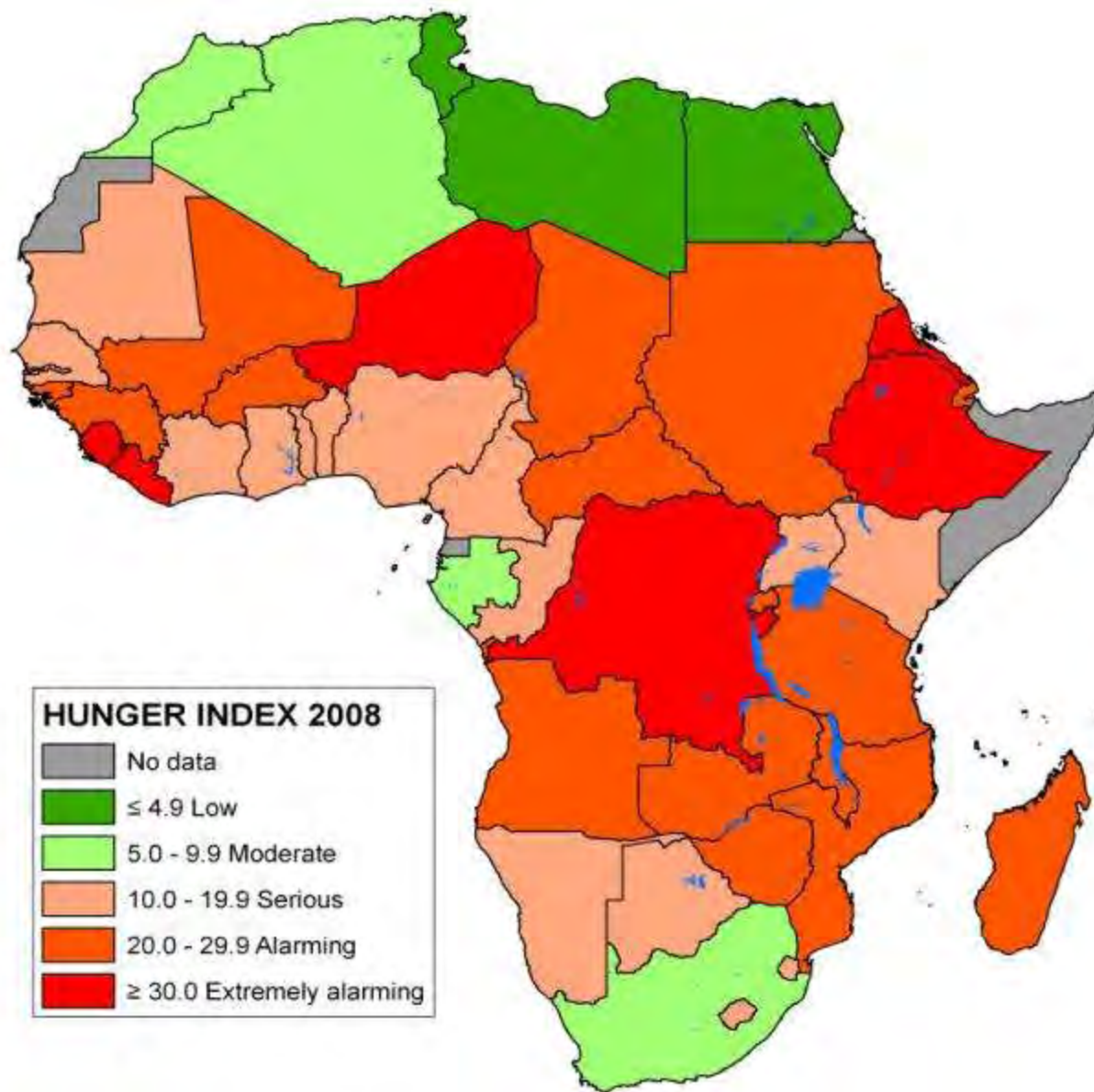


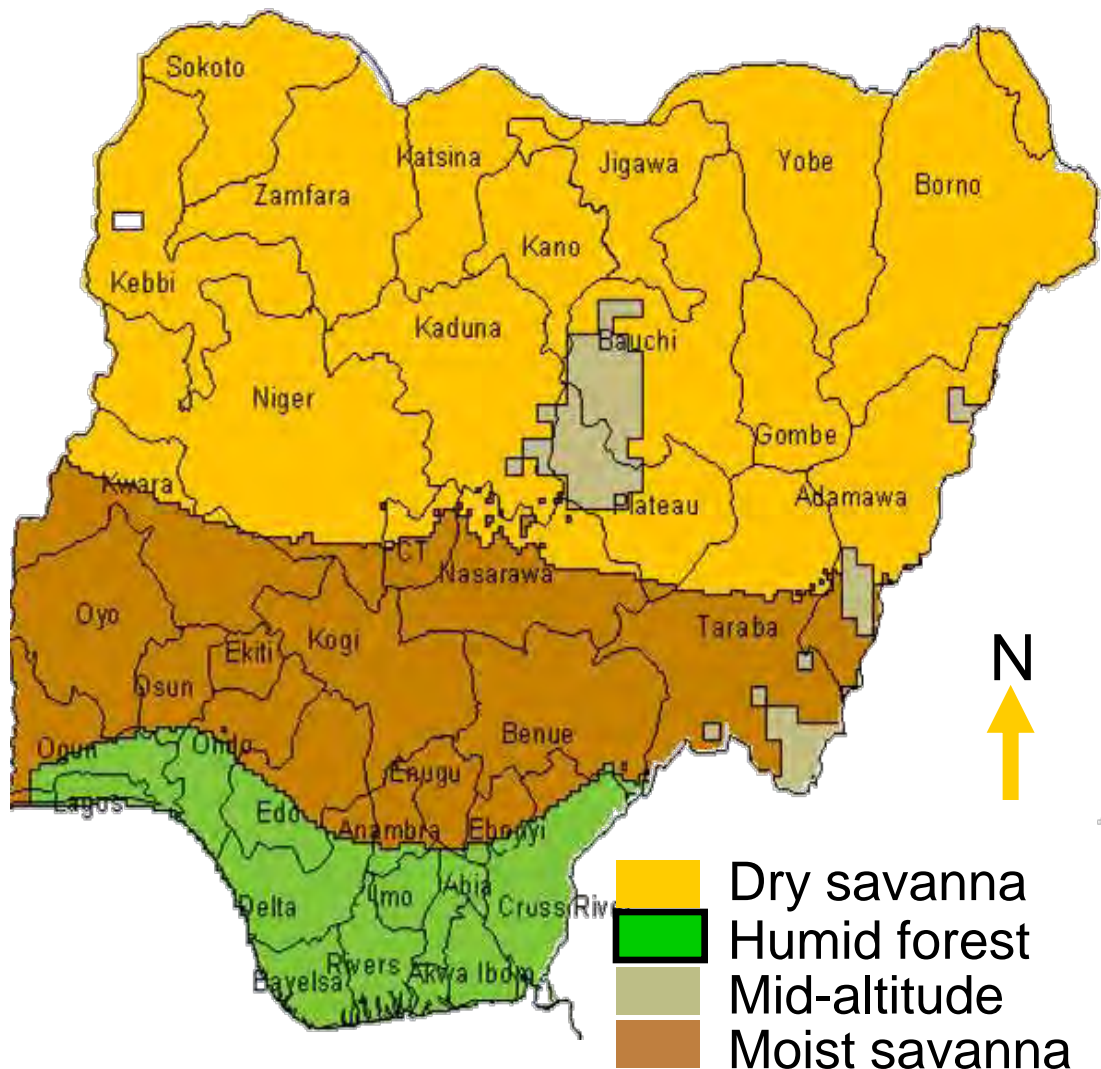
A Place for Soy in Nutrition and Agricultural Development

Busie Maziya-Dixon

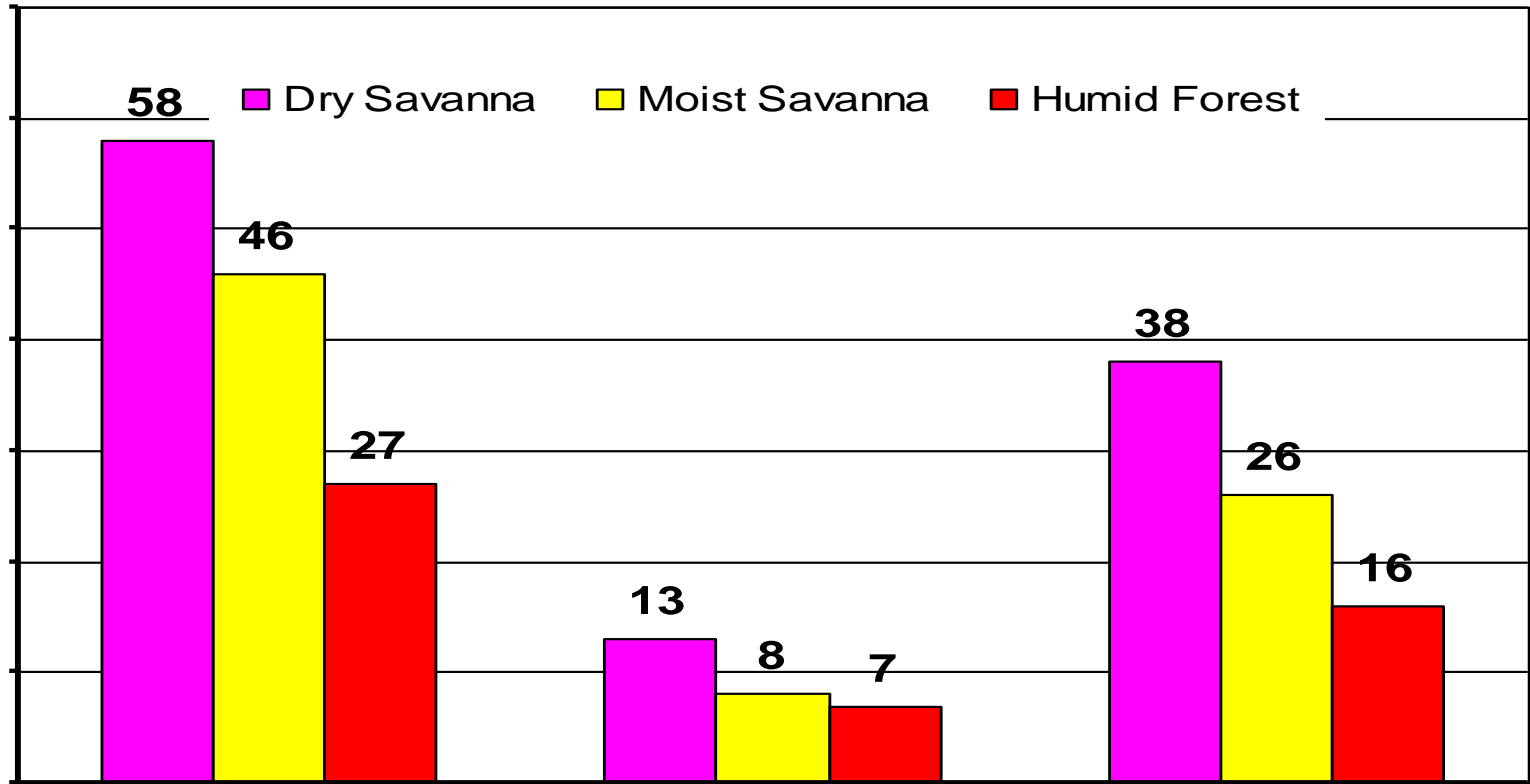


Nigeria Food consumption and nutrition survey

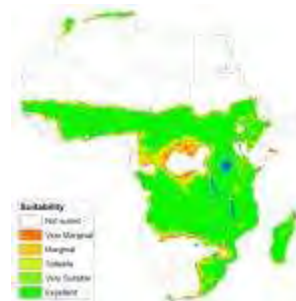
- Based on the agro ecological zones and principal food crops concept
- Crops grown and foods consumed
- Types of foods consumed and nutritional deficiencies
- National representative sample size



Prevalence of malnutrition among children 0-59 months in Nigeria by agroecological zone



- Nationally, chronic under nutrition (stunting) was the major form of malnutrition (42%)
- Followed by underweight at 25% and wasting at 9%



Soybean Production in Africa

Country	Acreage (ha)
Nigeria	601,000
South Africa	150,000
Uganda	144,000
Malawi	68,000
Zimbabwe	61,000
Rwanda	42,160
Democratic Republic of Congo	30,000
Zambia	15,000

Source: FAO, 2005

Improved varieties

- 17 improved varieties officially released by national agricultural research and extension systems in West and Central Africa
- Show considerable increases in grain and fodder yields
- Improving soil fertility in the savannas
- Enhancing the yield of subsequent crops such as maize and sorghum

Role of soybean in cropping systems in the savanna

- The effect of previous soybean crop on maize grain yield in a rotation arises due to residual N availability either from the roots, fallen plant parts of soybean or nitrate-sparing effect
- Sanginga *et al.* (1997) estimated a net contribution of 18 kg N/ha to soil on the average after grain removal and it ranged from -8 to 43 kg N/ha depending on the soybean line grown
- Further study by Sanginga *et al.* (2002) substantiated the beneficial effect of soybean to maize; 1.2 – 2.3-fold increase in maize yield when grown after soybean as compared to maize after maize

Role of soybean in cropping systems in the savanna

- On-farm study in southern Guinea savanna using TGx 1456-2E and TGx 1660-19F indicated that these lines fixed 39-54% of their total N requirement that amounted to 56-70 kg N/ha in TGx 1456-2E and 51-78 kg N/ha in TGx 1660-19F (Osunde *et al.*, 2003)
- A maize grain yield of 3 t/ha was reported by these workers indicating the tremendous contribution from a 2-year soybean rotation
- They recommended growing of promiscuous soybeans in rotation with maize even without the residues of soybean being returned to the farm land

Soybean in Nigeria

- Introduced by the British in 1908 for new sources of supply at Moor Plantation, Ibadan
- 1928 successfully introduced at Samaru, Zaria
- European demand for oilseeds during World War II, expansion in acreage and in 1947 the first exports of 9 tonnes were recorded
- Yields reached 1,100 kg/ha

Soybean in Nigeria

- Became a cash crop in the Benue Valley which became the leading area of production
- Grown in mixed cultivation with sorghum, millet, and citrus
- Most were exported as a cash crop to Europe, with a small amount fed locally to animals, a small portion used as food in the northern States (Ashaye, 1975)
- Onochie (1965) investigated the use of soyfoods in Nigeria and suggested soybeans be mixed with a paste of cowpeas to make *olele* and *akara*

Soybean in Nigeria

- Fortify wheat flour in Bread
- Made into soymilk, which could then be used in traditional recipes
- Akinrele (1966) and Oke (1967) recommended its use as a fortifier for *ogi*
- Ashaye and colleagues (1975) reported that various ethnic groups have discovered that when pounded to a powder:
 - it can be used in the place of melon to thicken a soup
 - locust bean to make *daddawa*



Promoting
Soybean
Processing and
utilization

- IITA began soybean improvement research in 1974
- Average yield per hectare in Africa was 660 kg/ha
- Total production was only 0.2 million tons
- Using IITA-developed varieties, the average yields in West Africa today is 1.1 t/ha
- Nigeria has the highest 6-year (2000-2005) average production of 486,000 tons on an area of 553,260 ha

Promoting Soybean Processing and Utilization



- Improve nutrition and create demand, IITA and its partners began the development of small-scale and home level processing technologies in 1985
- Successfully used to increase the protein content of traditional foods
- New products were developed and promoted
- Over 25,000 people in rural areas were trained

Promoting Soybean Processing and Utilization



- The number of farmers growing soybean in target villages increased by 35%
- Impact study conducted in 4 states showed:
 - Markets had increased from 2 in 1987 to 42 in 1993
 - Retailers from 4 to 824
 - Benue State: more women involvement in production
 - Improved varieties: 9% of farmers in 1989 to 75% in 1997 on 30% of the area planted to soybean

Nutritional analysis

- Soybean oil
 - 61% polyunsaturated and 24% monosaturated fat
 - Contains no cholesterol
 - Polyunsaturated fats in the diet shown to lower cholesterol levels
 - Rich in the essential polyunsaturated fatty acids
linoleic and linolenic (precursors to hormones)

Nutritional analysis



SOY OGI



SOY VEGETARIAN PIZZA

- Soy protein
 - Higher in protein content than other legumes and many animal products
 - Quality of the protein is highly notable and approaches the quality of meat and milk
 - Defatted soy flours are about 86% protein and are low in moisture

Nutritional analysis



- Soy fiber
 - Contains both soluble and insoluble fiber

 - Soluble fiber may help lower cholesterol and control blood sugar

 - Insoluble fiber increases stool bulk, may prevent colon cancer, and can help relieve symptoms of several digestive disorders

Nutritional content of a serving of soybean products

Food Product	Calories	Protein	CHO	Fat	Measure
Mature Soybeans (yellow), cooked	149	14.3	8.5	7.7	1/2 cup (86 g)
Soybeans, green	127	11.1	10.0	5.8	1/2 cup (90 g)
Soy flour, defatted	82	11.8	9.6	0.3	1/4 cup (25 g)
Soymilk	100	7.0	8.0	4.0	1 cup (245 g)

Soy's nutritional value for people with HIV/AIDS

- Poor nutrition increases the risk and progression of disease. In turn, disease exacerbates malnutrition.
- Protein requirements of HIV-infected persons jump to 50-100% higher than for uninfected persons.
- Soy protein and adequate calories can help to prevent body from wasting, which is often associated with HIV/AIDS.
- Soy plays a role in nutritional maintenance, an essential feature of optimal effectiveness of medicine while helping to minimize nutrition-related side effects.

Why should we
continue
promoting
soybean



- Nutritive value
 - High content of good quality protein
 - High content of essential minerals and vitamins
 - Good source of essential fatty acids

- Economic benefits
 - Cash crop of high economic value to farmers

- Industrial raw material
 - Oil industry
 - Livestock and poultry industry

Constraints to soybean production

- Seed production and distribution
- Pod shattering especially in the hot dry savanna environment
- Diseases such as rust, red leaf blotch, bacterial blight among others
- Insects and pests such as pod sucking and defoliating insects
- Lack of varieties tolerant to midseason moisture loss
- Lack of high yielding varieties tolerant to low phosphorus
- Lack of market and processing knowledge for home consumption

Constraints and challenges for utilization

- Novelty and inertia to change
- Cannot be cooked and eaten like any other bean
 - Long cooking time
 - Unpalatability or beany/rancid flavor
- The egg and chicken scenario
 - No utilization, cultivation dies
 - No beans on the open market, utilization dies

Constraints and challenges for utilization

- Inadequate knowledge of appropriate processing
- Presence of anti-nutritional factors
 - Heat labile such as trypsin inhibitors, lipoxidase enzymes, goitrogens, phytates
 - Heat stable factors such as flatulence factors, saponins, isoflavones

Conclusion



- Soybean has a great potential in the development of three key sectors of the economy
 - Health
 - Agriculture
 - Industry

- There is however the need for more research and development activities if the full potential of soybean is to be realized in Nigeria

- Provides good opportunities for small-holder farmers in Nigeria

Conclusion



➤ Considerable potential

- Improving declining soil fertility
- Enhancing household nutrition security
- Raising rural incomes as an important cash crop
- Raw material for the local food and feed production industries
- Reducing poverty



THANK YOU