

Soy Protein in Food Aid

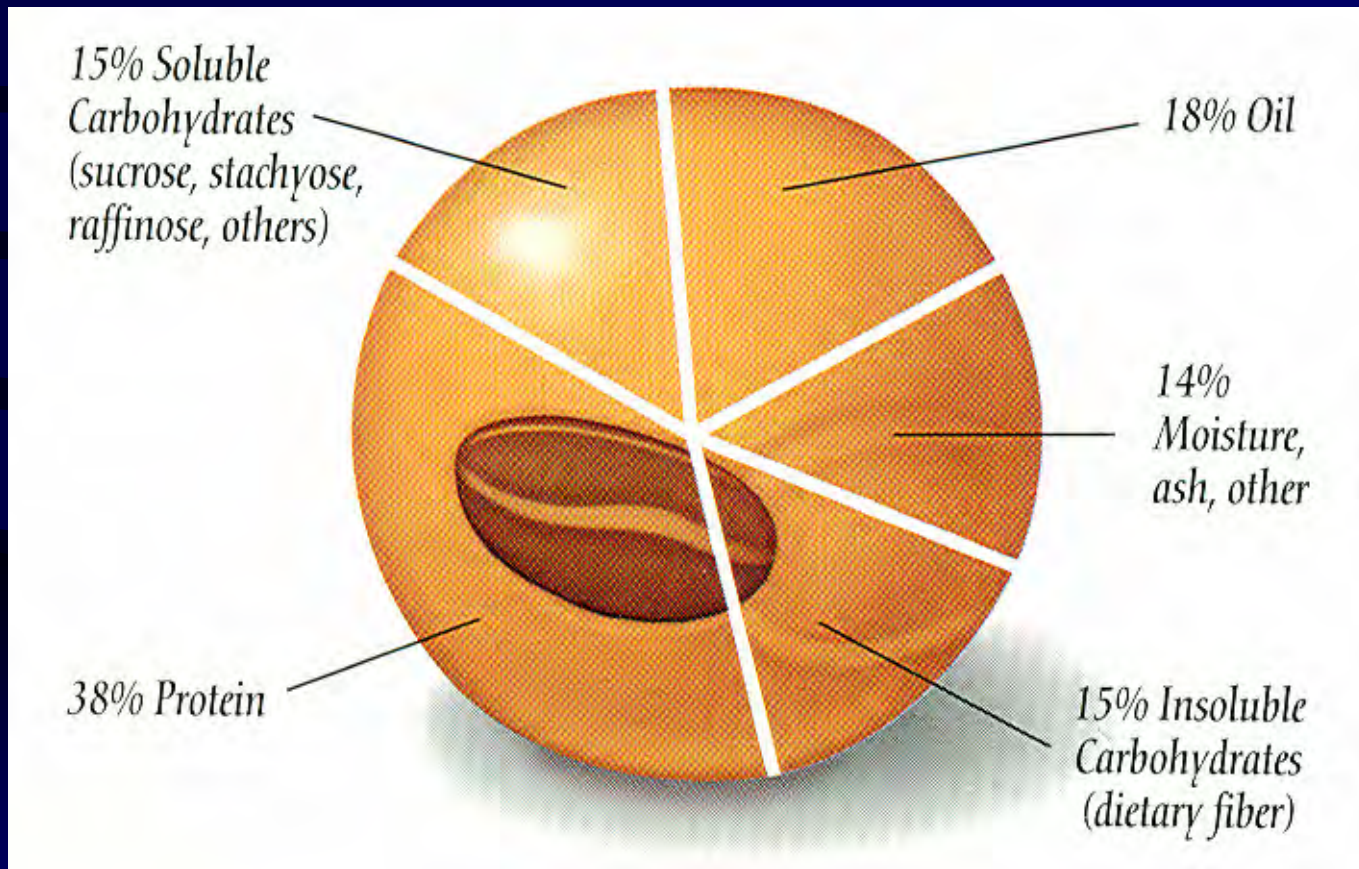
Unique Qualities
Economic Benefits
Cultural Acceptability

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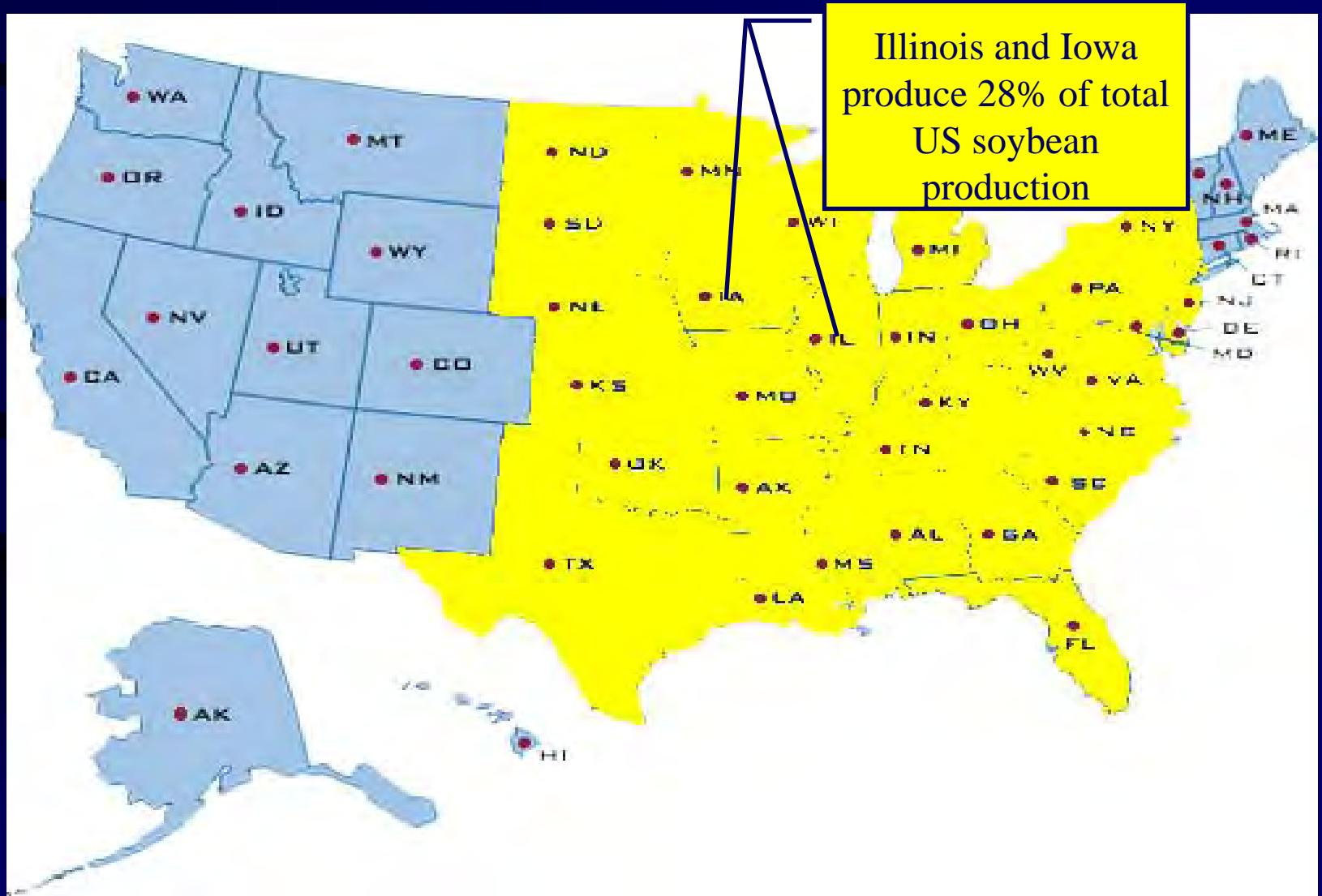
Soybean Composition



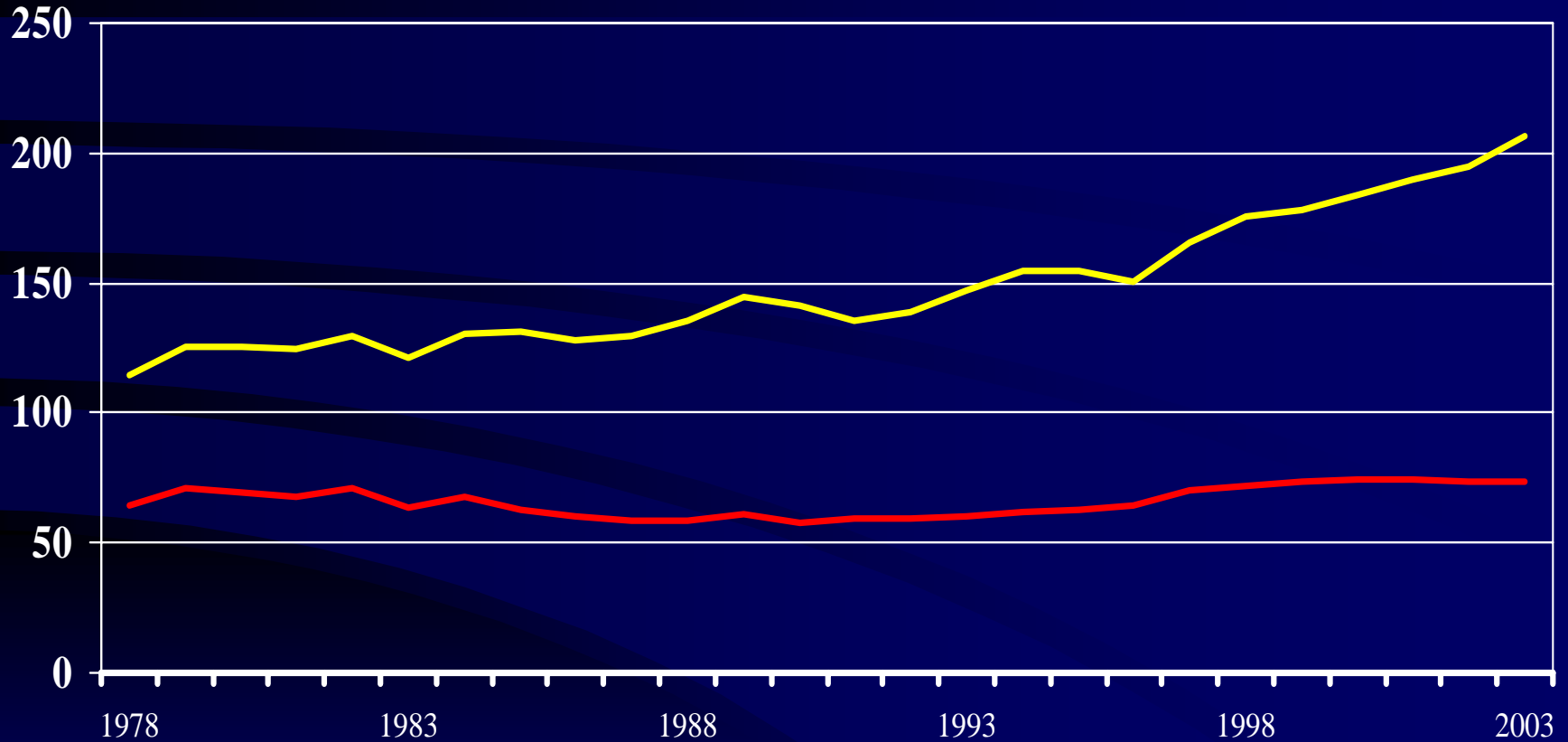
Soybean Consumption

- Oil
- Protein
 - Feed
 - Food
 - Traditional
 - Functional
- Hulls
 - Feed
- Industrial uses

U.S. Soybean Production

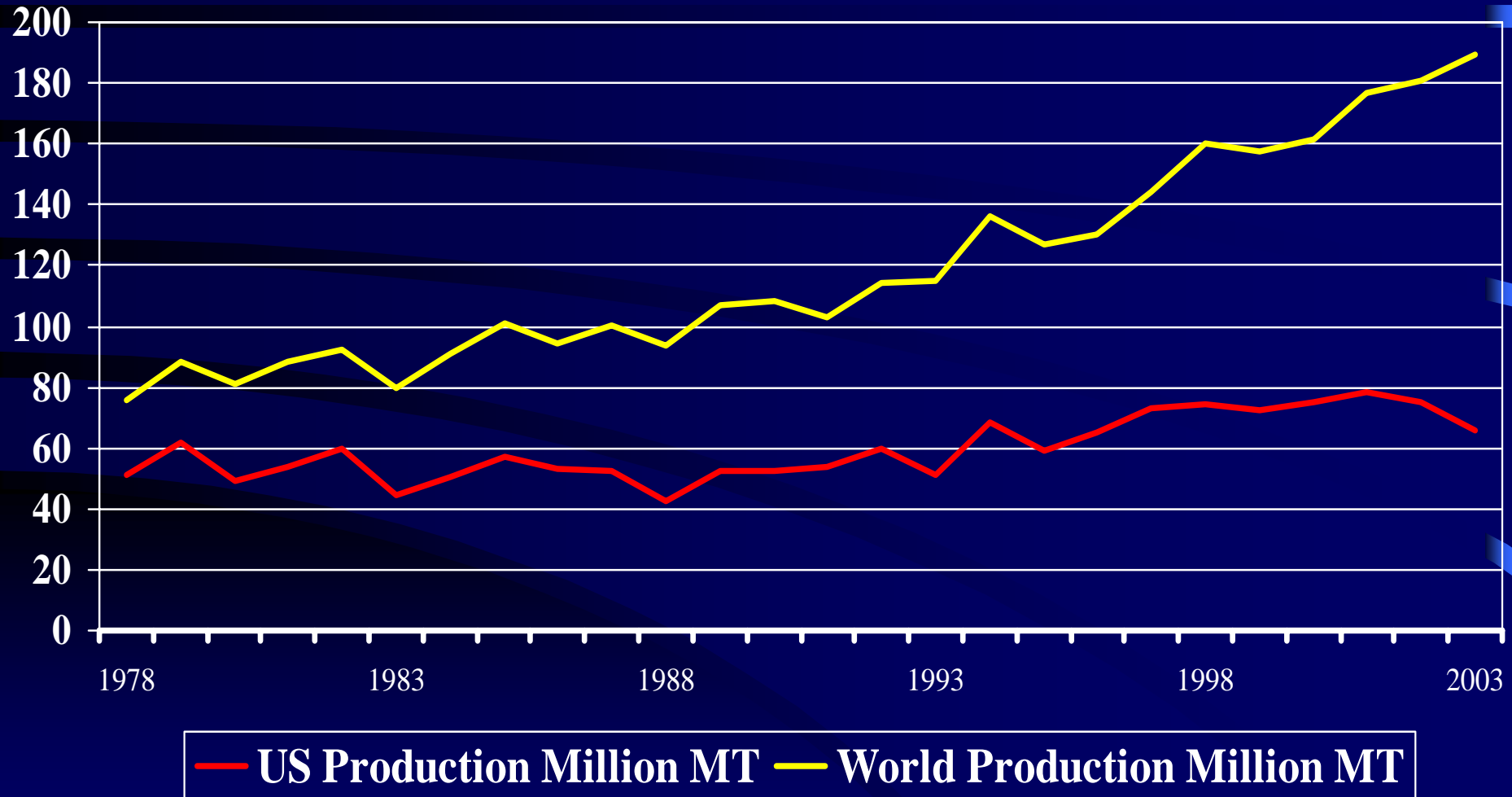


World Soybean Acreage

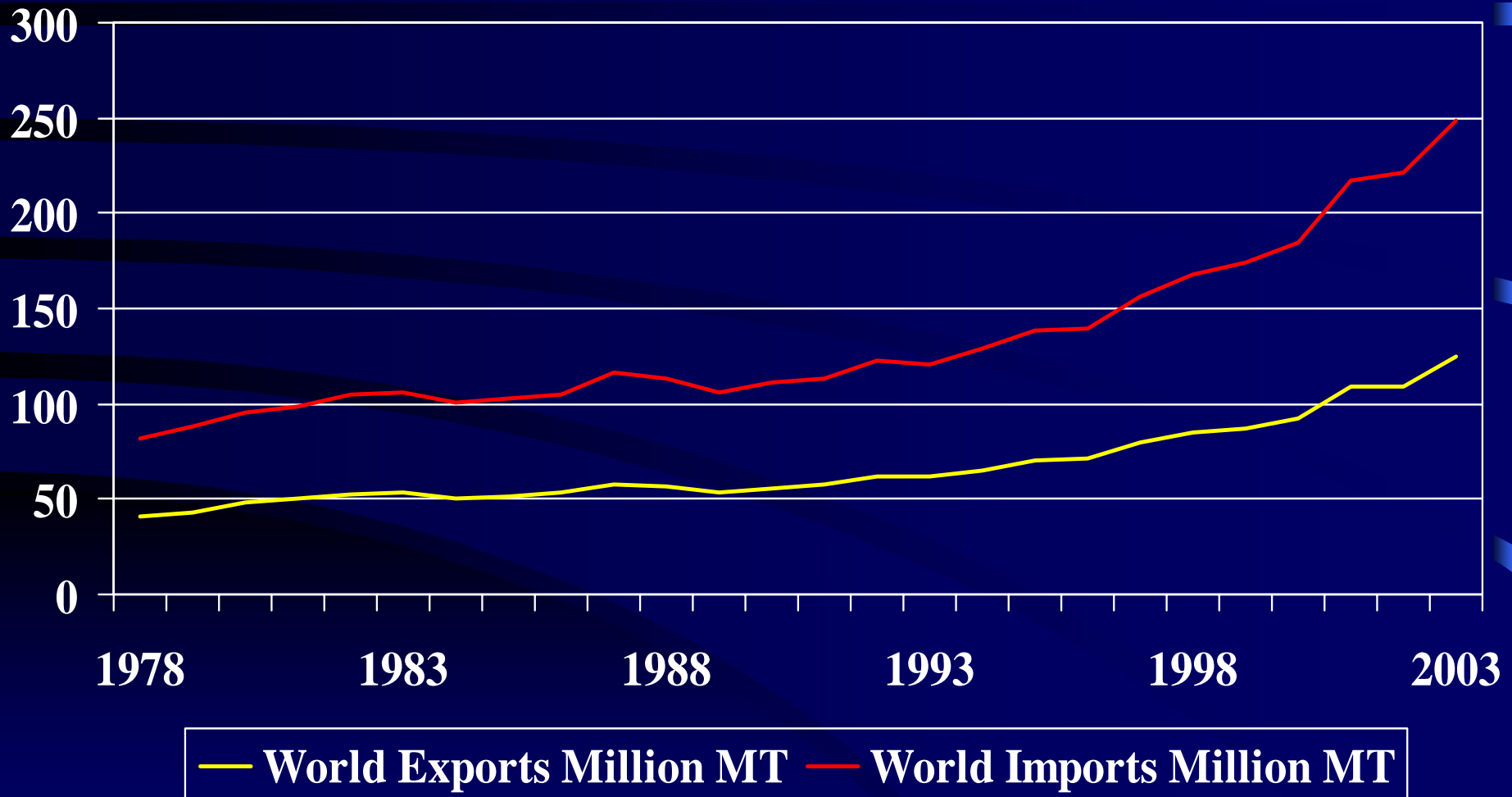


— Million Acres Planted US — Million Acres Planted World

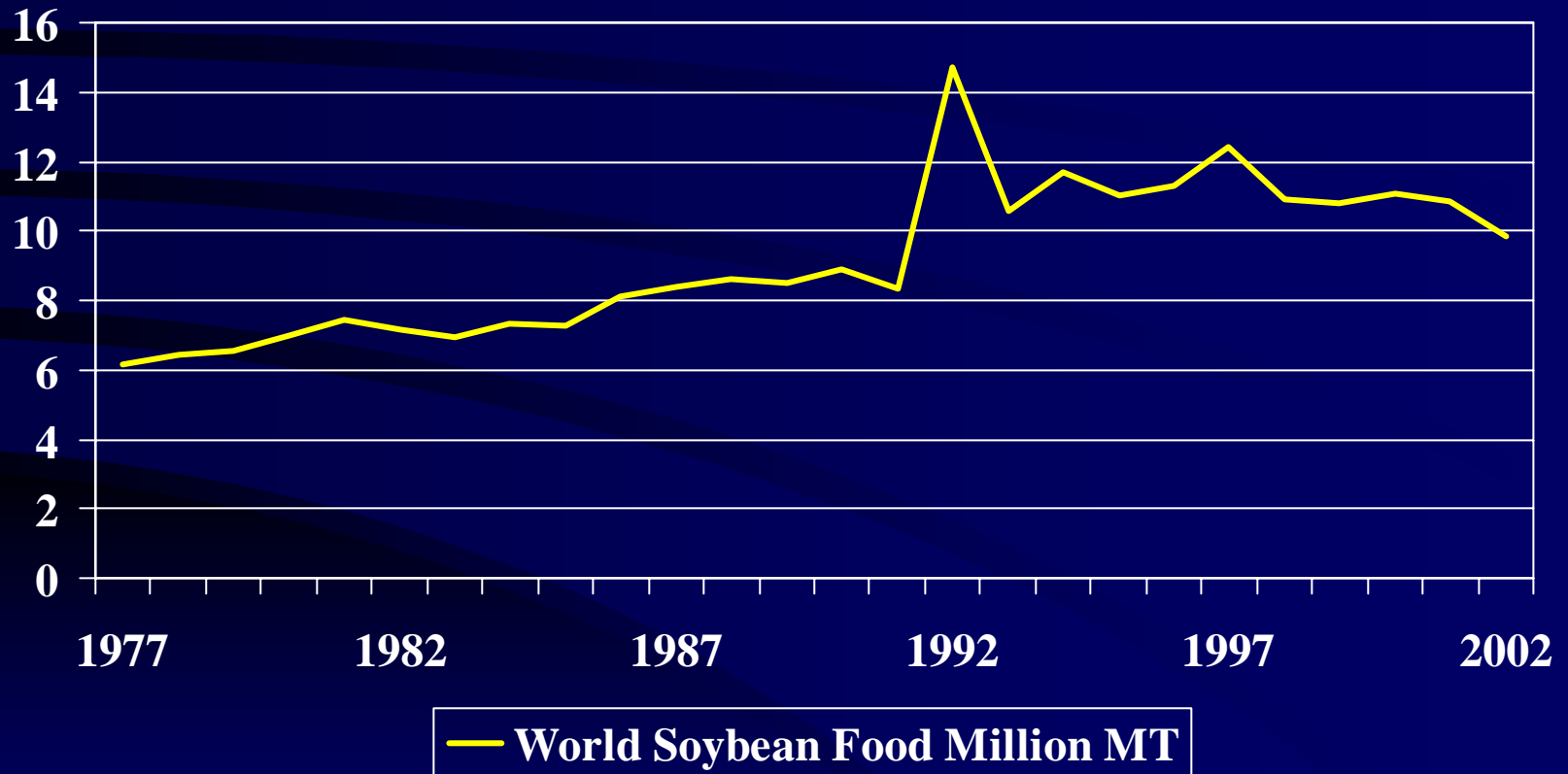
World Soybean Production



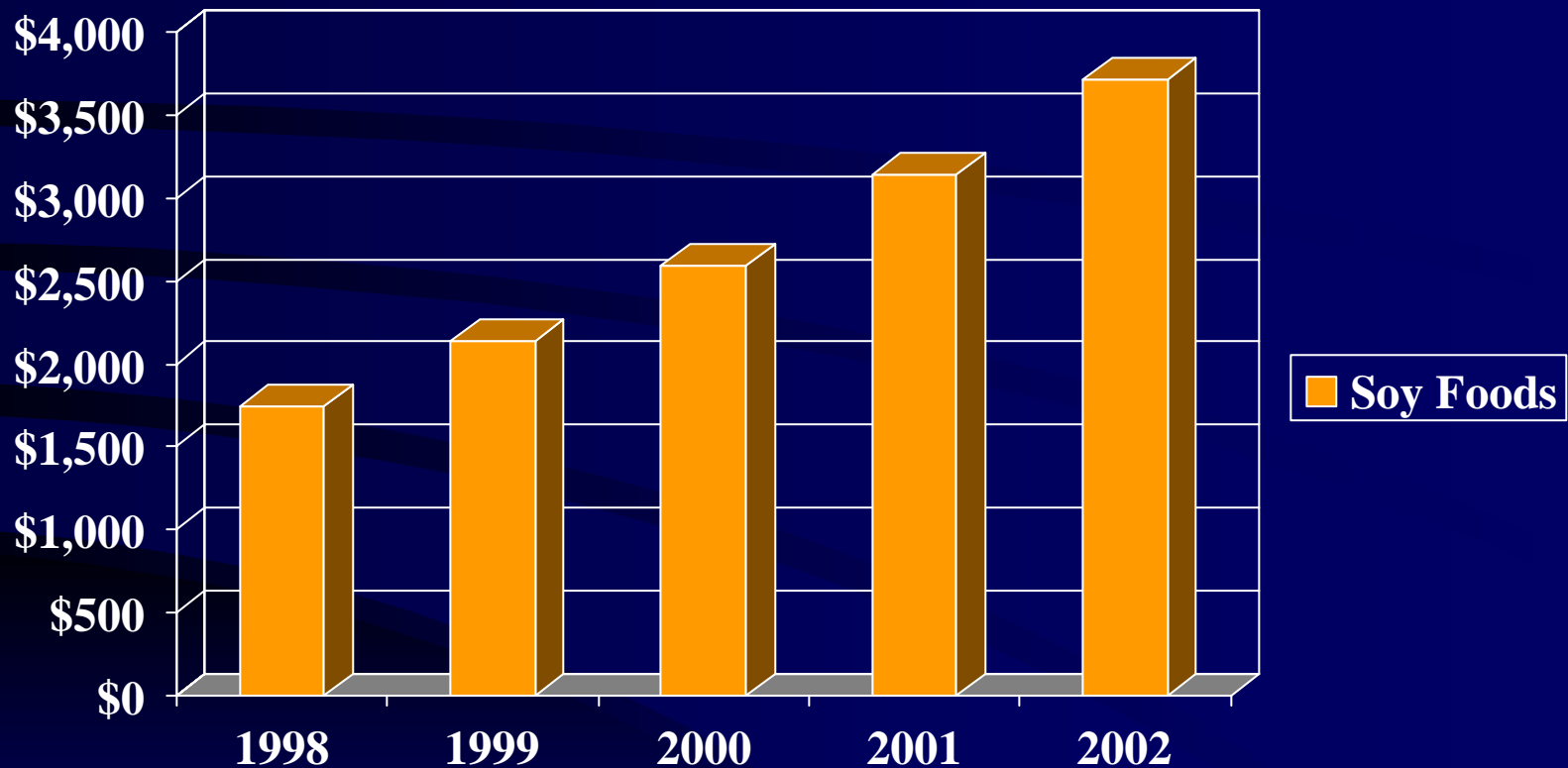
World Soy Exports and Imports



World Consumption of Soy Food (Million MT)



Increase in Soy Foods Consumption in the U.S.



Data adapted from Soyatech
Soyfoods Study

Unique Benefits of Soy Protein

- Broad Application
- Improved Food Products
- Health Benefits
- Higher Protein
- Better Protein

Applications

- Food Aid Programs
 - School lunch
 - Mother child health
 - Institutional feeding
 - Hospitals
 - Abandoned/orphaned children centers
 - Community kitchens
 - Emergency feeding



Improved Food Products

- Bland
- Absorbs flavor
- Conditions dough
- Emulsifies
- Increases whiteness
- Improves texture
- Retains moisture
- Absorbs fat
- Keeps product fresh for longer time



Health Benefits

- Cholesterol
- Hypertension
- Certain cancer
- Diabetes
- Kidney disease
- Menopause
- Osteoporosis
- Weight loss

Soy Health Claims

- Heart Health (October 1999)
 - Diets low in saturated fat and cholesterol that include 25 grams of soy protein a day may reduce the risk of heart disease.
 - A serving of soymilk has 7 grams of soy protein
- Qualified Cancer Claim (Pending)
 - Consumption of soy protein-based foods may reduce the risk of certain types of cancer, including breast, prostate and colon cancer, submitted by Solae in June 2004

Higher Protein

Commodity	Protein per 100 gms (in gms)	Calories per 100 gms (in Kcal)
Defatted Soy Flour	53	329
Textured Soy Protein	60.5	334
Wheat Flour	10.3	364
Corn meal	8.5	366
Rice	7.1	365
Wheat Soy Blend	21.5	355
Soy Bulgur	18.2	340
Corn Soy Blend	17.2	376
Lentils	28.1	338
Peas	24.6	341

Better Protein

Product	Protein Digestibility Corrected Amino Acid Score (PDCAAS)
Soy protein	0.90 -1.00
Whole wheat	0.4
Wheat gluten	0.25
Rice	0.47
Corn	0.42
Oats	0.57
Kidney bean	0.68
Chickpeas	0.71
Pea	0.73
Egg white	1.00
Beef	0.92

Economic Benefits of Soy Protein

- Lowest cost source of protein
- Food aid case studies
 - Corn based diets
 - Wheat based diets
 - Rice based diets

Reduced Cost

Product	Price (ton)	Price (pound protein)	Price (1000 Kcals)
Defatted Soy Flour (DSF)	\$307	\$0.26	\$0.09
Textured Soy Protein (TSP)	\$517	\$0.39	\$0.13
Wheat Flour	\$233	\$1.03	\$0.06
Corn Meal	\$173	\$0.92	\$0.05
Rice	\$277	\$1.77	\$0.08
Soy Bulgur	\$235	\$0.59	\$0.07
Wheat Soy Blend	\$241	\$0.90	\$0.08
Peas	\$240	\$0.44	\$0.07
Lentils	\$435	\$0.70	\$0.13

Case Studies

- Based on programmed food aid commodity mix
- Fortifying major staples
 - Rice
 - Corn
 - Wheat
- Soy fortification
 - Textured soy protein (TSP)
 - Defatted soy flour (DSF)
- Purpose
 - Improve taste
 - Increase protein
 - Reduce costs
 - Ensure cultural acceptability
- No negative impact on developmental objectives



Rice-based Diet

Table 1

	Quantity (g)	Price \$	Protein (g)	Energy (Kcal)
Basic Ration				
Rice	225	\$0.061	16	821
Beans	50	\$0.027	12	165
CSB	15	\$0.0043	3	56
Total		\$0.092	30	1042
Soy Alternative				
Rice	225	\$0.061	16	821
Beans	25	\$0.013	6	83
TSP	25	\$0.0077	15	100
CSB	15	\$0.0043	3	56
<i>Total</i>		<i>\$0.087</i>	<i>40</i>	<i>1060</i>
% Change		-6%	30%	2%

Corn-based Diet

Table 2

	Quantity (g)	Price \$	Protein (g)	Energy (Kcal)
Basic Ration				
Corn Meal	225	\$0.061	19	824
Beans	50	\$0.027	12	165
CSB	15	\$0.0043	3	56
<i>Total</i>		<i>\$0.092</i>	<i>34</i>	<i>1045</i>
Soy Alternative				
Corn Meal	200	\$0.05	17	732
Beans	25	\$0.013	6	83
DSF	25	\$0.0077	13	82
TSP	25	\$0.0077	15	100
CSB	15	\$0.0043	3	56
<i>Total</i>		<i>\$0.087</i>	<i>54</i>	<i>1053</i>
<i>% Change</i>		<i>-5%</i>	<i>61%</i>	<i>1%</i>

Wheat-based Diet

Table 3

	Quantity (g)	Price \$	Protein (g)	Energy (Kcal)
Basic Ration				
Wheat Flour	225	\$0.055	23	819
Beans	50	\$0.027	12	165
CSB	15	\$0.0043	3	56
Total		\$0.086	38	1040
Soy Alternative				
Wheat Flour	200	\$0.049	21	728
Beans	25	\$0.013	6	83
DSF	25	\$0.0077	13	82
TSP	25	\$0.0077	15	100
CSB	15	\$0.0043	3	56
Total		\$0.082	58	1049
<i>% Change</i>		<i>-5%</i>	<i>53%</i>	<i>1%</i>

Other Costs

- Education
 - Decision makers
 - Implementers
- Training needs
 - Food preparers
- Unfamiliar foods?
 - Not a hurdle
- Consumer awareness
 - Incorporated in the existing education efforts

Cultural Acceptability

- Haiti
- Honduras
- Senegal
- Tajikistan

Haiti

- HIV/AIDS nutrition program
- Local Partner: Espoire Anaise
- 300 families with at least one PLWHA
- TSP and DSF
- Nutrition education and food technology training
- 106 (52 male, 54 female) participated in survey



Haiti

Before Eating a Dish

Taste	91%	Like extremely
Soy Healthy (y/n)	100%	yes
Corn Healthy (y/n)	100%	yes

After Eating a Dish

Look	31%	like
	69%	like extremely
Taste	18%	like
	82%	like extremely
Texture	22%	like
	78%	like extremely
Overall Opinion	18%	like
	82%	like extremely

Consumption Amount

None	--
Some	--
Half	7%
Most	25%
All	68%

Honduras

- Four projects:
 - HIV/AIDS (IMANAS)
 - Mother Child Care (Hogasa)
 - School lunch
 - Capacity building
 - Zamarano training
- Commercial markets
- Funded by Cargill, ISPOB, U of I



Honduras

- Mother-Child Care Program (Hogasa)
- 90%+ adults, 84% children preferred soy enhanced to regular dishes
- No problem in using or storing soy
- Recipes modified regularly to include available ingredients
- Health benefits of soy well understood
- Beneficiaries reactions
 - Feel healthier
 - Can do more work
 - Children look healthier
 - Without soy food will be lacking in nutrition
 - Increased diversity in foods
- No negative impact on developmental objectives

Honduras

- HIV/AIDS (IMANAS)
- 10 lbs TSP and DSF per family/month
- Survey after 9 months of distribution
- 92.7% beneficiaries found soy protein products highly acceptable
- Higher preference for TSP because of ease of use and multiple applications
- Health benefits of soy well understood
- No problem in using or storing soy

Senegal

- **Counterpart International Fouta-Toro Project for Education and Food Security**
- **Five schools**

School	Number of Girls	Number of Boys	Total Students
Gamadji Sare	136	124	260
Doubangue	43	32	75
Gawdi Gotti	50	42	92
Madina fresbe	63	33	96
Lerabe	99	63	162
Total	391	294	685

Senegal

- Consumer acceptance surveys
 - June 2003 (123 surveys taken)
 - November 2003 (133 surveys taken)
- Counterpart staff conducted surveys
- Children, cooks and teachers surveyed



June 2003 Survey

- Children:
 - 93% of children ate all or most of soy enhanced dish
 - 88% of children strongly liked the taste of soy
- Food Preparers
 - 100% of food preparers found it easier to cook with soy compared to other foods
 - Required less time, less water, less heat, less firewood and burnt less than food without soy
- Teachers
 - 94% of teachers liked extremely the taste of soy
 - 100% of teachers would eat soy again

November 2003 Survey

- Children
 - 98% of children ate all or most of the dish at mealtime
 - 85% of children liked extremely the taste of soy
- Food Preparers
 - 95% of food preparers liked extremely the tomato sauce with TSP
 - 100% of food preparers found it easier to cook with soy compared to other foods
 - Required less time, less water, less heat, less firewood, and burnt less than food without soy
- Teachers
 - 88% of teachers liked extremely the taste of soy
 - 100% of teachers would eat soy again

Tajikistan

- Introduced soy fortified wheat flour (SFWF)
 - 12% defatted soy flour
 - 87% wheat flour
 - 1% vitamin-mineral pre-mix

Consumer reactions

- Preferred to wheat bread
- Well accepted
 - Ease of use
 - Cultural adaptability
 - Better functionality

