

A photograph of a soybean field with mature, yellowish-brown pods hanging from the stems against a clear blue sky. The pods are in sharp focus in the foreground and background, with a green semi-transparent box overlaid in the center containing the title text.

Soybeans Around the Globe

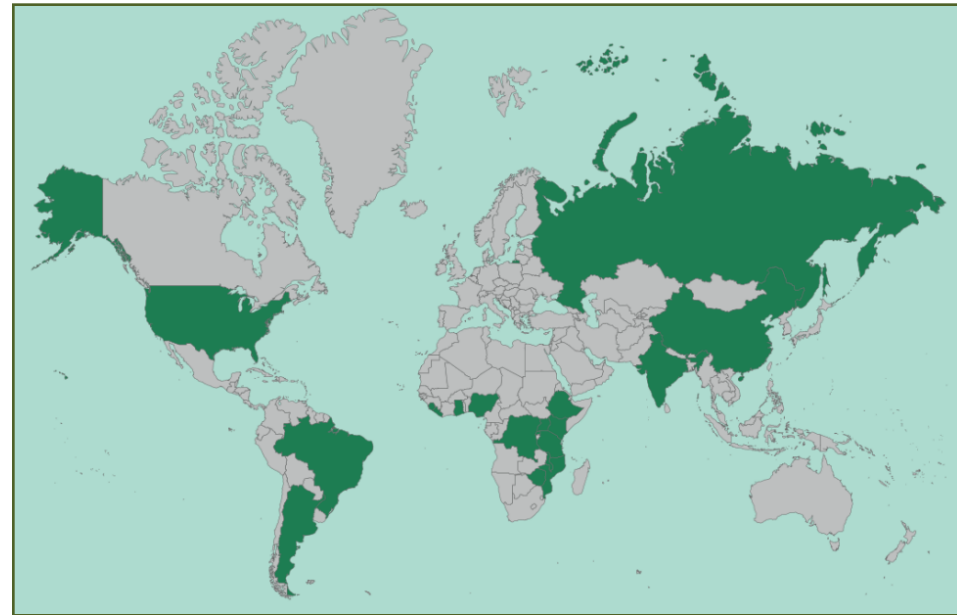
WG8

**Nutrient Decision Support for
Soybean Systems**

**Buenos Aires, Argentina
June 25th, 2014**

Regions reporting

- Brazil
- China
- Latin America Southern Cone (Argentina, Bolivia, Paraguay, and Uruguay)
- North America (Alabama, Arkansas, and Kansas)
- Southern & Eastern Russia
- Sub-Saharan Africa (Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Zimbabwe, Ethiopia, Uganda, Tanzania, Liberia and Sierra Leone)
- South Asia



Questionnaire

A) Cropping System

1. What kind of agricultural system soybean is included in?
2. What is the main soybean use for?
3. What is the current average grain yield?
4. What is the grain yield record?
5. What is the predominant soil management?
6. What is the predominant production system?

B) Crop Management

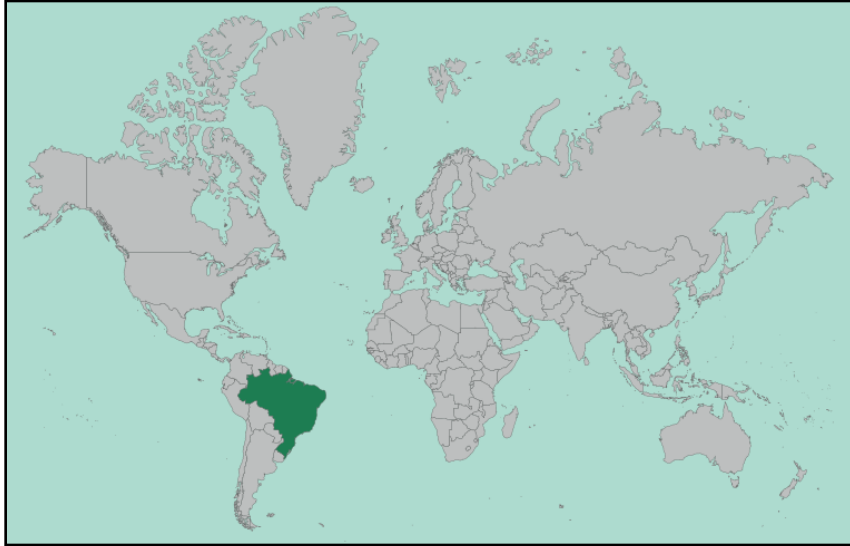
1. What is the relative maturity grown?
2. What is the average life cycle in days?
3. What are the GMO traits available?
4. What is the plant population used?
5. What is the plant arrangement?
6. What is the row spacing?
7. How is soybean planted?
8. How is the date of planting determined?
9. What is the plant protection program?
10. Is any plant regulator used? If so, product, rate, and timing?

Questionnaire

C) Soil and Nutrient Management

1. What is the average soil pH?
2. How often is liming done?
3. What is the average lime rate?
4. How is lime applied?
5. Is livestock manure applied? If so, type and rate?
6. How is fertilizer applied?
7. What are the fertilizer P and K rates?
8. When are P and K fertilizers applied?
9. P and K rates are recommended on?
10. What are the major P and K sources?
11. Is S applied? What source, rate, and timing of application?
12. How are micronutrients (B, Co, Cu, Fe, Mn, Mo, Zn) managed?
Source, rate, and timing of application?
13. Are seeds inoculated? What is the rate of inoculant?
14. Is N applied? What source, rate, and timing of application?

Brazil



Brazil

Cropping System

- ✓ Mechanized agriculture
- ✓ Mainly exported as grain, but also crashed for oil and meal
- ✓ No tillage is predominant
- ✓ Rotation with maize, wheat, sorghum, sunflower, cotton, rice, or continuous soybean followed by cover crops
- ✓ Average grain yield is 3.0 t/ha (range of 2.4 to 3.2 t/ha)
- ✓ Grain yield record is 7.0 t/ha

Crop Management

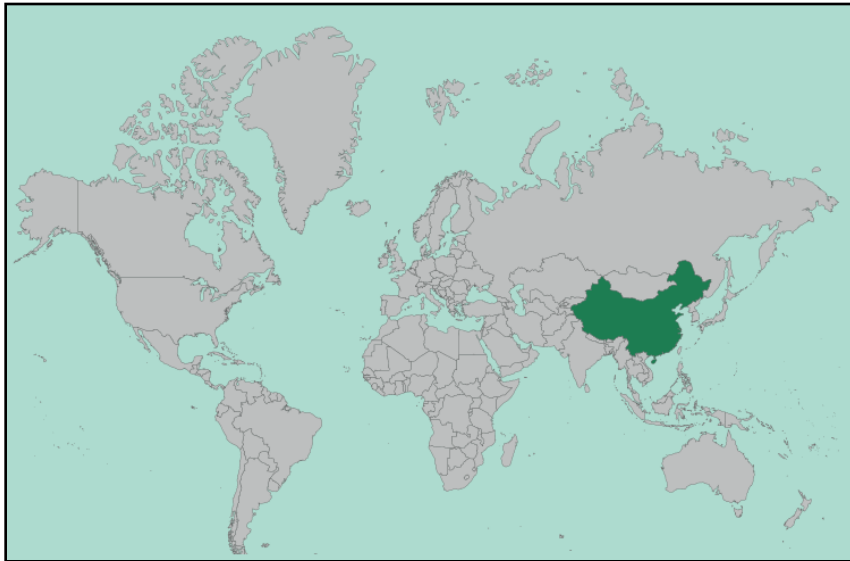
- ✓ Relative maturity: 6 to 8
- ✓ Life cycle: 90 to 130 days
- ✓ Traits: RR, SCN, Intacta
- ✓ Plant population of 200 to 400 thousand
- ✓ Single rows
- ✓ Row spacing of 50 cm
- ✓ Mechanical planter
- ✓ Planting date:
 - ✓ Midwest: Sep-Nov
 - ✓ North: Dec-Jan
 - ✓ South: Oct-Nov
- ✓ Herbicides, insecticides, and fungicides are commonly applied
- ✓ No growth regulator

Brazil

Soil and Nutrient Management

- ✓ Soil pH: 5.4-5.8 (Midwest) and 5.5-6.0 (South)
- ✓ Liming is done every 3-4 years at 1.5-3.0 t/ha on surface (starting operation with 4.0-7.0 t/ha)
- ✓ No manure applied (only close to poultry or swine operations)
- ✓ Fertilizer is applied in furrow at planting or on surface pre-planting and recommended based on soil test (mainly) or tradition
- ✓ PK rates are:
 - ✓ P: 20 to 40 kg P/ha via SSP, STP, MAP or blends
 - ✓ K: 60 to 80 kg K/ha via KCl
- ✓ S is applied via SSP or S_0 at 10 to 20 kg S/ha
- ✓ Micronutrients: Co and Mo (seeds), and Mn (foliar)
- ✓ Seeds are inoculated mostly every year with 1,200,000 cels/seed
- ✓ N is not recommended, but is being tested at 20-30 kg/ha

China



China

Cropping System

- ✓ Mechanized agriculture in Northeast and small holders in South and Huang Huai Hai Plan
- ✓ For domestic use as oil and meal
- ✓ No tillage in South and Huang Huai Hai Plan and shallow ploughing/deep digging in Northeast
- ✓ Continuous soybean in Northeast and intercropping with maize, tea or fruits in South
- ✓ Current average yield:
 - ✓ Northeast, Northwest, and Huang Huai Hai Plain (2.8 t/ha)
 - ✓ South (2.2 t/ha)
 - ✓ Grain yield record: 4.4 t/ha (Northeast)

Crop Management

- Relative maturity: 90 to 130 days
- Average life cycle: 150 days
- No traits available
- Plant population of over 400 thousand
- Single and double rows
- Row spacing of 30-35 cm
- Use of mechanical planter
- Planting when soil T > 10 C
- Some herbicide and insecticide use
- No growth regulator use

China

Soil and Nutrient Management

- Soil pH:
- 5.0-6.0 (Northeast)
- 7.5 (Huang Huai Hai)
- Liming is rarely done
- No manure applied
- Fertilizer is applied to the side of the seed row at planting and recommended based on soil test
- PK rates are: 28-32 kg P/ha + 30-40 kg K/ha
- No S is applied
- Micronutrients are rarely applied: B or Mo at R₂ via foliar
- Seeds are rarely inoculated
- N is applied via urea as starter at 40-55 kg N/ha

Latin America - Southern Cone

(Argentina, Bolivia, Paraguay, and Uruguay)



Latin America - Southern Cone

(Argentina, Bolivia, Paraguay, and Uruguay)

Cropping System

- ✓ Mechanized agriculture
- ✓ Exported as oil and meal (Argentina) and as grain (Bolivia, Paraguay, and Uruguay)
- ✓ No tillage is predominant
- ✓ Continuous soybean (Argentina, Bolivia and parts of Uruguay)
- ✓ Rotation with maize, wheat, sunflower, sorghum, barley, and canola (Paraguay, and parts of others)
- ✓ Current average yield: Argentina (2.8), Bolivia (2.1), Paraguay (2.9), and Uruguay (1.9 t/ha)
- ✓ Grain yield record: Argentina (8.2 t/ha)

Crop Management

- ✓ Relative maturity:
 - ✓ Argentina (3 to 8)
 - ✓ Bolivia (6 to 8)
 - ✓ Paraguay (4 to 8)
 - ✓ Uruguay (4 to 6)
- ✓ Life cycle of 110 to 140 days
- ✓ Roundup resistant (Intacta 1st season)
- ✓ Plant population of 300 to 400 thousand
- ✓ Single rows
- ✓ Row spacing mostly 52 cm (17 to 70 cm)
- ✓ Mechanical planter
- ✓ Planting date:
 - ✓ 70% (Oct-Nov) + 30% (Dec-Jan) in Argentina and Uruguay
 - ✓ Double crop (winter/summer) in Bolivia
 - ✓ Summer crop in Paraguay
- ✓ Herbicides, insecticides, and fungicides are used
- ✓ No growth regulator

Latin America - Southern Cone

(Argentina, Bolivia, Paraguay, and Uruguay)

Soil and Nutrient Management

- ✓ Soil pH:
 - ✓ 5.4-6.5: Argentina, Bolivia, and Uruguay
 - ✓ 7.0-8.0: parts of Bolivia
 - ✓ < 5.5: parts of Paraguay
- ✓ Liming: 2 t/ha on surface only in Paraguay
- ✓ No manure applied
- ✓ Fertilizer is placed in furrow at planting or banded immediately below the seeds
- ✓ Fertilizer is recommended based on: soil test, tradition, and dealer recommendation, and applied mostly at pre-planting and at planting
- ✓ PK rates are:
 - ✓ Argentina: 10 kg P/ha (50%) + 0 Kg K/ha
 - ✓ Bolivia: 10 kg P/ha (20%) + 10 Kg K/ha (5%)
 - ✓ Paraguay: 15 kg P/ha (80%) + 25 Kg K/ha (80%)
 - ✓ Uruguay: 10 kg P/ha (70%) + 50 Kg K/ha (20%)

Latin America - Southern Cone

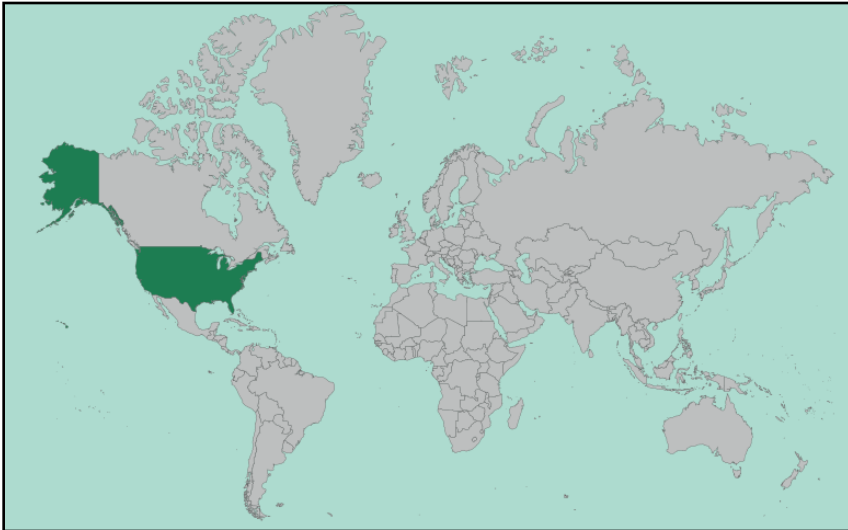
(Argentina, Bolivia, Paraguay, and Uruguay)

Soil and Nutrient Management

- ✓ P sources: MAP, SSP, or DAP (Argentina), DAP (Bolivia), bulk blend with MAP and DAP (Paraguay and Uruguay)
- ✓ K sources: KCl only in Uruguay
- ✓ S is applied via: SSP or calcium sulphate at 8-12 kg S/ha (Argentina), blends with varying rates in Paraguay and Uruguay, and not applied in Bolivia
- ✓ Micronutrients: not applied in Argentina and Uruguay, occasionally applied in Bolivia (foliar mixes), and commonly applied in Paraguay (foliar mixes and dry blends)
- ✓ Seeds are inoculated yearly
- ✓ No N is applied

North America

(Alabama, Arkansas, and Kansas)



North America

(Alabama, Arkansas, and Kansas)

Cropping System

- ✓ Mechanized agriculture
- ✓ Exported as grain (all) and exported as oil and meal (Arkansas and Kansas)
- ✓ Inversion tillage (Arkansas) and minimum tillage (Alabama and Kansas)
- ✓ Crop rotation with wheat, maize, cotton, and rice
- ✓ Average grain yield and record:
 - ✓ Alabama: 3.6 t/ha and 6.5 t/ha
 - ✓ Arkansas: 2.9 t/ha and 3.2 t/ha
 - ✓ Kansas: 3.2 t/ha and 6.5 t/ha

Crop Management

- ✓ Relative maturity of 4.0 to 6.0
- ✓ Life cycle of 120 to 130 days
- ✓ RR, SCN, and aphid resistance available
- ✓ Plant population below 200 thousand (Arkansas and Kansas) and of 200 to 300 thousand (Alabama)
- ✓ Single rows
- ✓ Row spacing of 17 to 72 cm
- ✓ Mechanical and pneumatic planters
- ✓ Planting date determined by soil temp, calendar or just after finishing maize
- ✓ Herbicide, insecticide, and fungicide
- ✓ No growth regulator use

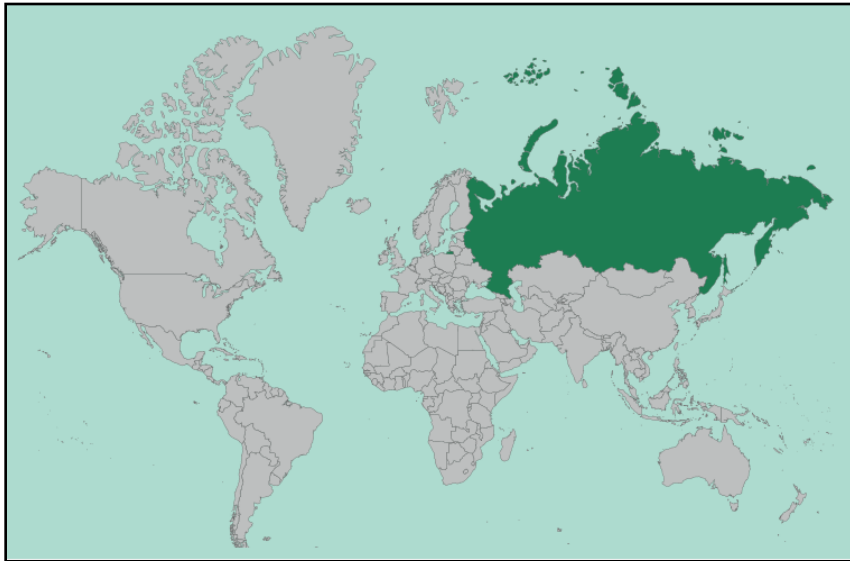
North America

(Alabama, Arkansas, and Kansas)

Soil and Nutrient Management

- ✓ Soil pH ranges widely from 6.0 to 8.0
- ✓ Liming is done based on soil test or every 4 years (Alabama)
- ✓ Lime is applied:
 - ✓ Alabama: 3 t/ha broadcasted on surface
 - ✓ Arkansas: 2-6 t/ha incorporated
 - ✓ Kansas: on surface or incorporated
- ✓ Chicken litter applied to soybean or previous crop
- ✓ Fertilizer is applied on surface before planting or banded to the side of the seed (Kansas) based on soil test
- ✓ PK rates are:
 - ✓ P: 0-40 kg P/ha via TSP, MAP, DAP
 - ✓ K: 0-120 kg K/ha via KCl
- ✓ S is not regularly applied
- ✓ Micronutrients: B and Mo are commonly applied; some Fe for high pH soils
- ✓ Seeds are inoculated yearly (Alabama and Kansas) or not inoculated (Arkansas)
- ✓ N is not applied

Southern & Eastern Russia



Southern & Eastern Russia

Cropping System

- ✓ Mechanized agriculture
- ✓ Domestic use for oil and meal
- ✓ Inversion and minimum tillage
- ✓ Rotation with wheat, sugar beet, maize, and barley
- ✓ Average grain yield of 1.8 t/ha
- ✓ Yield record of:
 - ✓ 5.5 t/ha (South)
 - ✓ 3.5 t/ha (Central)

Crop Management

- Relative maturity of 90 to 110 days
- Life cycle of 100 to 120 days
- No traits available
- Plant population of 200 to 400 thousand
- Single rows
- Row spacing of 70 cm
- Use of pneumatic planter
- Planting date when soil T > 14 C
- Insecticides and herbicides are used
- No plant regulator used, but bio stimulants as K humate, Agropon C, Mestim, and Nagro

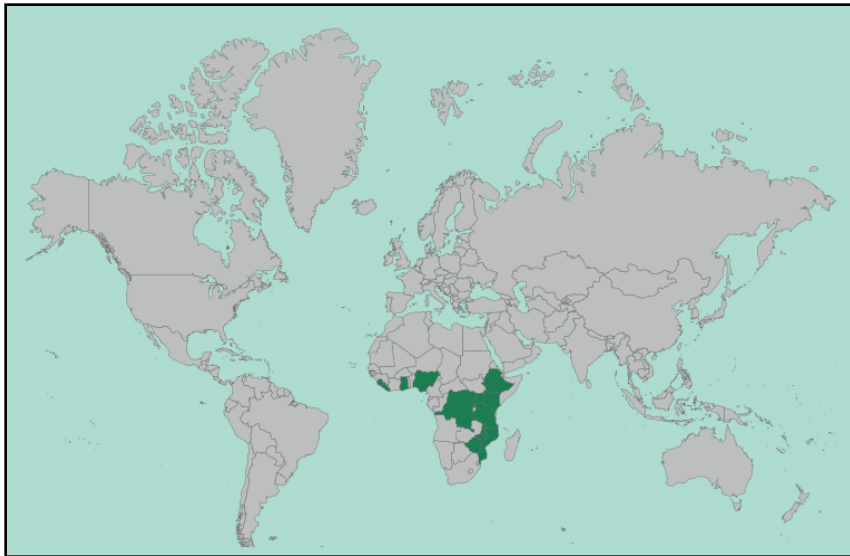
Southern & Eastern Russia

Soil and Nutrient Management

- ✓ Soil pH around 7.0
- ✓ No liming is done
- ✓ No manure is applied
- ✓ Fertilizer is banded to the side of the seed row (South) or broadcasted before planting (Central) and recommended based on tradition
- ✓ PK rates are:
 - ✓ South: 26 kg P/ha via MAP + 0 Kg K/ha
 - ✓ Central: 30 kg P/ha via MAP + 0 kg K/ha
- ✓ No S is applied
- ✓ Micronutrients:
 - ✓ South: B as boric acid (300 g/ha via foliar) + Mo as ammonium molybdate (100 g/t seeds)
 - ✓ Central: foliar application of Polyfeed (Fe, Mg, Zn, Cu, B, and Mo)
- ✓ Seeds are inoculated in rotation with 4 crops (every 4 years ???)
- ✓ N is applied via ammonium nitrate at 60-70 kg N/ha at planting or prior spring cultivation

Sub-Saharan Africa

(Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Zimbabwe, Ethiopia, Uganda, Tanzania, Liberia, and Sierra Leone)



Sub-Saharan Africa

(Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Zimbabwe, Ethiopia, Uganda, Tanzania, Liberia and Sierra Leone)

Cropping System

- ✓ Small holders
- ✓ Grain is exported
- ✓ Inversion tillage is predominant
- ✓ Rotation of soybean with cereals
- ✓ Not irrigated
- ✓ Grain yield of 1.2 to 1.8 t/ha

Crop Management

- ✓ Relative maturity of 80 to 100 days
- ✓ Average life cycle of 110 to 130 days
- ✓ No GMO traits
- ✓ Plant population of 300 to 400 thousand
- ✓ Single rows of plants
- ✓ Hand hoe seeding
- ✓ Seeding determined by expected rainfall date beginning
- ✓ Only herbicide use

Sub-Saharan Africa

(Democratic Republic of Congo, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Zimbabwe, Ethiopia, Uganda, Tanzania, Liberia and Sierra Leone)

Soil and Nutrient Management

- ✓ Average soil pH of 5.5
- ✓ Liming is rare. When done rate is around 1.5 to 2 t/ha applied on the surface
- ✓ Fertilizer is applied in furrow at seeding, recommended based on soil test
- ✓ 20 kg P/ha as DAP or animal manure/plant residue
- ✓ S and micronutrients are rarely applied
- ✓ Seeds are inoculated at 600 g/ha
- ✓ No N application