PART OF A LOGISTICS SIMULATION MODEL OF THE WORLD SOY COMPLEX

Jerry Fruin University of Minnesota NC-224 WCC-72 ANNUAL MEETING June 9-11, 2003 Las Vegas NV.

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General Objective

 Develop a model to analyse the short and long term competiveness of the world's soybean producing subregions

Look at:

- Changes in logistics infrastructures
- Changes in demand patterns
- Changes in production areas
- Inherent Protein and Oil Level Differences

ULTIMATE RESEARCH QUESTION

- How competitive are US soybeans in world markets?
 - I.E. US Producers are at the
 - **Technological Frontier**
 - South American Expansion is at the No Rent Frontier

or,

Can US soybean producers pay the rent??

OCEAN TRANSPORTATION MODEL

- 6 US EXPORTING PORTS
- 6 BRAZILAN EXPORTING PORTS
- 2 ARGENTINE EXPORTING PORTS
- 8 IMPORTING PORTS
- CAPTURES 88% of WORLD TRADE IN BEANS AND MEAL
- (ANOTHER 9% IS INTRA-CONTINTAL TRADE)
- INTRA-EUROPE TRADE IGNORED
- (SOY OIL WAS NOT INCLUDED)

Status to date

- Ocean transportation model completed with results
- US producing areas and processing plant location model in test phase
- Collaborators have completed model of Brazil

IMPORT PORT ASSIGNMENTS

PORT AREA	IMPORT AREA	BUSHELS	PERCENT	CUM PERCENT
Rotterdam	North Europe	1,459,124,333	47.53%	47.53%
Kobe	Japan	316,855,000	10.32%	57.86%
Xiamen	South China	258,509,167	8.42%	66.28%
Qinqdao/tsingtao	North China	256,543,833	8.36%	74.63%
Port Kelang	Southeast Asia	254,881,000	8.30%	82.94%
Port Said	Med & Near East	204,321,333	6.66%	89.59%
Vera Cruz/Rail	Mexico	176,642,000	5.75%	95.35%
Kaohsiung	Tawain	142,783,667	4.65%	100.00%
Wilmington	Southeast USA	1	0.00%	100.00%

EXPORT QUANTITIES BY PORT

PORT AREA	COUNTRY	BUSHELS	PERCENT	CUM PERCENT
GULF	USA	943,354,854	30.47%	30.47%
ROSARIO AREA	ARGENTINA	748,553,610	24.18%	54.65%
PARA/SFDS/SAN	BRAZIL	654,011,661	21.13%	75.78%
PACNW	USA	163,769,095	5.29%	81.07%
RIO GRANDE	BRAZIL	163,515,073	5.28%	86.35%
MEXBORDER	USA	98,872,329	3.19%	89.55%
VITORIA	BRAZIL	74,539,900	2.41%	91.95%
DULUTH	USA	47,956,032	1.55%	93.50%
BAHIA BLANCA	ARGENTINA	43,985,390	1.42%	94.92%
MANAUS	BRAZIL	41,324,617	1.33%	96.26%
NORFOLK	USA	39,553,141	1.28%	97.54%
TOLEDO	USA	29,222,549	0.94%	98.48%
ILHEUS	BRAZIL	24,131,462	0.78%	99.26%
SAO LUIS	BRAZIL	22,928,952	0.74%	100.00%
WILMINGTON	USA	0	0.00%	100.00%

OCEAN RATE COMPUTATIONS

 90 Observations of Panamax Vessels from Aug-01 to Jan-02
 Regressed against Nautical miles

Y=.0023NM+1.1638

Will Fine Tune Later Ship size Routes Load Discharge Limitations

EXAMPLES OF OCEAN RATES

EXPORTER	IMPORTER	N. MILES	M.TON RATE	BUSHEL RATE
GULF	Xiamen	9116	\$22.13	\$0.604
GULF	Rotterdam	4879	\$12.39	\$0.338
GULF	Qinqdao/tsing	10010	\$24.19	\$0.660
PACNW	Xiamen	5524	\$13.87	\$0.378
PACNW	Rotterdam	8748	\$21.28	\$0.580
PACNW	Qinqdao/tsing	5092	\$12.88	\$0.351
ROSARIOAREA	Xiamen	12299	\$29.45	\$0.803
ROSARIOAREA	Rotterdam	6469	\$16.04	\$0.438
ROSARIOAREA	Qinqdao/tsing	12907	\$30.85	\$0.841
PARA/SANTOS	Xiamen	11610	\$27.87	\$0.760
PARA/SANTOS	Rotterdam	5657	\$14.17	\$0.387
PARA/SANTOS	Qinqdao/tsing	12218	\$29.27	\$0.798
MANAUS	Xiamen	11915	\$28.57	\$0.779
MANAUS	Rotterdam	4797	\$12.20	\$0.333
MANAUS	Qinqdao/tsing	12042	\$28.86	\$0.787
SAO LUIZ	Xiamen	11116	\$26.73	\$0.729
SAO LUIZ	Rotterdam	4122	\$10.64	\$0.290
SAO LUIZ	Qinqdao/tsing	11272	\$27.09	\$0.739







BASELINE PORT TO PORT FLOWS

	OBJECTIVE FUNCTION	\$1,414,546,426
EXPORTING PORT	IMPORTING PORT	BUSHELS
GULF	Xiamen (South China)	258,509,167
GULF	Rotterdam(Northern Europe)	54,662,610
GULF	Vera Cruz(Mexico)	77,769,671
GULF	Qinqdao(North China)	92,774,739
GULF	Kobe(Japan)	316,855,000
GULF	Kaohsiung (Tawain)	142,783,667
GULF	Wilmington FLOWS	1
PACNW	Qinqdao(North China)	163,769,095
DULUTH	Rotterdam(Northern Europe)	47,956,032
TOLEDO	Rotterdam(Northern Europe)	29,222,549
NORFOLK	Rotterdam(Northern Europe)	39,553,141
MEXBORDER	MexicoRail	98,872,329
ROSARIOAREA	Rotterdam(Northern Europe)	675,114,742
BAHIA BLANCA	Port Kelang SE Asia	17,927,059
PARA/SFDS/SAN	Rotterdam(Northern Europe)	513,943,896
PARA/SFDS/SAN	Port Said(Med & Near East)	140,067,764
RIO GRANDE	Port Kelang SE Asia	163,515,073
VITORIA	Rotterdam(Northern Europe)	74,539,900
MANAUS	Port Said(Med & Near East)	41,324,617
ILHEUS-SALVADOR	Rotterdam(Northern Europe)	24,131,462
SAO LUIZ	Port Said(Med & Near East)	22,928,952

BASELINE SLACK VARIABLE

Cell	Name	Cell Value	Formula	Status	Slack
\$G\$10	BAHIA BLANCA ARGENTINA	17,927,059	\$G\$10<=\$I\$10	Not Binding	26,058,331

BASELINE PORT TO PORT FLOWS BY VOLUME

IMPORTING PORT	EXPORTING PORT	BUSHELS
Rotterdam(Northern Europe)	ROSARIOAREA	675,114,742
Rotterdam(Northern Europe)	PARA/SFDS/SAN	513,943,896
Kobe(Japan)	GULF	316,855,000
Xiamen (South China)	GULF	258,509,167
Qinqdao(North China)	PACNW	163,769,095
Port Kelang SE Asia	RIO GRANDE	163,515,073
Kaohsiung (Tawain)	GULF	142,783,667
Port Said(Med & Near East)	PARA/SFDS/SAN	140,067,764
MexicoRail	MEXBORDER	98,872,329
Qinqdao(North China)	GULF	92,774,739
Vera Cruz(Mexico)	GULF	77,769,671
Rotterdam(Northern Europe)	VITORIA	74,539,900
Rotterdam(Northern Europe)	GULF	54,662,610
Rotterdam(Northern Europe)	DULUTH	47,956,032
Port Said(Med & Near East)	MANAUS	41,324,617
Rotterdam(Northern Europe)	NORFOLK	39,553,141
Rotterdam(Northern Europe)	TOLEDO	29,222,549
Rotterdam(Northern Europe)	ILHEUS-SALVADOR	24,131,462
Port Said(Med & Near East)	SAO LUIZ	22,928,952
Port Kelang SE Asia	BAHIA BLANCA	17,927,059
Wilmington FLOWS	GULF	1

FREE FLOW EACH EXPORT PORT SUPPLY EQUAL TO TOTAL DEMAND

	TOTALCOST	\$909,763,115
	Name	Final Value
GULF	Vera Cruz FLOWS	77,769,671
PACNW	Xiamen FLOWS	258,509,167
PACNW	Qinqdao/tsingtao Fl	256,543,833
PACNW	Port Kelang FLOWS	254,881,000
PACNW	Kobe FLOWS	316,855,000
PACNW	Kaohsiung FLOWS	142,783,667
NORFOLK	Rotterdam FLOWS	1,459,124,333
MEXBORDER	MexicoRail FLOWS	98,872,329
SAO LUIZ	Port Said FLOWS	204,321,333

TOTAL SHIPMENTS EACH EXPORT PORT SUPPLY EQUAL TO TOTAL DEMAND

PORT	SHIPMENTS
NORFOLK	1,459,124,333
PACNW	1,229,572,667
SAO LUIZ	204,321,333
MEXBORDER	98,872,329
GULF	77,769,671
TOTAL	3,069,660,333

INCREASED SUPPLY COMPARISONS BY PORT

	BUSHELS	RECEIVING	OB FUNCT	SHIPPING	% of
	SHIPPED	PORTS		PORTS	OPTIMUM
OBJ. FUNC. OPTIMUM		NA	1,414,546,426	14	100.00%
FREE FLOW MIN OB FUN	NC.	NA	\$909,763,115	5	64.31%
PORT AREA					
PACNW	1,229,572,667	5	1,071,436,612	11	75.74%
NORFOLK	1,459,124,334	1	1,181,556,356	11	83.53%
TOLEDO	1,600,963,575	2	1,193,681,342	9	84.39%
WILMINGTON	1,571,741,025	2	1,209,231,725	10	85.49%
SAO LUIS	1,750,879,616	3	1,228,668,884	7	86.86%
DULUTH	1,530,416,408	2	1,264,948,161	11	89.42%
ILHEUS	1,662,801,475	3	1,285,310,761	10	90.86%
MANAUS	1,523,784,992	2	1,296,507,554	11	91.66%
GULF	2,347,021,157	7	1,309,631,950	11	92.58%
VITORIA	1,658,547,303	3	1,324,402,101	9	93.63%
PARA/SFDS/SAN	1,584,007,403	3	1,374,217,194	11	97.15%
RIO GRANDE	929,995,743	2	1,396,014,263	12	98.69%
ROSARIO AREA	766,480,669	3	1,414,419,356	13	99.99%
BAHIA BLANCA	17,927,059	1	1,414,546,426	14	100.00%

INCREASE SUPPLIES AT MANAUS 1000 MILES UP THE AMAZON

BASELINE	MAN300	MAN700	MAN800	MAN1000	MANALL
1,414,546,426	1,381,286,003	1,339,526,004	1,330,875,556	1,318,602,386	1,296,507,554
100.00%	97.65%	94.70%	94.08%	93.22%	91.66%
943,354,854	943,354,854	943,354,854	943,354,854	943,354,854	888,692,244
163,769,095	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095
47,956,032	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032
29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549
39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141
0	0	0	0	0	0
98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329
17,927,059	0	0	0	0	0
748,553,610	466,480,669	66,480,669	0	0	0
163,515,073	163,515,073	163,515,073	129,995,743	0	0
654,011,661	654,011,661	654,011,661	654,011,661	584,007,403	156,209,638
74,539,900	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900
24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462
22,928,952	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952
41,324,617	341,324,617	741,324,617	841,324,617	1,041,324,617	1,523,784,992
	SUBJECT PORT	Γ			
	DOMINATE-NO	LOSSES			
	LOSES VOLUM				
tod from the bott	om part of the Ar	awar tablaa fram i	the may 20, 22 m		
	In part of the Aff		uie illay20-23 lu		
	BASELINE 1,414,546,426 100.00% 943,354,854 163,769,095 47,956,032 29,222,549 39,553,141 0 0 98,872,329 17,927,059 748,553,610 163,515,073 654,011,661 74,539,900 24,131,462 22,928,952 41,324,617 ted from the bott	BASELINE MAN300 1,414,546,426 1,381,286,003 100.00% 97.65% 943,354,854 943,354,854 163,769,095 163,769,095 47,956,032 47,956,032 29,222,549 29,222,549 39,553,141 39,553,141 0 0 98,872,329 98,872,329 17,927,059 0 748,553,610 466,480,669 163,515,073 163,515,073 654,011,661 654,011,661 74,539,900 74,539,900 24,131,462 24,131,462 22,928,952 22,928,952 41,324,617 341,324,617 SUBJECT PORT DOMINATE-NO LOSES VOLUMI ted from the bottom part of the An	BASELINE MAN300 MAN700 1,414,546,426 1,381,286,003 1,339,526,004 100.00% 97.65% 94.70% 943,354,854 943,354,854 943,354,854 163,769,095 163,769,095 163,769,095 47,956,032 47,956,032 47,956,032 29,222,549 29,222,549 29,222,549 39,553,141 39,553,141 39,553,141 0 0 0 98,872,329 98,872,329 98,872,329 17,927,059 0 0 748,553,610 466,480,669 66,480,669 163,515,073 163,515,073 163,515,073 654,011,661 654,011,661 654,011,661 74,539,900 74,539,900 74,539,900 24,131,462 24,131,462 24,131,462 22,928,952 22,928,952 22,928,952 41,324,617 341,324,617 741,324,617 SUBJECT PORT DOMINATE-NO LOSSES LOSES VOLUME IoSES VOLUME	BASELINE MAN300 MAN700 MAN800 1,414,546,426 1,381,286,003 1,339,526,004 1,330,875,556 100.00% 97.65% 94.70% 94.08% 943,354,854 943,354,854 943,354,854 943,354,854 163,769,095 163,769,095 163,769,095 163,769,095 47,956,032 47,956,032 47,956,032 47,956,032 29,222,549 29,222,549 29,222,549 29,222,549 39,553,141 39,553,141 39,553,141 39,553,141 0 0 0 0 0 98,872,329 98,872,329 98,872,329 98,872,329 17,927,059 0 0 0 748,553,610 466,480,669 66,480,669 0 163,515,073 163,515,073 129,995,743 654,011,661 654,011,661 654,011,661 74,539,900 74,539,900 74,539,900 74,539,900 74,539,900 74,539,900 24,131,462 24,131,462 24,131,462 24,131,462 24,131,462	BASELINE MAN300 MAN700 MAN800 MAN1000 1,414,546,426 1,381,286,003 1,339,526,004 1,330,875,556 1,318,602,386 100.00% 97.65% 94.70% 94.08% 93.22% 943,354,854 943,354,854 943,354,854 943,354,854 943,354,854 943,354,854 163,769,095 163,769,095 163,769,095 163,769,095 163,769,095 163,769,095 47,956,032 47,956,032 47,956,032 47,956,032 47,956,032 47,956,032 29,222,549 29,222,549 29,222,549 29,222,549 29,222,549 29,222,549 39,553,141 39,553,141 39,553,141 39,553,141 39,553,141 39,553,141 0 0 0 0 0 0 0 98,872,329 98,872,329 98,872,329 98,872,329 98,872,329 98,872,329 17,927,059 0 0 0 0 0 654,011,661 654,011,661 654,001,661 584,007,403 74,539,900

INCREASE SUPPLIES AT SAO LUIZ IN NORTHEAST BRAZIL

	BASELINE	SAO LUIZ 100	SAO LUIZ 500	SAO LUIZ 1000	SAO LUIZ 1500	SAO LUIZ 1700	SAO LUIZ ALL
	1,414,546,426	1,398,486,629	1,339,105,414	1,276,227,342	1,232,962,056	1,229,110,707	1,228,668,884
PERCENT	100.00%	98.86%	94.67%	90.22%	87.16%	86.89%	86.86%
GULF	943,354,854	943,354,854	943,354,854	943,354,854	888,692,244	888,692,244	888,692,243
PACNW	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095
DULUTH	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032	27,950,662	0
TOLEDO	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549
NORFOLK	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141
WILMINGT	0	0	0	0	0	0	0
MEXBORD	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329
BAHIA							
BLANCA	17,927,059	0	0	0	0	0	0
ROSARI							
OAREA	748,553,610	666,480,669	266,480,669	0	0	0	0
RIO GRAN	163,515,073	163,515,073	163,515,073	0	0	0	0
PARA/SFD	654,011,661	654,011,661	654,011,661	584,007,403	156,209,638	0	0
VITORIA	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900
ILHEUS-S/	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462
SAO LUIZ	22,928,952	122,928,952	522,928,952	1,022,928,952	1,522,928,952	1,722,928,952	1,750,879,616
MANAUS	41,324,617	41,324,617	41,324,617	41,324,617	23,784,992	0	0
		SUBJECT POR	Т				
	DOMINATE-NO LOSSES						
		LOSES VOLUM	E				
This Tabl	in an antique to 1.6						
I his Table	is constructed fro	m the bottom pa	rt of the Answer	r tables from the i	may20-23 runs		

INCREASE SUPPLIES AT SELECTED PORTS

	BASELINE	DOUBLE GULF	DOUBLE PACNW	DBLGULF&PACNW	TOTALGULF&P	MANPACNWALL
	1,414,546,426	1,328,179,762	1,347,884,684	1,269,986,594	1,047,393,731	1,035,751,827
PERCENT OF BASE	100.00%	93.89%	95.29%	89.78%	74.04%	73.22%
GULF	943,354,854	1,886,709,708	943,354,854	1,886,709,708	1,461,558,686	77,769,672
PACNW	163,769,095	163,769,095	327,538,190	327,538,190	1,229,572,667	1,229,572,667
DULUTH	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032
TOLEDO	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549
NORFOLK	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141
WILMINGTON	0	0	0	0	0	0
MEXBORDER	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329
ROSARIOAREA	748,553,610	0	602,711,575	0	0	0
BAHIA BLANCA	17,927,059	0	0	0	0	0
PARA/SFDS/SAN	654,011,661	640,652,549	654,011,661	476,883,455	0	0
RIO GRANDE	163,515,073	0	163,515,073	0	0	0
VITORIA	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900	0
MANAUS	41,324,617	41,324,617	41,324,617	41,324,617	41,324,617	1,499,653,530
ILHEUS-SALVADOR	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462
SAO LUIZ	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952
		SUBJECT PORT				
		DOMINATE-NO LC	SSES			
		LOSES VOLUME				
This Table is constru	cted from the bot	tom part of the Δnsv	ver tables from the r	 may/20-23 runs		

INCREASE SUPPLIES AT SOUTH AMERICAN PORTS

	BASELINE	UNCONSTRAINED	BAHIA BLANCA	ROSARIOAREA	RIO GRANDE	PARA/SFDS/SAN	VITORIA	ILHEUS-SALVADOR	SAO LUIZ
	1,414,546,426	\$909,763,115	1,414,546,426	1,414,419,356	1,396,014,263	1,374,217,194	1,324,402,101	1,285,310,761	1,228,668,884
PERCENT OF BASELINE	100.00%	64.31%	100.00%	99.99%	98.69%	97.15%	93.63%	90.86%	86.86%
GULF	943,354,854	77,769,671	943,354,854	943,354,854	943,354,854	943,354,854	943,354,854	888,692,244	888,692,243
PACNW	163,769,095	1,229,572,667	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095	163,769,095
DULUTH	47,956,032	0	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032	47,956,032	0
TOLEDO	29,222,549	0	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549	29,222,549
NORFOLK	39,553,141	1,459,124,333	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141	39,553,141
WILMINGTON	0	1	0	0	0	0	0	0	0
MEXBORDER	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329
BAHIA BLANCA	17,927,059	0	17,927,059	0	0	0	0	0	0
ROSARIOAREA	748,553,610	0	748,553,610	766,480,669	0	0	0	0	0
RIO GRANDE	163,515,073	0	163,515,073	163,515,073	929,995,743	0	0	0	0
PARA/SFDS/SAN	654,011,661	0	654,011,661	654,011,661	654,011,661	1,584,007,403	0	0	0
VITORIA	74,539,900	0	74,539,900	74,539,900	74,539,900	74,539,900	1,658,547,303	74,539,900	74,539,900
ILHEUS-SALVADOR	24,131,462	0	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	1,662,801,475	24,131,462
SAO LUIZ	22,928,952	204,321,333	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952	1,750,879,616
MANAUS	41,324,617	0	41,324,617	41,324,617	41,324,617	41,324,617	41,324,617	41,324,617	0
	3,069,660,334								
		SUBJECT PORT							
	DOMINATÉ-NO LOSSES								
		LOSES VOLUME							
This Table is constructed from the	<u> </u>								
This Table is constructed from the bottom part of the Answer tables from the may20-23 run		5							

INCREASE SUPPLIES AT US PORTS

	BASELINE	UNCONSTRAINE	GULF	PACNW	DULUTH	TOLEDO	NORFOLK	WILMINGTON
	1,414,546,426	\$909,763,115	1,309,631,950	1,071,436,612	1,264,948,161	1,193,681,342	1,181,556,356	1,209,231,725
% OF BASELINE	100.00%	64.31%	92.58%	75.74%	89.42%	84.39%	83.53%	85.49%
GULF	943,354,854	77,769,671	2,347,021,157	943,354,854	888,692,243	888,692,243	927,449,964	888,692,243
PACNW	163,769,095	1,229,572,667	163,769,095	1,229,572,667	163,769,095	163,769,095	163,769,095	163,769,095
DULUTH	47,956,032	0	47,956,032	47,956,032	1,530,416,408	0	47,956,032	0
TOLEDO	29,222,549	0	29,222,549	29,222,549	29,222,549	1,600,963,575	29,222,549	29,222,549
NORFOLK	39,553,141	1,459,124,333	39,553,141	39,553,141	39,553,141	39,553,141	1,459,124,334	39,553,141
WILMINGTON	0	1	0	0	0	0	0	1,571,741,025
MEXBORDER	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329	98,872,329
BAHIA BLANCA	17,927,059	0	0	0	0	0	0	0
ROSARIOAREA	748,553,610	0	0	0	0	0	0	0
RIO GRANDE	163,515,073	0	0	0	0	0	0	0
PARA/SFDS/SAN	654,011,661	0	180,341,100	518,203,831	156,209,638	156,209,638	180,341,100	156,209,638
VITORIA	74,539,900	0	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900	74,539,900
ILHEUS-SALVADOR	24,131,462	0	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462	24,131,462
SAO LUIZ	22,928,952	204,321,333	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952	22,928,952
MANAUS	41,324,617	0	41,324,617	41,324,617	41,324,617	0	41,324,617	0
		SUBJECT PORT						
		DOMINATE-NO LO	DSSES					
		LOSES VOLUME						
This Table is constructed	from the better	nort of the Answer	tables from the	may 20, 22 mina				
				may20-23 runs				

FURTHER MODELING REQUIREMENTS

- Build 12-14 region Production and Transportation Model of US
- Add Argentine Production Regions
- Combine with Brazilian Model
- Refine Port Selection and Ocean rates
 Paranagua/Santos (Roundup-NonRoundup)

Add Lakesize or Capesize vessels

- Manaus/Itacoatiara 1000 miles up the Amazon is closer to most markets than most other SA Ports.
- Manaus is a long way from new SB production area.
- Sao Luiz is well located for worldwide shipments.
- Potential Sao Luiz Production area is limited.

- Brazil production may expand intensively near coast(FAS Study)
- •Argentina's SB production area is favorably located vis-a-vie it's ports
- •Argentina's ports are the most distant from SB markets

- US Soybean area is moving north and west
- PACNW ports are well positioned but protein and oil levels are measurably lower
- Duluth Shipments (Roundup)
- Jones Act is a major problem for US southeast markets

 Alternative to beans in US is corn Still has comparative advantage Higher yields than beans means more transportation infrastructure needed for exports!!



