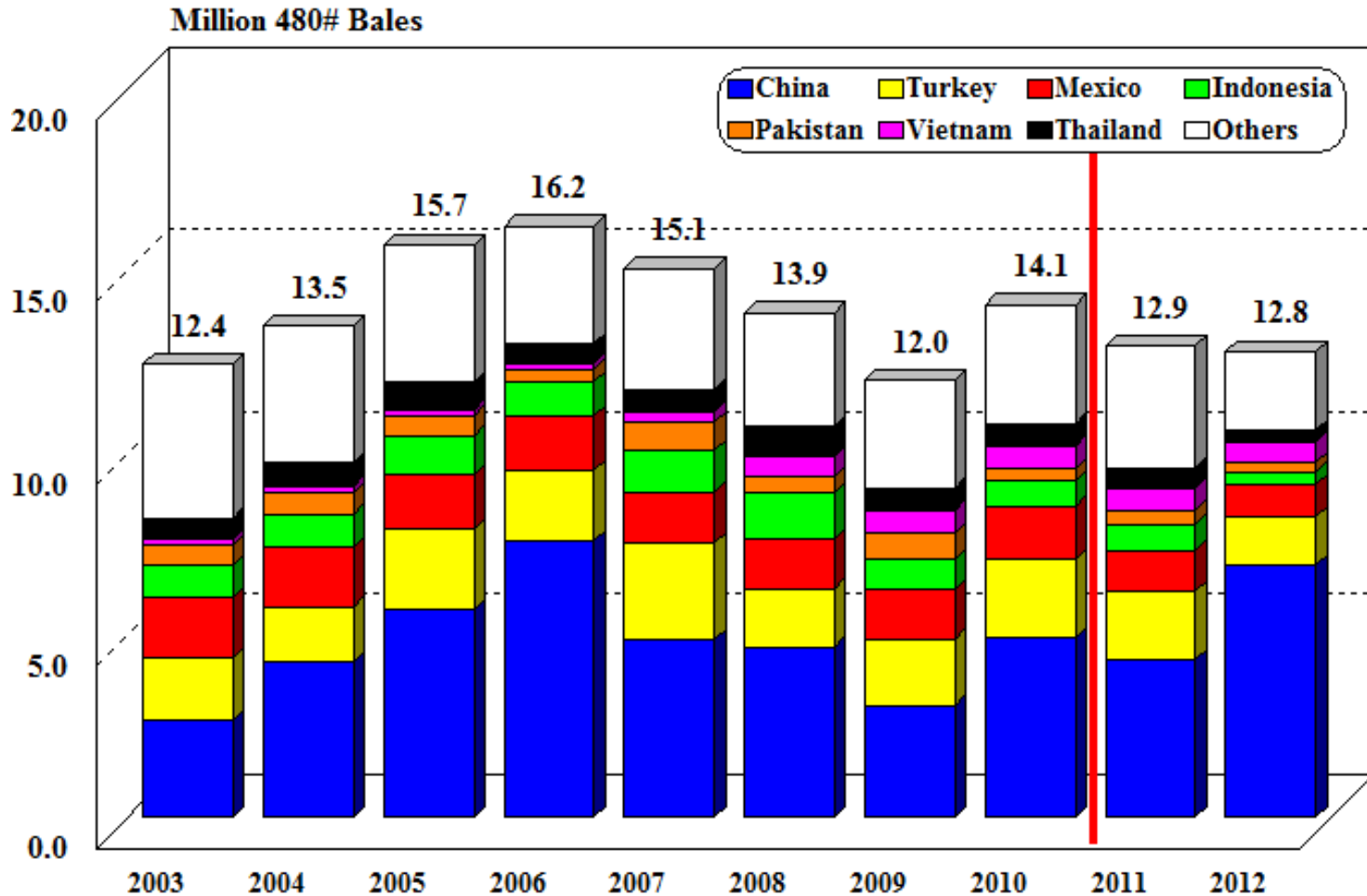
Imports (1,000 480 lb bales)



Background (cont.)

Major U.S. cotton export destinations

Historically, the top 3 destinations for U.S. cotton exports are China, Turkey, and Mexico

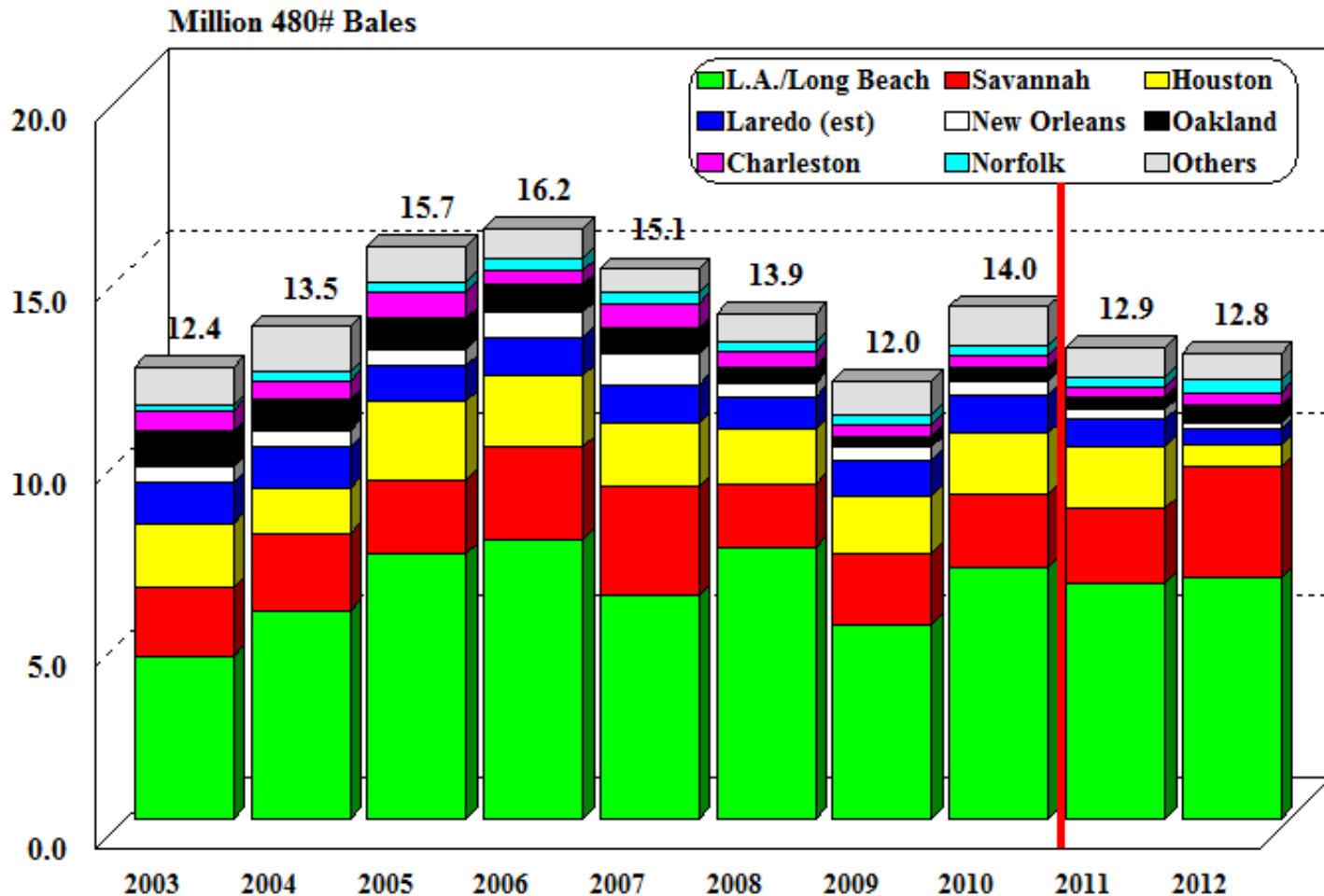


Source: Global Agricultural Trade System (GATS), USDA Foreign Agricultural Service, <http://www.fas.usda.gov/gats/default.aspx>

Background (cont.)

Major U.S. cotton export ports

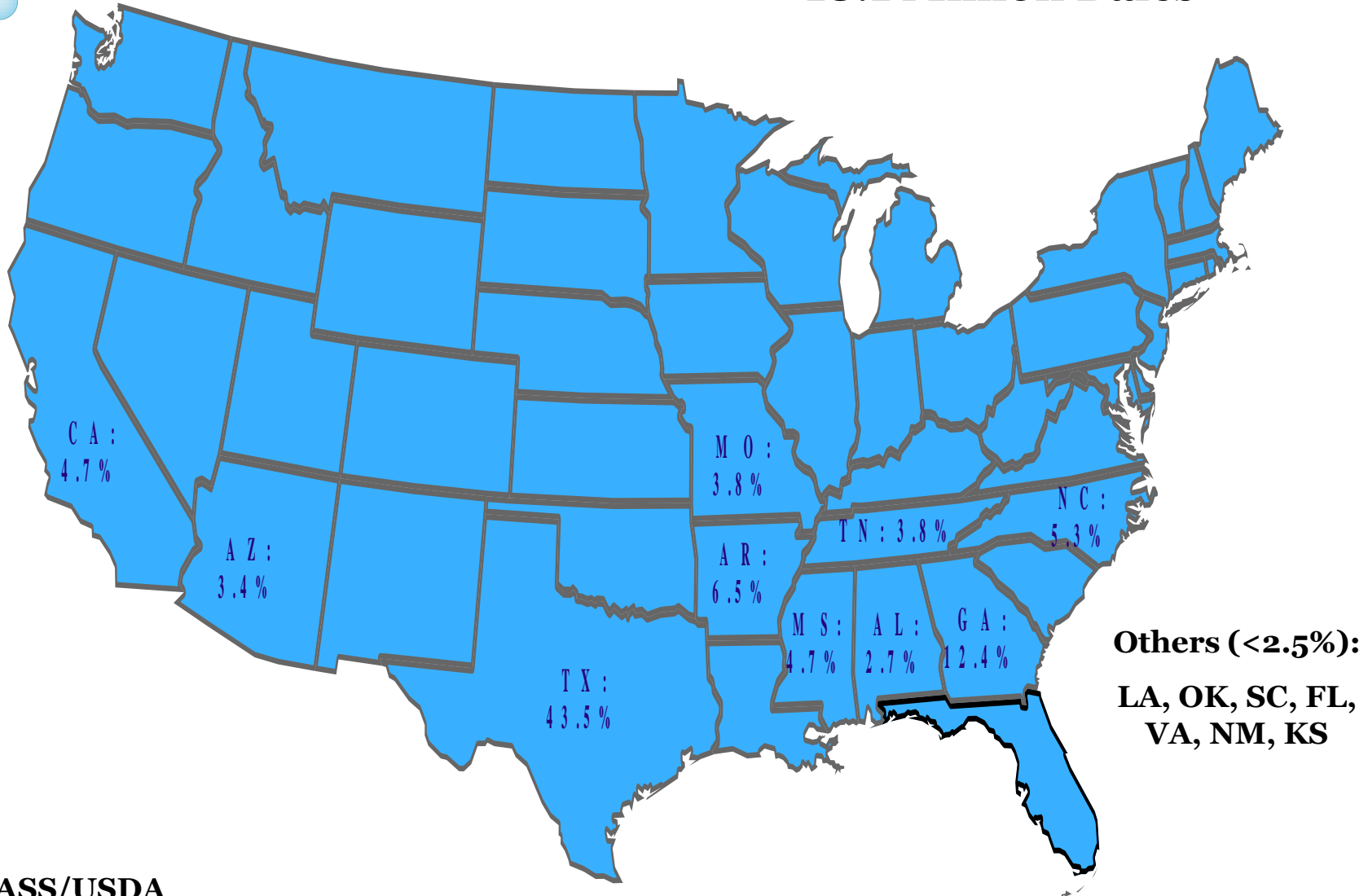
Historically, the top 3 U.S. cotton exporting ports are Long-Beach/Los Angeles ports, Savannah and Houston



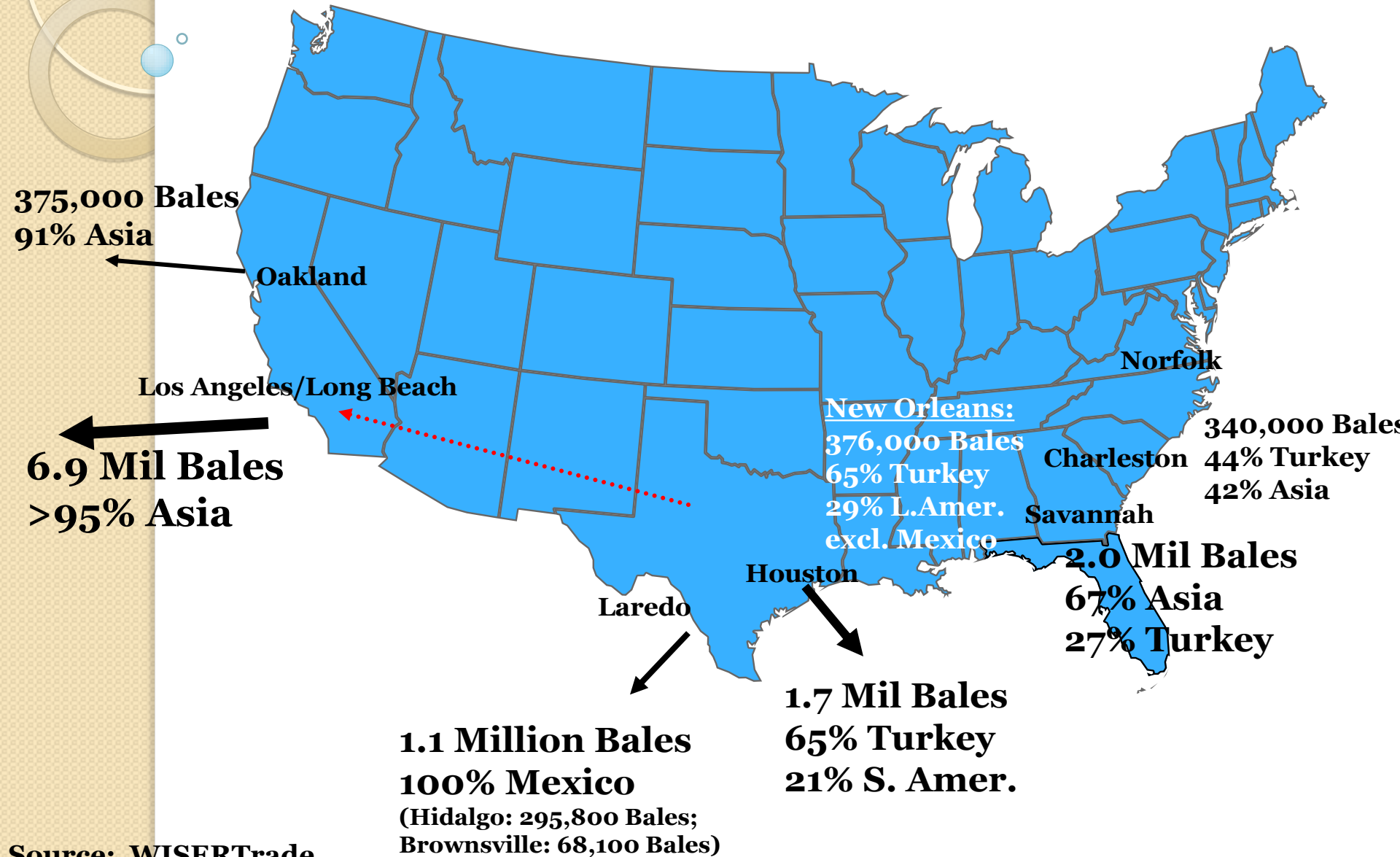
Source: Global Agricultural Trade System (GATS), USDA Foreign Agricultural Service, <http://www.fas.usda.gov/gats/default.aspx>

U.S. Cotton Production by State, 2010

**Total Production:
18.1 Million Bales**



U.S. Cotton Exports by Port & Destination, 2010



Background (cont.)

Panama Canal Importance to U.S. Cotton Exports

- In 2010, **1.34 million** bales from **Norfolk, Charleston, and Savannah** exported to **East Asia** via **Panama Canal** (compiled from WISERTrade)
 - This represents **~10%** of the total U.S. exports
- **Panama Canal** cannot **handle post-Panamax** vessels (12,000 TEUs)
- **U.S. cotton exports** via the **Panama Canal** were via smaller **Panamax** vessels (<5,000 TEUs)

TEU: No. of Twenty-foot Equivalent Unit of Containers

Background (cont.)

Panama Canal Expansion (PCE) & Costs

- **Economies of scale** in maritime shipping
 - Currently, 36% of the world containerized fleet is Post-Panamax vessels (up to 12,000 TEU)
 - After **PCE**, **shipping costs** per container likely **decline 40%**
- **Cost structure**
 - **Panamax vessel operational costs of \$2,314/TEU** (4,000 TEU)
 - **Post-Panamax vessel operational costs of \$1,449/TEU** (10,000 TEU)

Background (cont.)

Panama Canal Expansion

➤ Transit time vs. PCE Cost Savings

- **East Coast to China** (Shanghai port) route via the **Panama Canal** (all-water) is **7-8 transit days longer** than the **Intermodal Option** (rail to West Coast ports)
- **Intermodal Option** across U.S. is **more efficient** time-wise
- But, the **all-water** route from the **East Coast** is about **\$490/TEU cheaper** than the **Intermodal Option**
- This **cost differential** corresponds to a **savings of ~\$70/TEU/day** ($\$490/\text{TEU}/7$ days)
- **PCE** will reduce maritime costs at least **\$210/TEU** for the **East Coast ports to China**

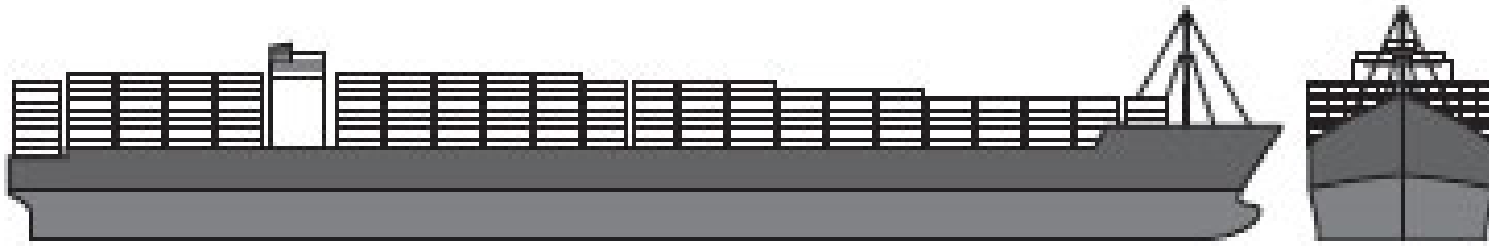
Background (cont.)

Panama Canal Expansion

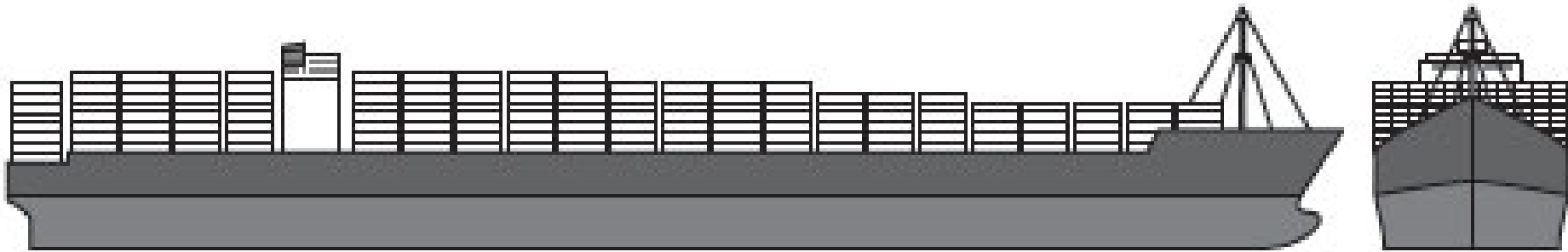
➤ Toll Charges

- Recent **toll increases** captured **1/3 of the potential savings** of the expansion or **\$70/TEU of \$210/TEU**
- In the end, **PCE** will reduce maritime costs for shipments from the **Gulf & South Atlantic ports to China** by **\$140/TEU**
 - **28% reduction** ($\$140/\$490 = 28\%$)

Panama Canal Expansion (PCE): \$5.25 Billion Project Completed by 2014



Panamax: max. load 5000 containers



Post-Panamax: max. load 12,000 containers

- PCE Will More than Double Average Vessel Size Passing thru the Canal by Adding a Third Shipping Lane
- Congestion Led to Expansion Project
- 97% of New Vessel Orders Are Post-Panamax Size

What We Did & Why

- Assess Impacts of the **Panama Canal Expansion** on **U.S. Cotton Exports by Port**
 - *Results of Costa and Rosson Paper presented here*
- Evaluate PCE Impacts on **U.S. Cotton Export Flows, Export Levels, Prices & Revenues**
- PCE Will Shape **Future Competitive Position** of **U.S. Cotton Production & Exports**
- Evaluate impacts on other **exporting countries**
- **Spatial Equilibrium Model** of the **International Cotton Industry 2008/09 MY**

Spatial Price Equilibrium Model

- **567 excess supply regions and 46 excess demand regions**
 - **410 U.S.** excess supply regions (warehouses)
 - **152 Brazilian** excess supply regions (farm)
 - **5** foreign regions (i.e. Australia, India)
 - **11 U.S.** excess demand regions (domestic mills)
 - **21 Brazilian** demand regions (domestic mills)
 - **15 foreign** excess demand regions (i.e. Bangladesh, China)
- **U.S. cotton transportation network** (rail and truck)
 - **15 cotton exporting ports** and **5 intermodal** (rail loading) sites
- **Brazilian cotton transportation network** (truck)
 - **5 cotton exporting ports**

Data and Parameters

- Estimated excess demand and supply equations; cotton handling and storage costs; and railroad, truck, ocean freight rates

- **U.S. component model**
 - Excess supply regions are **warehouses** => optimal solution to the least cost shipping model developed by **Fraire et. al (2011)**
 - **Truck and rail rates** were based on estimates from **Fraire et. al (2011)**

- **Brazilian component model**
 - **Production and consumption** were based on **IBGE** and **RAIS**
 - **Truck costs** from **CEPEA/USP**

- **Ocean freight rate** estimates were **proxies** of the **difference** between **import price (CIF)** and **export price (FOB)** for each pair of **trading partners**

Results

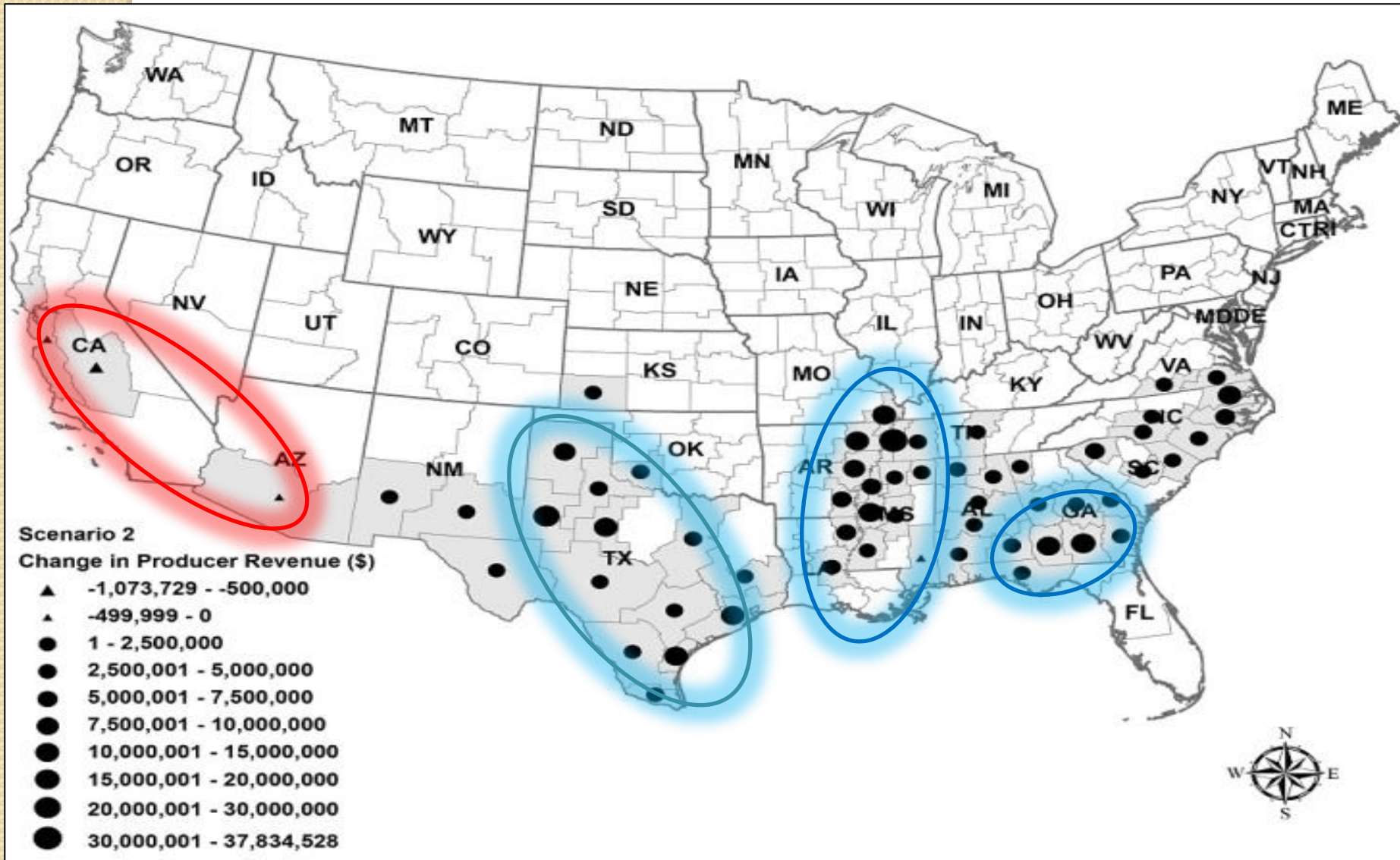
Scenario 2: 28% Reduction in Ocean Freight rates Due to PCE

- **Panama Canal expansion** is expected to **increase cotton exports** via the **Panama Canal**
- **U.S. Gulf and Atlantic ports** should **increase** cotton exports
- **Pacific Coast ports**, however, would experience a **reduction** in cotton exports
- *Note: Scenario 1 is 10% Reduction in Rates; Scenario 3 is Scenario 2 + 10% Reduction in LA/LB Rates*

Results for 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports

Port	Base Model	Scenario 1	Change (%)	Scenario 2	Change (%)	Scenario 3	Change (%)
Savannah	2,236.7	3,907.5	74.7	4,450.9	99.0	3,903.3	74.5
Houston	1,551.8	2,046.2	31.8	2,434.5	56.9	1,795.6	15.7
New Orleans	514.7	724.2	40.7	1,197.8	132.7	1,144.7	122.4
Charleston	338.3	534.3	57.9	875.6	158.8	577.9	70.8
Norfolk	282.2	333.5	18.2	617.9	118.9	579.9	105.5
Gulfport	45.3	20.9	-54.9	20.5	-54.9	0.0	-100.0
Mobile	72.8	24.0	-67.0	0.0	-100.0	0.0	-100.0
<i>Total U.S. Gulf and Atlantic</i>	<i>5,041.8</i>	<i>7,590.6</i>	<i>50.5</i>	<i>9,597.2</i>	<i>90.3</i>	<i>8,001.4</i>	<i>58.7</i>
L.A.-Long Beach	6,163.3	3,697.2	-40.0	1,879.5	-69.5	3,827.7	-37.9
Oakland	343.8	343.6	-0.1	343.3	-0.1	45.4	-86.8
Total West Coast	6,507.1	4,040.8	-37.9	2,222.9	-65.8	3,873.1	-40.4
Laredo-El Paso	1,141.3	1,296.7	13.6	1,269.5	11.2	1,264.6	10.8
Hidalgo-Brownsville	340.6	176.6	-48.1	179.2	-47.4	179.6	-47.3
<i>Total U.S.-Mexico Border Ports</i>	<i>1,481.9</i>	<i>1,473.3</i>	<i>-0.6</i>	<i>1,448.7</i>	<i>-2.2</i>	<i>1,444.2</i>	<i>-2.5</i>
Total U.S. Ports	13,030.8	13,104.7	0.6	13,268.8	1.8	13,318.7	2.2

Warehouse Revenue Change Attributed to 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports



Change in Warehouse Revenue & Value of Cotton Due to 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports, Scenario 2

State	Revenue (Million \$)	Price (\$/Bale)
Texas	\$85.73	\$11.42
Georgia	\$44.46	\$21.03
Tennessee	\$42.31	\$19.68
Arkansas	\$30.04	\$18.36
Mississippi	\$21.78	\$18.99
North Carolina	\$23.84	\$21.78
Missouri	\$13.61	\$17.32
South Carolina	\$11.29	\$22.60
Louisiana	\$8.83	\$18.82
Alabama	\$8.79	\$16.66
Virginia	\$4.64	\$21.89
Florida	\$1.58	\$20.69
New Mexico	\$0.78	\$16.26
Kansas	\$0.14	\$17.27
Oklahoma	\$3.12	\$11.78
Arizona	\$(0.45)	\$(1.00)
California	\$(1.14)	\$(0.94)
<i>U.S. Total</i>	<i>\$299.36</i>	<i>\$16.04</i>

Estimated Effects of PCE on Exports, Prices, and Revenue for Exporting Countries Due to 28% Reduction in Ocean Freight, Gulf & S. Atlantic Ports

Exports (1,000 480 lbs. bales)	Scenario 2
United States	238.00
India	-30.38
Brazil	-29.02
Australia	-1.92
Sub-Saharan Africa	-7.51
Uzbekistan	-6.44
Rest of the World	-30.96
Prices (\$/bale)	Scenario 2
United States	\$16.04
India	(\$0.96)
Brazil	(\$1.07)
Australia	(\$0.96)
Sub-Saharan Africa	(\$0.96)
Uzbekistan	(\$0.96)
Rest of the World	(\$0.96)
Revenues (million \$)	Scenario 2
United States	\$299.36
India	(\$11.54)
Brazil	(\$9.51)
Australia	(\$1.81)
Sub-Saharan Africa	(\$5.30)
Uzbekistan	(\$4.45)
Rest of the World	(\$12.68)

Similar Impacts for Other Ag Products?

- **Probably, but to a Lesser Degree than Cotton**
- **Soybeans – Most Exports to Asia Shipped through LA, WA, and VA, Closer to Source**
- **But, CA Ports Account for 3.9% of (1.2 MMT) Soybean Shipments to Asia while Producing no Soybeans**
 - **Must come from considerable distance as only minimal amounts produced west of Great Plains**
- **Corn – Most Exports to Asia Shipped through LA and WA, Closer to Source**
- **But, California Ports Account for 5.6% (680 TMT) of Corn Shipments to Asia while Producing Minimal Amounts**
 - **Likely comes from considerable distance as only minimal amounts produced in nearby states**

Similar Impacts for Other Ag Products?

- **Rice – Most Rice Exported to Asia Shipped via CA Ports, but CA Grows about ¼ of U.S. Rice**
 - **Unlikely to shift**
- **Wheat – Most Wheat Exported to Asia Shipped via WA and LA Ports**
 - **Both are nearest to large production areas**
- **Meats, Fruits and Vegetables – Most of What is Shipped to Asia is via CA Ports**
 - **Unlikely to change as production centers are nearby and/or lower transit times are extremely crucial for these product categories**

Summary

Panama Canal Expansion Will Play Major Role in Future of U.S. Cotton Exports

- ✓ **Total U.S. cotton exports increase by 238,000 Bales, 2%**
- ✓ **Gulf and S. Atlantic ports increase cotton exports by 4.6 Million Bales or 90%**
- ✓ **West Coast ports exports decline by 4.3 Million Bales or 66%**

Summary

- **Gains in Revenue for Most Cotton Producing States**
 - TX, GA, TN & AR Lead Gainers
- **CA & AZ Lose Revenue**
 - Marginal losses (**\$1.14 million for CA**)
- **Total Revenue Increase, \$300 Million**
 - **\$86 Million Gain for Texas**

Conclusions

- PCE Could Be Larger than Estimated
- Competitive Position of **U.S. Cotton Enhanced**
- **Gulf & South Atlantic Ports Stand to Gain**
 - Constraints: Depth, Land Area & Funding
- Infrastructure Improvement & Gains Follow Port Development
 - ✓ Roads, Bridges, Power Supplies, etc.
- Could Have Similar Impacts for Soybeans and Corn Shipped Out of CA Ports to Asia

Questions?

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