

International Crop Production Forecasting Component of World Agricultural Supply and Demand Estimate (WASDE)



- United States Department of Agriculture (USDA)
- Foreign Agricultural Service (FAS)
- **International Production Assessment (IPA)**

United States Department of Agriculture (USDA)

- International crop production forecast process
- World Agricultural Supply and Demand Estimate report (WASDE)
- published by World Agricultural Outlook Board (WAOB)



WAOB Chaired Meetings: Cotton, Oilseeds, Rice, Grains

WAOB Arbitration: FAS, WAOB, ERS, JAWF

WASDE Report

FAS Lockup Commodities

Monthly review of available crop condition data. Crop estimates revised as needed. Production estimates are first step in S&D balance sheet. These estimates form basis of the WASDE report.

- **Food**

 - Wheat, Rice

- **Feed Grains**

 - Corn, Barley, Oats, Sorghum, Rye

- **Oilseeds**

 - Soybeans, Sunflower, Rapeseed, Peanuts, Palm

- **Cotton**

Mandate and Mission for Global Crop Production Analysis

Monthly International Production Crop Monitoring Reports on Area, Yield and Production of Major Grains, Oilseeds and Cotton

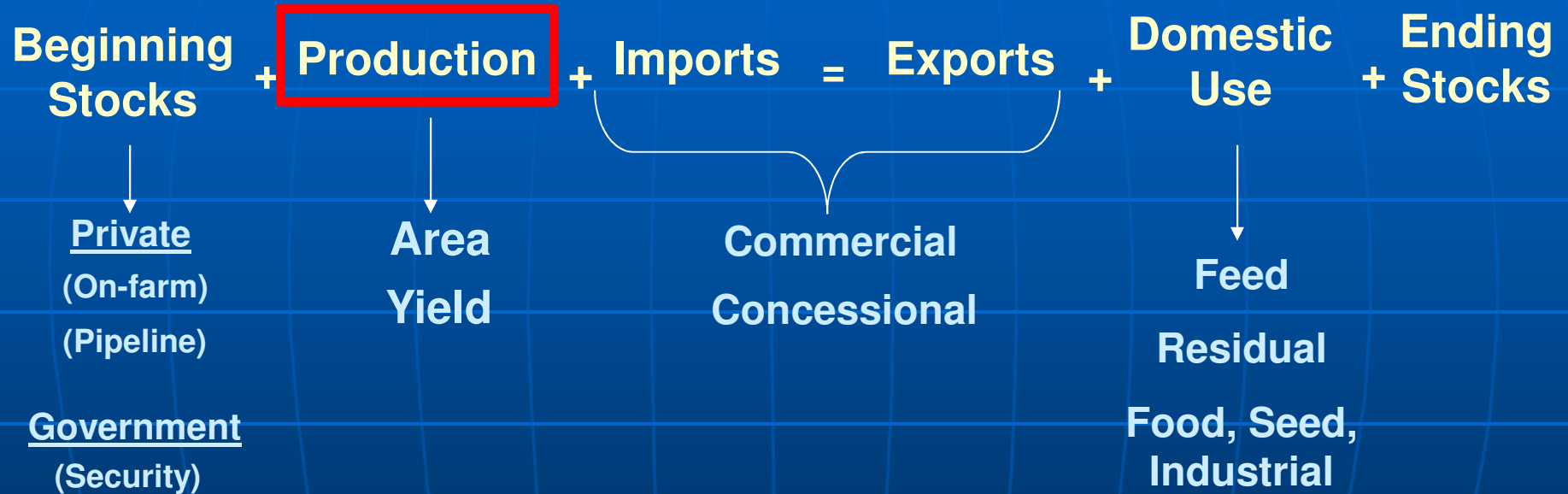
1. FAS Strategic Plan 2010-2015 (page iv)
2. OMB Principle Federal Economic Indicator
3. Code of Federal Regulations - TITLE 7 AGRICULTURE -
Under Secretary for Farm and Foreign Agricultural
Services: "...Conduct studies of worldwide production..."

http://edocket.access.gpo.gov/cfr_2003/7cfr2.43.htm



Develop Country/Commodity Balance Sheets

SUPPLY = DEMAND



←—————→
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WASDE Report

Monthly FAS Report: World Agricultural Production (WAP)



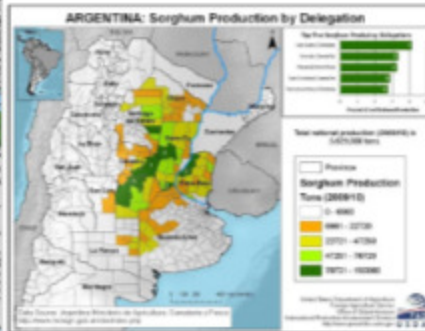
United States
Department of
Agriculture

Foreign
Agricultural
Service

Circular Series
WAP 11-13
November 2013

World Agricultural Production

Argentina Sorghum: Estimated Production Reduced Due to Lower Planted Area



Argentine sorghum has benefitted from recent rainfall. (image USDA/FAS/DGA/IPAD)

The USDA forecasts Argentine sorghum production for 2013/14 at 4.6 million metric tons, 15 percent below September's estimate and 8 percent below the 5.0 million tons grown last year. Harvested area is estimated at 1.0 million hectares, 17 percent lower than September's estimate and 13 percent less than last year. Yield is estimated at 4.60 tons per hectare, 2.0 percent higher than September's estimate, and 5.8 percent higher than last year.

Argentine producers are facing low returns due to a drop in crop prices and an unfavorable exchange rate. Many farmers will likely switch from sorghum to soybeans due to its profitability and marketability. A larger world production of feed grains from the northern hemisphere is providing strong competition for Argentine sorghum and reducing export demand. (For more information, contact Denise McWilliams, PhD., at 202-720-0107.)

Approved by the World Agricultural Outlook Board

Note: Neither the World Agricultural Supply and Demand Estimates nor the World Agricultural Production were published in October 2013 due to a government shutdown.

- FAS publishes updates on a monthly schedule of Area, Yield, and Production for foreign commodities.
- **WAP** Release location: <http://www.fas.usda.gov/wap/current/>
- FAS published OMB Principle Federal Economic Indicator
- Schedule of release dates for principal Federal Economic indicators for 2013: <http://www.whitehouse.gov/sites/default/files/omb/inforeg/statpolicy/pfei-schedule-of-release-dates-2013.pdf>

World Agricultural Production: Table 1 of 17

Table 01 World Crop Production Summary

Million Metric Tons

Commodity	World	Total Foreign	North America			European Union	Former Soviet		Asia (WAP)					South America		Selected Other			All Others
			United States	Canada	Mexico		Russia	Ukraine	China	India	Indonesia	Pakistan	Thailand	Argentina	Brazil	Australia	South Africa	Turkey	
---Million metric tons---																			
Wheat																			
2011/12	697.5	643.1	54.4	25.3	3.6	138.4	56.2	22.3	117.4	86.9	nr	25.0	nr	15.5	5.8	29.9	2.0	18.8	95.9
2012/13 prel.	655.5	593.8	61.7	27.2	3.2	133.6	37.7	15.8	121.0	94.9	nr	23.3	nr	9.5	4.4	22.1	1.9	15.5	83.8
2013/14 proj.																			
Sep	708.9	651.4	57.5	31.5	3.4	142.9	54.0	22.0	121.0	92.5	nr	24.0	nr	12.0	4.8	25.5	1.8	18.0	98.0
Nov	706.4	648.4	58.0	33.2	3.4	143.3	51.5	22.0	121.0	92.5	nr	24.0	nr	11.0	4.8	25.5	1.8	18.0	96.5
Coarse Grains																			
2011/12	1,151.3	827.6	323.7	22.9	25.7	149.9	33.1	33.5	199.3	42.3	8.9	3.6	4.4	30.1	75.9	12.3	13.3	11.3	161.3
2012/13 prel.	1,131.1	845.1	286.0	24.3	28.9	145.8	28.7	29.5	212.8	39.9	8.0	3.6	4.7	37.0	83.8	10.1	12.7	10.6	164.8
2013/14 proj.																			
Sep	1,245.5	877.8	367.8	25.6	29.5	156.2	35.1	38.0	217.5	41.5	9.2	3.6	4.9	36.2	74.8	11.1	13.5	12.9	168.2
Nov	1,252.4	880.7	371.7	26.2	29.4	158.5	35.6	38.0	217.8	42.0	9.2	3.6	4.9	35.4	72.8	11.0	13.5	13.0	169.8
Rice, Milled																			
2011/12	465.8	459.9	5.9	nr	0.1	2.1	0.7	0.1	140.7	105.3	36.5	6.2	20.5	1.0	7.9	0.7	nr	0.5	137.7
2012/13 prel.	469.0	462.6	6.3	nr	0.1	2.1	0.7	0.1	143.0	104.4	36.6	5.4	20.2	0.9	8.0	0.8	nr	0.5	139.8
2013/14 proj.																			
Sep	476.8	470.9	5.9	nr	0.1	2.1	0.7	0.1	142.0	108.0	37.7	6.4	21.1	1.0	8.3	0.7	nr	0.5	142.1
Nov	473.2	467.2	6.0	nr	0.1	2.1	0.6	0.1	141.5	105.0	37.7	6.0	21.1	1.0	8.2	0.7	nr	0.5	142.6
Total Grains																			
2011/12	2,314.6	1,930.6	384.0	48.2	29.4	290.4	90.0	55.9	457.4	234.4	45.4	34.8	24.8	46.6	89.6	42.8	15.3	30.6	395.0
2012/13 prel.	2,255.5	1,901.5	354.0	51.5	32.2	281.5	67.1	45.4	476.8	239.2	44.6	32.3	24.9	47.5	96.1	33.0	14.6	26.6	388.4
2013/14 proj.																			
Sep	2,431.2	2,000.0	431.2	57.1	33.0	301.2	89.8	60.1	480.5	242.0	46.9	34.0	26.0	49.2	87.9	37.4	15.3	31.4	408.4
Nov	2,431.9	1,996.2	435.7	59.4	33.0	304.0	87.7	60.1	480.3	239.5	46.9	33.6	26.0	47.3	85.8	37.2	15.3	31.5	408.8
Oilseeds																			
2011/12	445.6	353.3	92.3	18.9	0.9	29.4	12.4	14.2	59.2	36.4	10.2	5.8	0.6	44.8	70.0	5.0	1.3	2.1	42.0
2012/13 prel.	474.0	380.8	93.1	18.9	1.0	27.7	10.9	12.6	59.6	36.8	10.9	5.1	0.6	53.6	84.5	5.5	1.5	2.1	49.5
2013/14 proj.																			
Sep	495.1	402.0	93.2	20.4	0.9	30.6	11.8	16.5	58.4	38.6	11.5	5.2	0.6	58.4	91.0	4.8	1.7	2.3	49.2
Nov	499.4	402.9	96.4	21.0	0.9	30.9	12.8	16.6	58.4	38.1	11.5	5.1	0.6	57.8	91.0	4.8	1.7	2.3	49.4
Cotton																			
2011/12	126.6	111.1	15.6	nr	1.2	1.6	nr	nr	34.0	29.0	0.0	10.6	0.0	1.0	8.7	5.5	0.1	3.4	16.0
2012/13 prel.	123.1	105.8	17.3	nr	1.1	1.5	nr	nr	35.0	28.5	0.0	9.3	0.0	0.8	6.0	4.6	0.0	2.6	16.4
2013/14 proj.																			
Sep	112.4	104.5	12.9	nr	0.8	1.4	nr	nr	33.0	29.0	0.0	9.7	0.0	0.9	7.2	4.5	0.0	2.3	15.8
Nov	117.2	104.1	13.1	nr	0.8	1.4	nr	nr	32.5	29.0	0.0	9.7	0.0	0.9	7.4	4.5	0.0	2.3	15.6

1/ Includes wheat, coarse grains, and rice (milled) shown above.

World Wheat AYP: Table 2 of 17

Table 02 Wheat Area, Yield, and Production

Country / Region	Area (Million hectares)				Yield (Metric tons per hectare)				Production (Million metric tons)				Change in Production			
	2011/12	Prel. 2012/13	2013/14 Proj.		2011/12	2012/13	2013/14 Proj.		2011/12	2012/13	2013/14 Proj.		From last month		From last year	
			Sep	Nov			Sep	Nov			Sep	Nov	MMT	Percent	MMT	Percent
World	221.25	216.06	220.88	219.72	3.15	3.03	3.21	3.21	697.50	655.49	708.89	706.38	-2.52	-0.35	50.88	7.76
United States	18.50	19.80	18.51	18.27	2.94	3.12	3.11	3.17	54.41	61.67	57.54	57.96	0.43	0.74	-3.71	-6.02
Total Foreign	202.75	196.26	202.37	201.45	3.17	3.03	3.22	3.22	643.09	593.82	651.36	648.42	-2.94	-0.45	54.59	9.19
1 China	24.27	24.20	24.25	24.25	4.84	5.00	4.99	4.99	117.40	121.00	121.00	121.00	0.00	0.00	0.00	0.00
2 South Asia																
3 India	29.07	29.86	29.40	29.40	2.99	3.18	3.14	3.14	86.87	94.88	92.46	92.46	0.00	0.00	-2.42	-2.55
4 Pakistan	8.90	8.66	8.67	8.67	2.81	2.69	2.77	2.77	25.00	23.30	24.00	24.00	0.00	0.00	0.70	3.00
5 Afghanistan	2.10	2.51	2.50	2.50	1.19	1.65	1.62	1.62	2.50	4.15	4.05	4.05	0.00	0.00	-0.10	-2.41
6 Former Soviet Union - 12																
7 Russia	24.81	21.30	24.00	23.50	2.27	1.77	2.25	2.19	56.24	37.72	54.00	51.50	-2.50	-4.63	13.78	36.53
8 Ukraine	6.66	5.63	6.50	6.50	3.35	2.80	3.38	3.38	22.32	15.76	22.00	22.00	0.00	0.00	6.24	39.59
9 Kazakhstan	13.69	12.40	12.50	12.50	1.66	0.79	1.36	1.24	22.73	9.84	17.00	15.50	-1.50	-8.82	5.66	57.50
10 Uzbekistan	1.40	1.40	1.40	1.40	4.50	4.79	4.79	4.86	6.30	6.70	6.70	6.80	0.10	1.49	0.10	1.49
11 European Union - 28	25.83	25.96	26.03	25.86	5.36	5.14	5.49	5.54	138.41	133.58	142.90	143.34	0.45	0.31	9.76	7.31
12 France	5.41	5.30	5.40	5.33	6.66	7.15	7.14	7.24	35.99	37.91	38.55	38.60	0.05	0.13	0.69	1.82
13 Germany	3.25	3.06	3.15	3.13	7.01	7.33	7.84	7.96	22.78	22.41	24.70	24.87	0.17	0.67	2.46	10.96
14 United Kingdom	1.97	1.99	1.60	1.62	7.75	6.66	7.56	7.47	15.26	13.26	12.10	12.10	0.00	0.00	-1.16	-8.75
15 Poland	2.26	2.08	2.23	2.15	4.13	4.14	4.22	4.37	9.34	8.61	9.40	9.40	0.00	0.00	0.79	9.20
16 Spain	1.99	2.17	2.21	2.15	3.46	2.35	3.49	3.59	6.90	5.09	7.70	7.70	0.00	0.00	2.61	51.19
17 Italy	1.62	1.87	1.82	1.82	3.98	4.09	3.92	3.92	6.45	7.63	7.13	7.13	0.00	0.00	-0.50	-6.55
18 Denmark	0.74	0.61	0.70	0.60	6.81	6.92	7.14	6.81	5.06	4.23	5.00	4.60	-0.40	-8.00	0.37	8.80
19 Hungary	0.98	1.06	1.10	1.09	4.20	3.74	4.55	4.68	4.11	3.97	5.00	5.10	0.10	2.00	1.13	28.40
20 Romania	1.95	1.99	2.05	2.05	3.65	2.66	3.61	3.61	7.10	5.30	7.40	7.40	0.00	0.00	2.10	39.62
21 Bulgaria	1.14	1.19	1.14	1.19	3.92	3.76	4.17	4.05	4.46	4.46	4.75	4.83	0.08	1.58	0.37	8.31
22 Canada	8.55	9.50	10.50	10.28	2.96	2.86	3.00	3.23	25.29	27.21	31.50	33.20	1.70	5.40	6.00	22.04
23 Australia	13.90	13.24	13.70	13.70	2.15	1.67	1.86	1.86	29.91	22.08	25.50	25.50	0.00	0.00	3.42	15.49
24 Middle East																
25 Turkey	7.70	7.80	7.70	7.70	2.44	1.99	2.34	2.34	18.80	15.50	18.00	18.00	0.00	0.00	2.50	16.13
26 Iran	6.80	7.00	7.00	7.00	1.99	2.00	2.07	2.07	13.50	14.00	14.50	14.50	0.00	0.00	0.50	3.57
27 Syria	1.60	1.60	1.55	1.55	2.41	2.31	2.71	2.71	3.85	3.70	4.20	4.20	0.00	0.00	0.50	13.51
28 North Africa																
29 Egypt	1.28	1.35	1.40	1.40	6.56	6.30	6.29	6.29	8.40	8.50	8.80	8.80	0.00	0.00	0.30	3.53
30 Morocco	3.04	3.14	3.28	3.28	1.91	1.23	2.13	2.13	5.80	3.87	7.00	7.00	0.00	0.00	3.13	80.88
31 Argentina	5.17	3.60	3.90	3.70	3.00	2.64	3.08	2.97	15.50	9.50	12.00	11.00	-1.00	-8.33	1.50	15.79
Others	17.99	17.10	18.10	18.27	2.46	2.49	2.53	2.49	44.27	42.54	45.75	45.56	-0.19	-0.41	3.03	7.12

World and Selected Countries and Regions

World Agricultural Supply and Demand Estimates



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World Agricultural Supply and Demand Estimates

Office of the Chief Economist

Agricultural Marketing Service
Farm Service Agency

Economic Research Service
Foreign Agricultural Service

WASDE - 523

Approved by the World Agricultural Outlook Board

November 8, 2013

Note: The *World Agricultural Supply and Demand Estimates (WASDE)* report was not published in October 2013 due to the Federal Government shutdown.

WHEAT: Projected U.S. wheat supplies for 2013/14 are raised 26 million bushels with higher estimated production and an increase in expected imports. Production was raised 14 million bushels in the September 30 *Small Grains* report. Production is further raised 2 million bushels for Hard Red Spring (HRS) wheat and slightly for Durum based on the resurvey of North Dakota and Montana producers who had not finished harvesting when the September survey was completed for the *Small Grains* report. Imports are projected 10 million bushels higher with larger supplies in Canada and stronger food use expected for HRS wheat. Food use for all wheat, however, is lowered 8 million bushels reflecting the latest flour production data reported by the North American Millers' Association with Hard Red Winter wheat food use reduced. Feed and residual use is projected 30 million bushels higher based on indicated June-August disappearance from the September 1 stocks. Projected ending stocks are raised 4 million bushels.

The projected range for the 2013/14 season-average wheat farm price is narrowed 20 cents on each end to \$6.70 to \$7.30 per bushel. The midpoint of the range is unchanged from September at \$7.00 per bushel. Normally 60 percent or more of each year's crop is marketed from June through October and reported farm prices so far for this marketing year have averaged near \$7.00 per bushel.

Global 2013/14 wheat supplies are lowered 0.8 million tons as a decline in global output more than offsets higher beginning stocks, mostly in the European Union. European Union production for 2012/13 is revised higher and domestic consumption is estimated lower boosting 2013/14 beginning stocks. European Union production for 2013/14 is raised 0.4 million tons with small increases to reported crops in a number of member countries. Canada production is raised 1.7 million tons in line with official estimates. Global production, however, declines 2.6 million tons with production lowered 2.5 million tons for Russia, 1.5 million tons for Kazakhstan, and 1.0 million tons for Argentina. Reductions for Russia and Kazakhstan reflect late-season harvest reports for spring wheat. The reduction for Argentina is based on lower expected harvested area as dryness and late-season freeze events reduce prospects for a crop which will be harvested over the coming weeks.

Global wheat consumption for 2013/14 is lowered 3.0 million tons with reductions in foreign feed and food use projected this month. Feed use is lowered for China, Russia, and the European Union, more than offsetting a small increase for South Korea. Food use is lowered for India, Russia, and the European Union. Global wheat trade, in the aggregate, is mostly unchanged this month with imports raised for several African countries and Mexico, but lowered for China, the European Union, and the Philippines. World exports decline slightly as reductions for Argentina, Kazakhstan, and Russia more than offset increases for Canada, the European Union, and India. World wheat stocks are projected 2.2 million tons higher with the biggest increases for the European Union, Canada, and Argentina.

COARSE GRAINS: Projected U.S. feed grain supplies for 2013/14 are raised with higher estimated beginning stocks and increases in corn and sorghum production with the November *Crop Production* report. Corn production is forecast 146 million bushels higher at a record 13,989 million bushels. A 1.9-million-acre reduction in harvested area is more than offset by a 5.1-bushel-per-acre increase in the forecast yield. At 160.4 bushels per acre, the national average yield remains 4.3 bushels per acre

- USDA World Agricultural Outlook Board publishes updates on a monthly schedule.
- Supply (Production) and Demand for major world commodities.
- **WASDE** Release location: <http://www.usda.gov/oce/commodity/wasde/latest.pdf>
- **International AYP: FAS**

WASDE-523-8: World and U.S. Supply and Use for Grains

November 2013

WASDE - 523 - 8

World and U.S. Supply and Use for Grains 1/
Million Metric Tons

World		Output	Total Supply	Trade 2/	Total Use 3/	Ending Stocks
Total Grains 4/	2011/12	2314.58	2778.25	343.51	2309.15	469.10
	2012/13 (Est.)	2255.54	2724.64	295.64	2278.03	446.61
	2013/14 (Proj.) Sep	2431.20	2861.05	326.76	2393.97	467.08
	Nov	2431.92	2878.53	333.88	2395.90	482.63
	Wheat	2011/12	697.50	896.48	157.78	697.11
	2012/13 (Est.)	655.49	854.87	138.32	679.28	175.59
	2013/14 (Proj.) Sep	708.89	882.75	154.52	706.47	176.28
	Nov	706.38	881.96	153.72	703.49	178.48
Coarse Grains 5/	2011/12	1151.28	1317.37	146.66	1152.15	165.22
	2012/13 (Est.)	1131.08	1296.30	118.46	1131.73	164.57
	2013/14 (Proj.) Sep	1245.54	1396.36	133.11	1212.95	183.41
	Nov	1252.37	1416.94	140.90	1219.31	197.63
	Rice, milled	2011/12	465.80	564.40	39.07	459.89
	2012/13 (Est.)	468.96	573.48	38.85	467.03	106.44
	2013/14 (Proj.) Sep	476.77	581.94	39.13	474.55	107.39
	Nov	473.18	579.62	39.26	473.10	106.52
United States						
Total Grains 4/	2011/12	384.01	447.82	72.83	325.65	49.34
	2012/13 (Est.)	354.01	414.06	51.55	318.23	44.29
	2013/14 (Proj.) Sep	431.18	478.83	68.51	343.73	66.59
	Nov	435.69	487.76	73.51	346.84	67.40
	Wheat	2011/12	54.41	80.93	28.61	32.11
	2012/13 (Est.)	61.67	85.22	27.42	38.27	19.54
	2013/14 (Proj.) Sep	57.54	80.90	29.94	35.68	15.28
	Nov	57.96	81.58	29.94	36.28	15.37
Coarse Grains 5/	2011/12	323.73	358.89	41.03	290.05	27.82
	2012/13 (Est.)	286.01	320.53	20.73	276.21	23.59
	2013/14 (Proj.) Sep	367.75	390.17	35.45	304.37	50.36
	Nov	371.72	398.31	40.39	306.88	51.04
	Rice, milled	2011/12	5.87	8.00	3.20	3.49
	2012/13 (Est.)	6.33	8.31	3.40	3.75	1.16
	2013/14 (Proj.) Sep	5.90	7.77	3.12	3.69	0.96
	Nov	6.01	7.87	3.19	3.69	0.99

1/ Aggregate of local marketing years. 2/ Based on export estimate. See individual commodity tables for treatment of export/import imbalances. 3/ Total use for the United States is equal to domestic consumption only (excludes exports). 4/ Wheat, coarse grains, and milled rice. 5/ Corn, sorghum, barley, oats, rye, millet, and mixed grains (for U.S. excludes millet and mixed grains).

Balance Sheet

- Output
- Supply
- Trade
- Use
- Stocks

Production is essential component of Output, Supply and Estimating World Trade forecasts

FAS: "Production Supply Distribution" Database (PSD Online)

- AYP and Balance Sheet Data Input to the PSD system
- Public Facing Database
- Extraction for AYP and Trade Data
- Transparent USDA Market Information

Table 02: World Area, Yield, and Production

Country / Region	Area (Million Hectares)			Yield (Metric tons per hectare)			Production (Million metric tons)			Change in Production	
	2011/12	2012/13	2013/14	2011/12	2012/13	2013/14	2011/12	2012/13	2013/14	2012/13	2013/14
World	133.22	133.26	133.28	149.72	151.3	152.1	197.70	197.49	198.09	0.25	0.60
Developed Areas	30.50	30.50	30.51	182.7	184.0	185.0	55.42	55.67	55.94	0.41	0.27
Developing Areas	102.72	102.76	102.77	149.2	149.3	149.1	142.28	141.82	142.15	-0.46	0.33
China	28.27	28.26	28.25	141.0	141.0	141.0	39.97	39.97	39.97	0.00	0.00
South Asia	10.00	10.00	10.00	100.0	100.0	100.0	10.00	10.00	10.00	0.00	0.00
Latin America	10.00	10.00	10.00	100.0	100.0	100.0	10.00	10.00	10.00	0.00	0.00
Europe	10.00	10.00	10.00	100.0	100.0	100.0	10.00	10.00	10.00	0.00	0.00
North America	10.00	10.00	10.00	100.0	100.0	100.0	10.00	10.00	10.00	0.00	0.00
Other	10.00	10.00	10.00	100.0	100.0	100.0	10.00	10.00	10.00	0.00	0.00

USDA United States Department of Agriculture
Foreign Agricultural Service

psd
Production, Supply and Distribution Online

PSD Online Home About PSD Online Help Contact Us

You are here: FAS Home / Market and Trade Data / PSD Online Home

Production, Supply and Distribution Online

Welcome to the Foreign Agricultural Service's Production, Supply and Distribution (PSD) online database. This database contains current and historical official USDA data on production, supply and distribution of agricultural commodities for the United States and key producing and consuming countries.

Release Schedule
Get the complete PSD data release schedule for the current calendar year. PSD data will next be released on: **Friday, November 15, 2013**

Perform a Custom Query
View PSD Official Statistics on screen or create downloadable files for your spreadsheet or database program.

Downloadable Data Sets
Downloadable files containing Official Statistics are generated when each commodity's data is released. These data files include all attributes, countries and years pertaining to a particular commodity.

Reports (Listed by Category)
Click on a Category to expand the list and reveal available Reports. Click on the desired Report in the list to view it.

- ☑ Coffee
- ☑ Cotton
- ☑ Dairy
- ☑ Field Crops - Production
- ☑ Fruits and Vegetables
- ☑ Grains
- ☑ Juice
- ☑ Livestock
- ☑ Oilseeds
- ☑ Poultry
- ☑ Sugar
- ☑ Tree Nuts

My PSD Online

Signing in to PSD Online allows you to save your Custom Queries.

[New User](#)
[Forgot Your Password?](#)

Username:

Password:

[Sign In](#)

Note: It is not necessary to sign in to view PSD data.

- More PSD Information**
- **Data Availability**
Get a list of available data and country market year information ...
 - **Data Publications**
Current World Production, Market and Trade Reports, and other data publications ...
 - **Regions**
Countries as they are grouped in PSD's regions ...
- See Also ...**
- **IDB Summary Demographic Data**
 - **Global Agricultural Trade System**

WASDE - 523 - 8 November 2013

World and U.S. Supply and Use for Grains 1/		Total Supply		Total Use 2/		Ending Stocks	
Million Metric Tons		Output	Trade 3/	Domestic	Trade 3/	Domestic	Trade 3/
World	2011/12	2314.58	2778.25	343.31	2309.13	489.10	
	2012/13 (Est.)	2255.54	2724.84	295.84	2278.03	446.01	
	2013/14 (Proj.)	3481.20	3861.05	326.78	2399.97	467.08	
Wheat	2011/12	697.50	896.48	157.78	697.11	199.37	
	2012/13 (Est.)	655.49	854.87	138.32	679.28	175.59	
	2013/14 (Proj.)	706.89	882.75	154.32	706.47	176.28	
Coarse Grains 3/	2011/12	1151.28	1317.37	146.66	1152.15	165.22	
	2012/13 (Est.)	1131.08	1294.30	138.46	1131.73	164.57	
	2013/14 (Proj.)	1245.54	1396.36	133.11	1212.99	183.41	
Rice, milled	2011/12	465.80	364.80	39.07	459.89	104.51	
	2012/13 (Est.)	468.06	373.48	38.85	467.03	106.44	
	2013/14 (Proj.)	476.77	381.94	39.13	474.55	107.39	
United States	2011/12	384.01	447.82	72.83	325.65	49.34	
	2012/13 (Est.)	354.01	454.86	51.55	318.23	44.29	
	2013/14 (Proj.)	431.18	478.83	68.51	343.73	66.59	
Wheat	2011/12	54.41	83.89	28.61	32.11	20.21	
	2012/13 (Est.)	61.87	83.22	27.42	38.27	19.54	
	2013/14 (Proj.)	57.54	80.90	29.94	35.66	15.28	
Coarse Grains 3/	2011/12	323.75	358.89	41.03	296.05	27.82	
	2012/13 (Est.)	286.01	329.53	29.73	276.21	23.59	
	2013/14 (Proj.)	367.75	390.17	35.45	304.37	50.36	
Rice, milled	2011/12	5.87	8.00	3.29	3.49	1.30	
	2012/13 (Est.)	6.33	8.31	3.40	3.75	1.16	
	2013/14 (Proj.)	5.90	7.77	3.12	3.69	0.96	

1/ Aggregate of local marketing years. 2/ Based on export estimates. See individual commodity tables for treatment of export/import rebalances. 3/ Total use for the United States is equal to domestic consumption only (excludes exports). 4/ Wheat, coarse grains, and milled rice. 5/ Corn, sorghum, barley, oats, rye, millet, and mixed grains (for U.S. excludes wild rice and mixed grains).

Convergence of Evidence

IPADs final production estimate, produced by the 10th day of each month and cleared by the World Agricultural Outlook Board, is based on an all source convergence of evidence methodology.

USDA's International Commodity Forecasts

The final production estimates are used in a variety of ways including

- Official USDA statistics
- Principal federal economic indicators
- Crop conditions and early warning alerts
- Agricultural monitoring and food security
- Foreign aid assessments for food import needs
- Disaster monitoring and relief efforts related to food aid
- Commercial market trends and analysis
- Trade policy and exporter assistance

HOW

Input From Multiple Sources

Informational Inputs
country, date, crop

Agribusiness

Analyst Processing

Travel Reports

World Weather Reports

Wire Services

Government Reports

Earth Observations

Official Country Reports

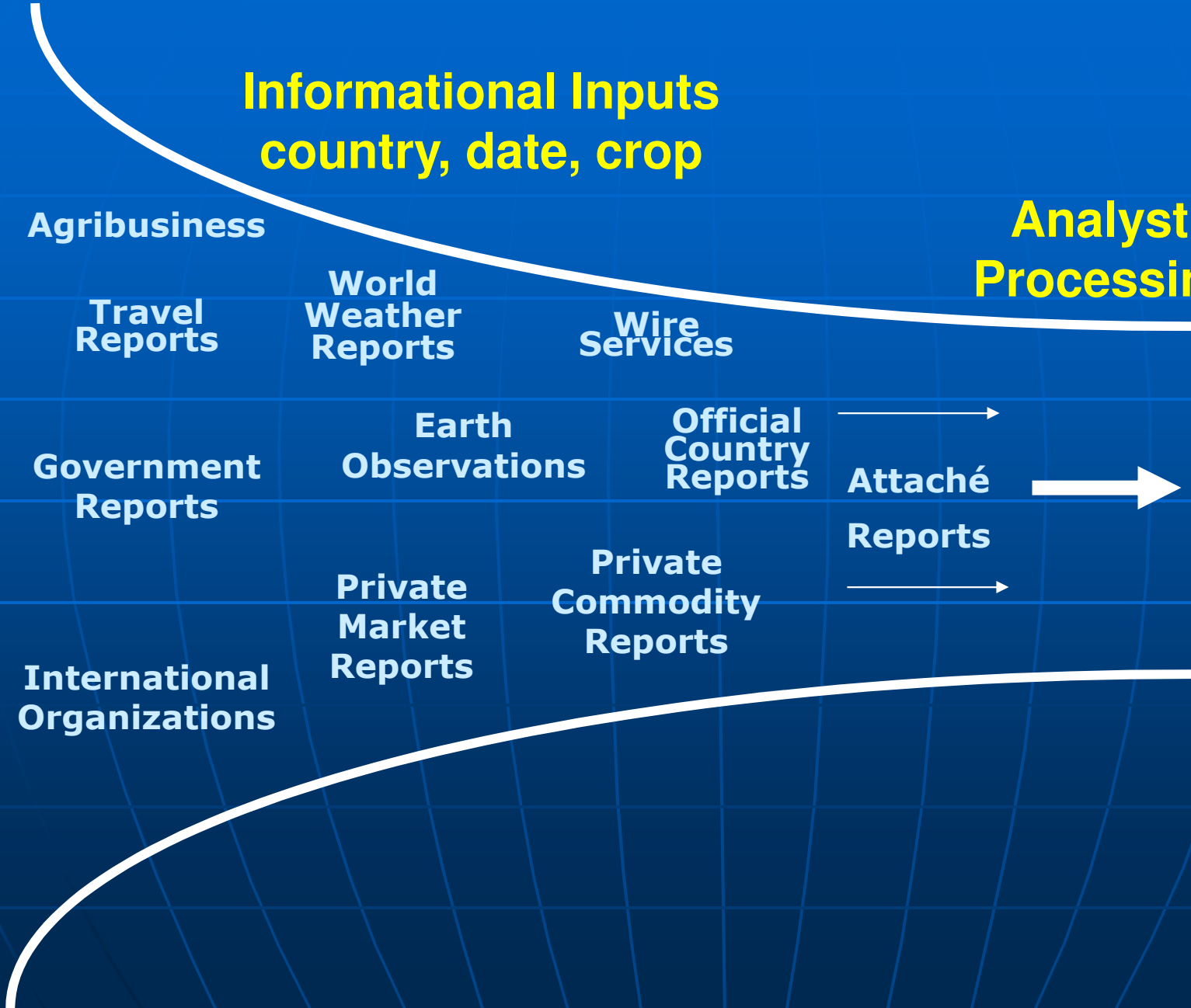
Attaché Reports

Crop Forecasts

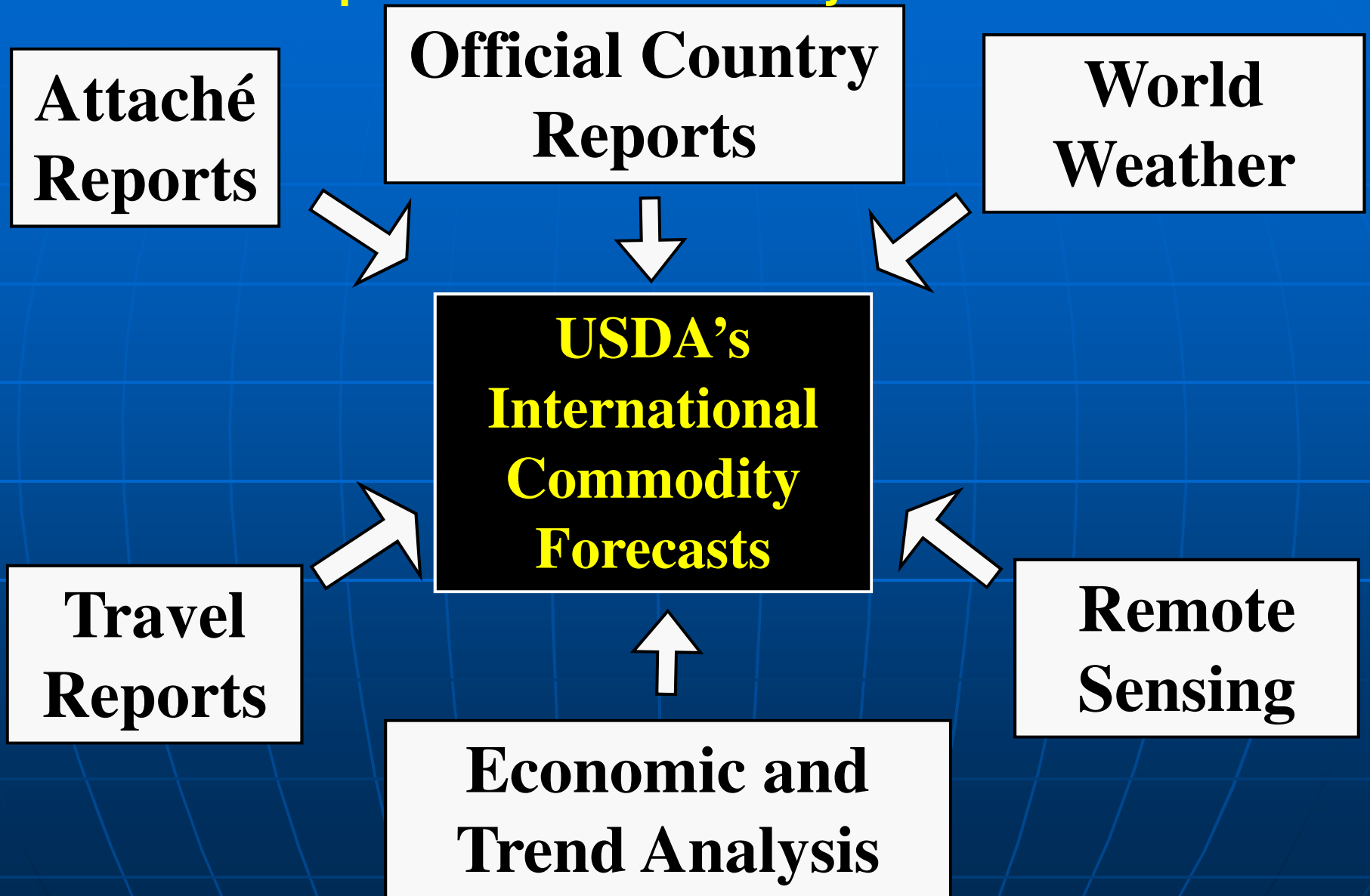
Private Market Reports

Private Commodity Reports

International Organizations



Convergence of Evidence Inputs to USDA Monthly Forecasts



Mission: provide timely and informed estimates of world-wide crop production.

Global Data Sources for Estimating Crop Production

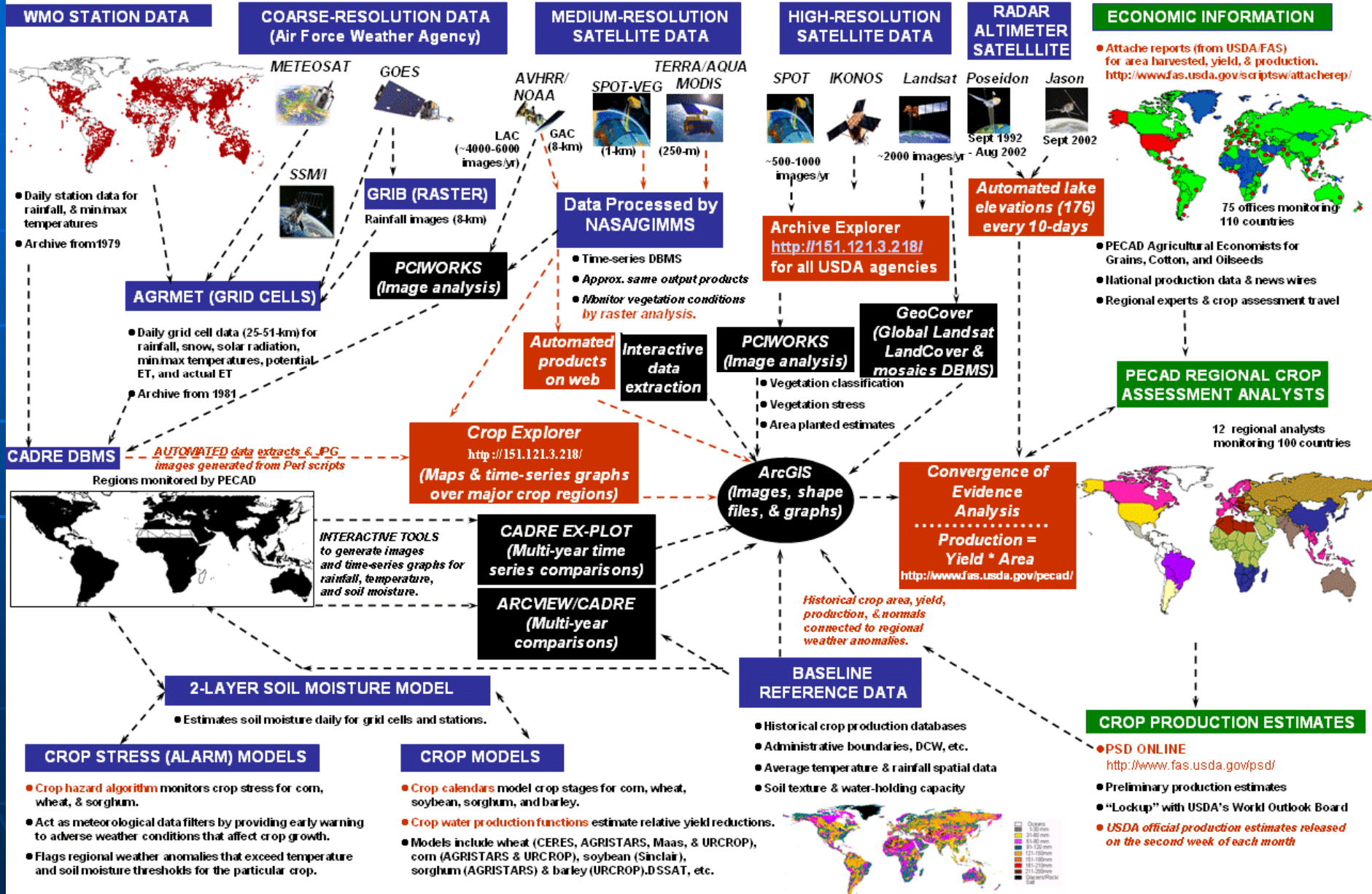
Production Estimates and Crop Assessment Division (PECAD)

USDA/FAS/PECAD, USDA South Building, MS-1045, 1400 Independence Ave., SW, Washington DC, 20250

URL: <http://www.fas.usda.gov/pecad/>



Foreign Agricultural Service



World Weather

WMO STATION DATA
Daily rainfall, temperature, etc. Archive from 1979

COARSE-RESOLUTION DATA (Air Force Weather Agency)
METEOSAT, GOES (~4000-6000 images)

AGRMET (GRID CELLS)
Daily grid cell data (25-51 km) for rainfall, snow, solar radiation, min/max temperatures, potential ET, and actual ET

PCWORKS (Image analysis)

Satellite Imagery

MEDIUM-RESOLUTION SATELLITE DATA
TERRA/AQUA (MODIS), SPOT-VEG (3-km), GAC (3-km)

HIGH-RESOLUTION SATELLITE DATA
SPOT, IKONOS, Landsat, Poseidon

RAI ALTIM SATEL

Data Products:
Time-series, Approx. same output products, Monitor vegetation conditions by raster analysis.

Automated products on web
Interactive data extraction

GeoCover (Global Landsat LandCover & mosaics DBMS)
Vegetation classification, Vegetation stress, Area planted estimates

Economic Data And Trends

Attaché reports (from USDA/FAS) for area harvested, yield, & production.

75 offices monitoring

Attaché Reports

PECAD Agricultural Economists for Grains, Cotton, and Oilseeds
National production data & news wires
Regional experts & crop assessment travel

PECAD REGIONAL CROP ASSESSMENT ANALYSTS

12 regional analysts monitoring 100 countries

Crop Models

ADRE DBMS
Regions monitored by PECAD

INTERACTIVE TOOLS
to generate images and time-series graphs for rainfall, temperature, and soil moisture.

2-LAYER SOIL MOISTURE MODEL
Estimates soil moisture daily for grid cells and stations.

CROP STRESS (ALARM) MODELS
Crop hazard algorithm monitors crop stress for corn, wheat, & sorghum.
Act as meteorological data filters by providing early warning to adverse weather conditions that affect crop growth.
Flags regional weather anomalies that exceed temperature and soil moisture thresholds for the particular crop.

CROP MODELS
Crop calendars for soybean, sorghum
Crop water production functions estimate relative yield reductions.
Models include wheat (AGRISTARS, URCROP), corn (AGRISTARS, URCROP), soybean (Sinclair), & barley (URCROP/DSSAT, etc.)

Official Statistics Baseline Data

(Images, shape files, & graphs)

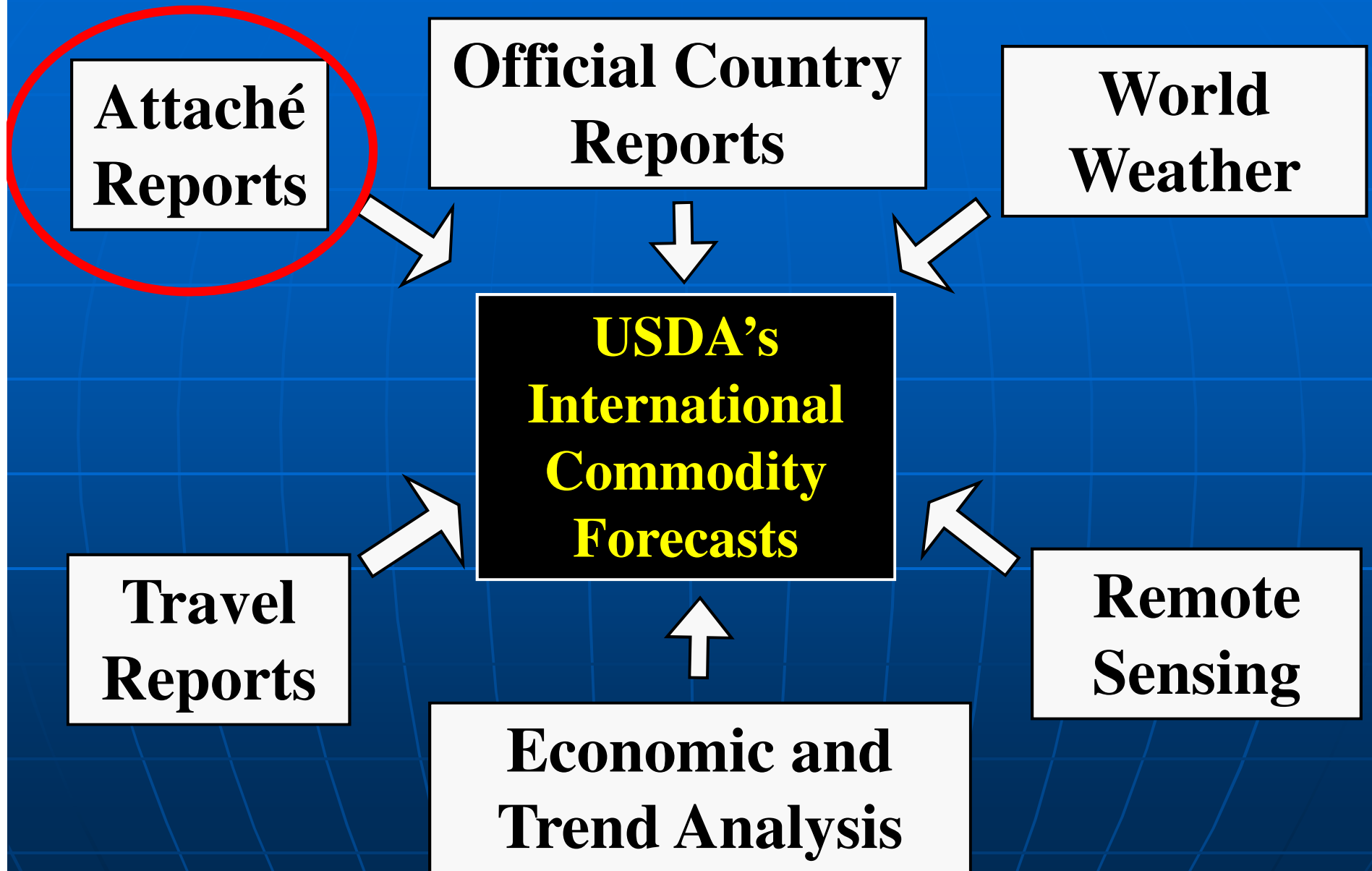
Evidence Analysis Production Yield Area
<http://www.fas.usda.gov>

Official Statistics Baseline Data:
International crop production databases
Administrative boundaries, DCW, etc.
Average temperature & rainfall spatial data
Soil texture & water-holding capacity

Field Travel by Analyst

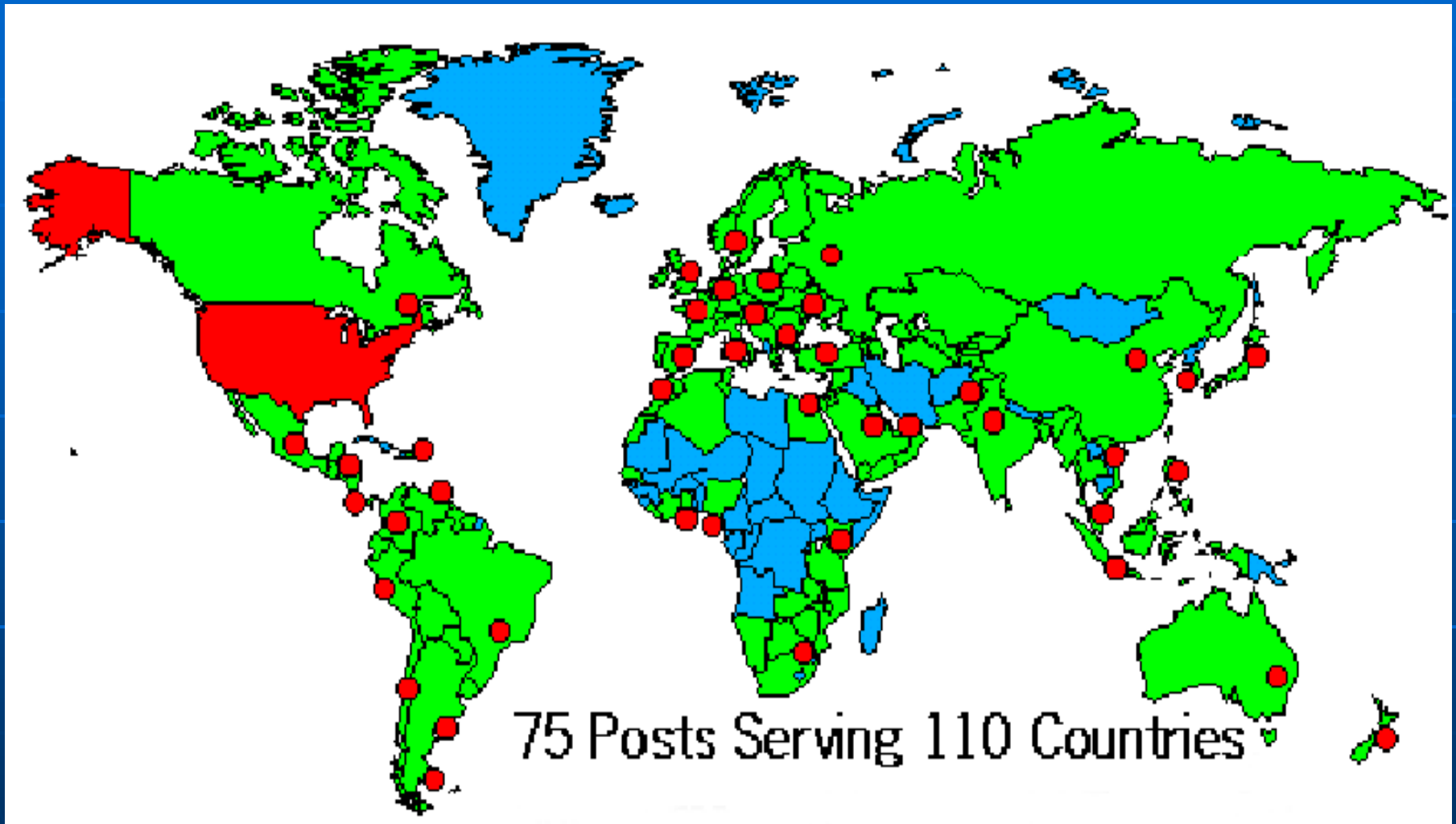
International AYP Forecasts

Inputs to USDA Monthly Forecasts



Mission: provide timely and informed estimates of world-wide crop production.

Foreign Agricultural Service (FAS) of USDA



FAS Overseas staff, collect data, statistics, crop progress, and agricultural market information

FAS: Global Agricultural Information Network

[FAS Home](#) > [GAIN Home](#) > [Published GAIN Reports](#)

Published GAIN Reports

These reports are in PDF format and you will need Adobe Reader in order to view or print these files. The download is free at <http://www.adobe.com/products/reader>

Mouse-over the Column Names in the table below to sort or filter the details

Name	Created
Product Brief - Distilled Spirits_Warsaw_Poland_11-12-2013	11/15/2013 2:56 PM
Coffee Semi-annual_Sao Paulo ATO_Brazil_11-12-2013	11/15/2013 2:56 PM
Fresh Deciduous Fruit Annual_Ottawa_Canada_11-12-2013	11/15/2013 2:56 PM
In-Store Promotion - Capital Hypermarket 2013_Bangkok_Thailand_11-6-2013	11/15/2013 2:56 PM
Fresh Fruit and Vegetable Prices Escalate in Jordan_Amman_Jordan_11-6-2013	11/13/2013 2:56 PM
Rice Production and Trade Update_Santo Domingo_Haiti_11-7-2013	11/13/2013 2:56 PM
US Sorghum Exports to Show Success of USDA Marketing Programs_Beijing_China - Peoples Republic of_11-8-2013	11/13/2013 2:56 PM
Health Claims - New EU Regulation on Generic Descriptors_Brussels USEU_EU-27_11-6-2013	11/13/2013 2:56 PM
Macao Food Safety Center Established_Hong Kong_Hong Kong_11-8-2013	11/13/2013 2:56 PM
Macao's Regulation on Veterinary Drug Residue in Food_Hong Kong_Hong Kong_11-8-2013	11/13/2013 2:56 PM
Human H7N9 Case Confirmed in HK's "Backyard"_Hong Kong_Hong Kong_11-7-2013	11/13/2013 2:56 PM
Food Safety Law Draft for Comment _Beijing_China - Peoples Republic of_11-8-2013	11/13/2013 2:56 PM
Mesopotamian Minute - October 2013_Cairo_Iraq_11-7-2013	11/12/2013 2:57 PM
Sugar Semi-annual_Santo Domingo_Dominican Republic_10-1-2013	11/12/2013 2:56 PM
Ukrainian Agrarians are in Favor of Production of GE Crops _Kiev_Ukraine_11-6-2013	11/12/2013 2:56 PM
Proposed Changes to the Thai Food Labeling Law_Bangkok_Thailand_11-7-2013	11/12/2013 2:56 PM
Ukraine Introduces New Poultry Meat Requirements_Kiev_Ukraine_11-6-2013	11/12/2013 2:56 PM
Dairy and Products Annual_Seoul_ATO_Korea - Republic of_10-31-2013	11/12/2013 2:56 PM

GAIN Reports

- [Search Reports](#)
- [View All Reports](#)
- [Legacy Reports\(Prior to 07/03/2009\)](#)

External Links

- [PSD Online](#)
- [GATS](#)

FAS: Global Agricultural Information Network

USDA Foreign Agricultural Service

GAIN Report

Global Agricultural Information Network

THIS REPORT CONTAINS ASSESSMENTS OF COMMODITY AND TRADE ISSUES MADE BY USDA STAFF AND NOT NECESSARILY STATEMENTS OF OFFICIAL U.S. GOVERNMENT POLICY

Voluntary Public

Date: 11/18/2013

GAIN Report Number: RS1383

Russian Federation

Post: Moscow

Russian Agricultural Policy and Situation Bi-Weekly Update - 5

Report Categories:

Agriculture in the News

Approved By:

Levin Flake

Prepared By:

FAS Moscow Staff

Report Highlights:

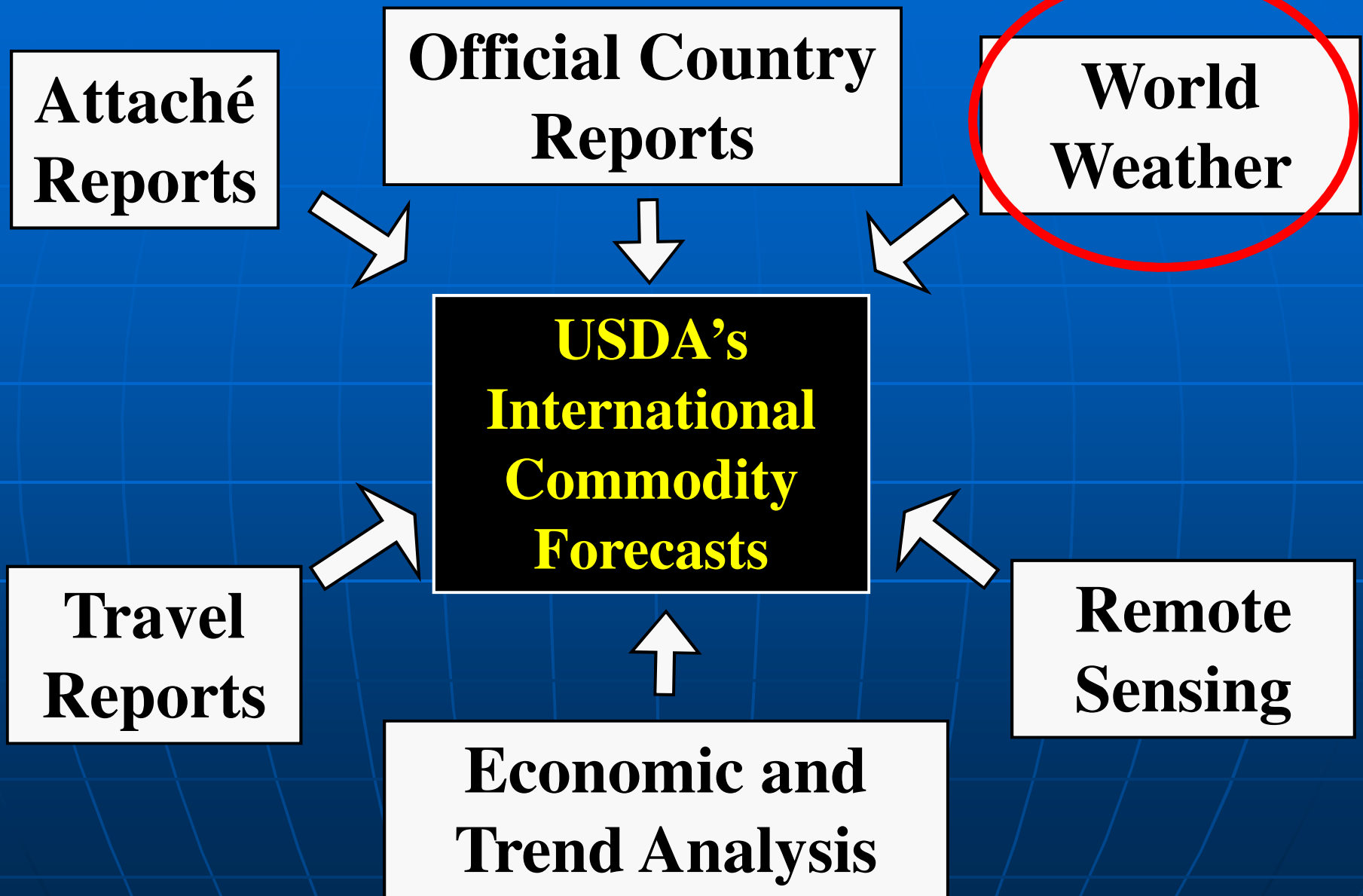
Russia and EU discuss potato ban...Ministry of Agriculture begins domestic food aid pilot projects...The Minister of Agriculture discusses WTO impact and Russia's self sufficiency goals...And also discusses milk subsidies...A new lysine facility to supply Russian feed manufacturers...Illegal black caviar seized in Vladivostok

General Information:

Welcome to the Russian Agricultural Policy and Situation Bi-Weekly Update, a summary of issues of interest to the U. S. agricultural community. The report includes information that has been garnered during travel within Russia, reported in the local media, or offered by host country officials and agricultural analysts. Press articles are included and summarized in this report. Significant issues will be expanded upon in subsequent reports from this office. Minor grammatical changes have been made for clarification.

FAS Overseas staff, collect data, statistics, crop progress, and agricultural market information

Inputs to USDA Monthly Forecasts



Mission: provide timely and informed estimates of world-wide crop production.

Inputs to USDA Monthly Forecasts



**World
Weather**

Weather Data Sources

- World Meteorological Organization (WMO)
- US Air Force Weather Agency (AFWA)
- Experimental products from NASA

World Meteorological Organization (WMO)

Daily Data Loaded Next Day:

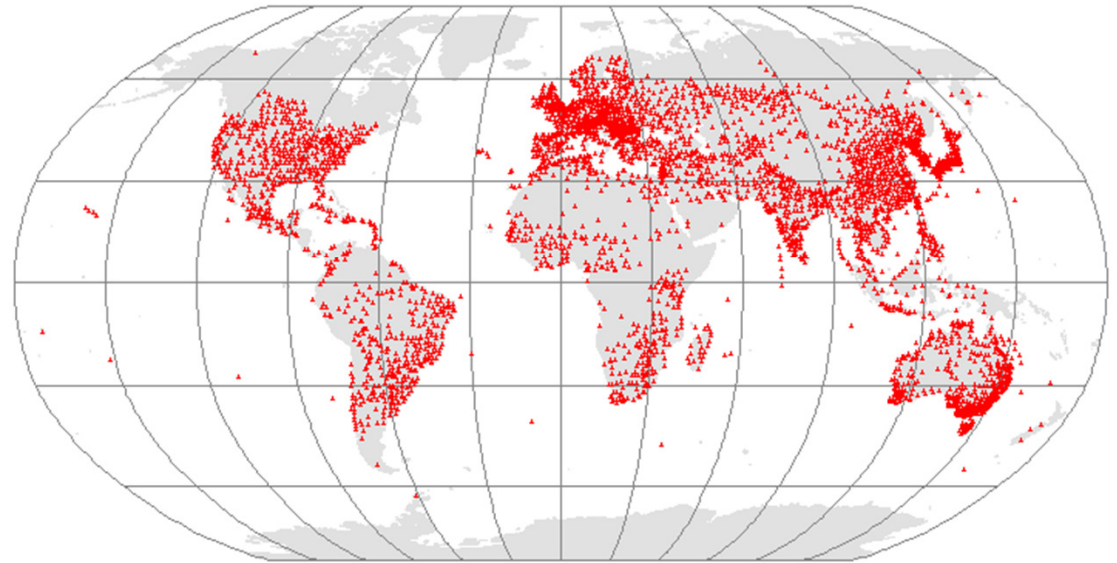
- 24-hour precipitation
- Max Temp
- Min Temp
- Snow Coverage

IPAD Updates Assessment Database:

- Average Daily Temperature
- Cumulative precipitation
- Potential ET
- Soil Moisture
- Crop Calendar
- Corn Hazard (Alarm)
- Winterkill Model

Weather Station Observations: Daily Data

“Yesterday’s Weather Delivered Today”



Daily weather data provided by
approximately 7000 WMO ground stations

Air Force Weather Data (AFWA)

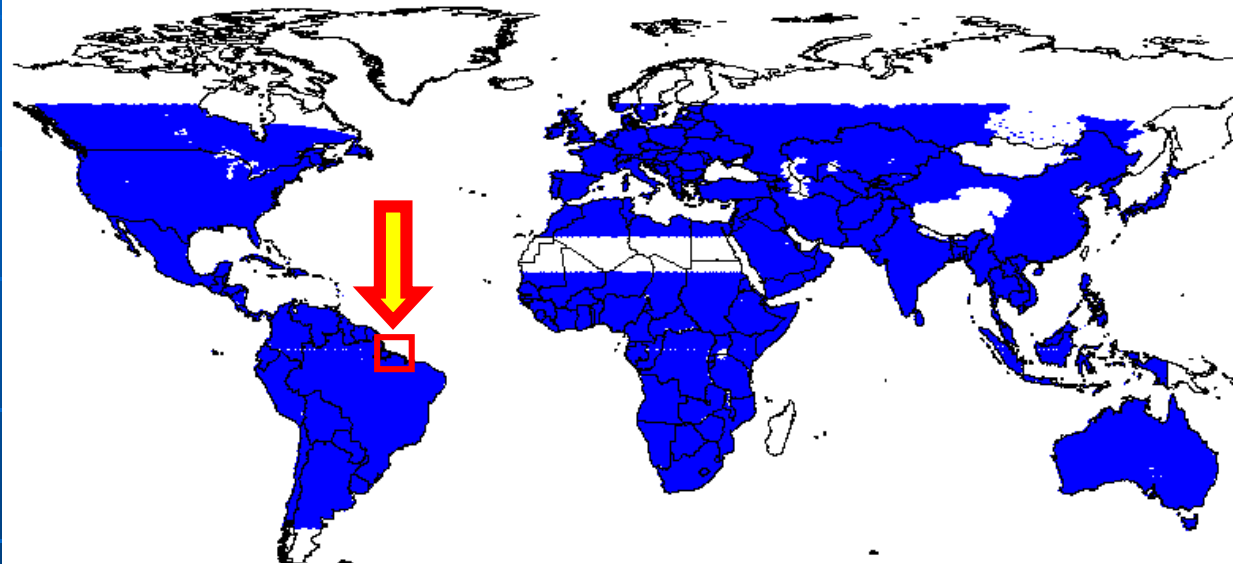
Daily AFWA Data Loaded Next Day:

- 24-hour precipitation
- Max Temp
- Min Temp
- Snow Coverage
- Actual and Potential ET
- Solar and IR Radiation

IPAD Updates Assessment Database:

- Average Daily Temperature
- Cumulative precipitation
- Potential ET
- Soil Moisture
- Crop Calendar
- Corn Hazard (Alarm)
- Relative Yield Reduction
- Winterkill Model

Spatial Coverage of AFWA Weather Data



Daily Modeled Weather Data for 85,000 Locations (Grid Cells)

□ Countries
■ AFWA Grid Cells (85,200)

 Production Estimates and
Crop Assessment Division (PECAD)
Foreign Agricultural Service (FAS)
<http://www.fas.usda.gov/pecad/>

11/29/2013

USDA/FAS/OGA/IPAD

Northeast Brazil

IPAD Database Resolution
Grid Cell Reference System

Atlantic Ocean

Atlantic Ocean

17mi edge



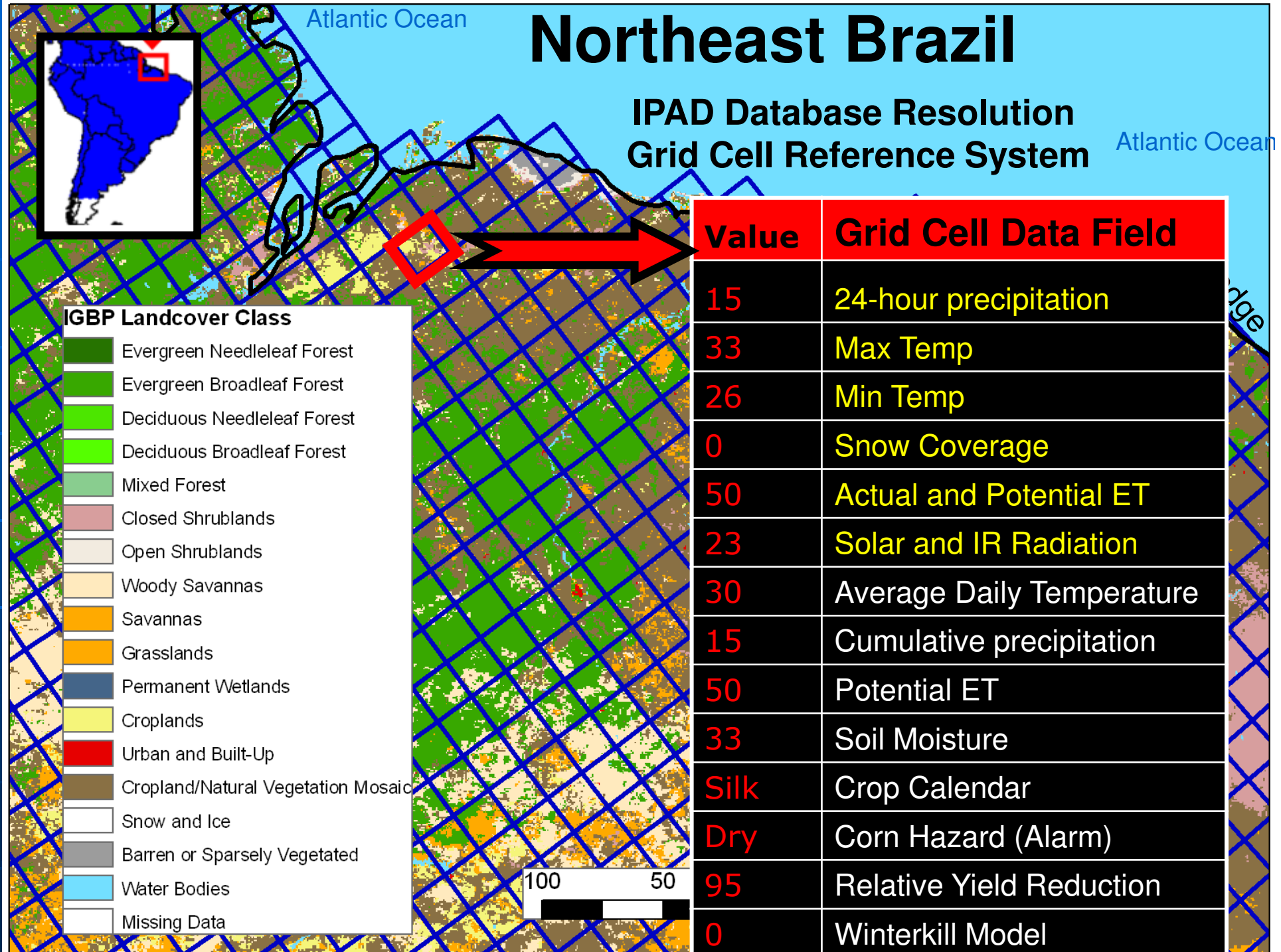
IGBP Landcover Class

- Evergreen Needleleaf Forest
- Evergreen Broadleaf Forest
- Deciduous Needleleaf Forest
- Deciduous Broadleaf Forest
- Mixed Forest
- Closed Shrublands
- Open Shrublands
- Woody Savannas
- Savannas
- Grasslands
- Permanent Wetlands
- Croplands
- Urban and Built-Up
- Cropland/Natural Vegetation Mosaic
- Snow and Ice
- Barren or Sparsely Vegetated
- Water Bodies
- Missing Data



Northeast Brazil

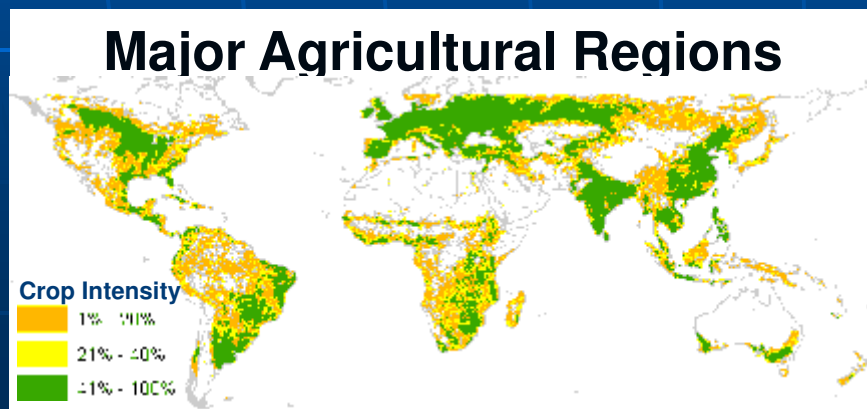
IPAD Database Resolution Grid Cell Reference System



IPAD database / Baseline CADRE

baseline geo-spatial data sets:

- *Climate 30-year normals & NDVI multi-year averages*
- *Soils water holding capacity*
- *Average crop planting dates*



11/29/2013

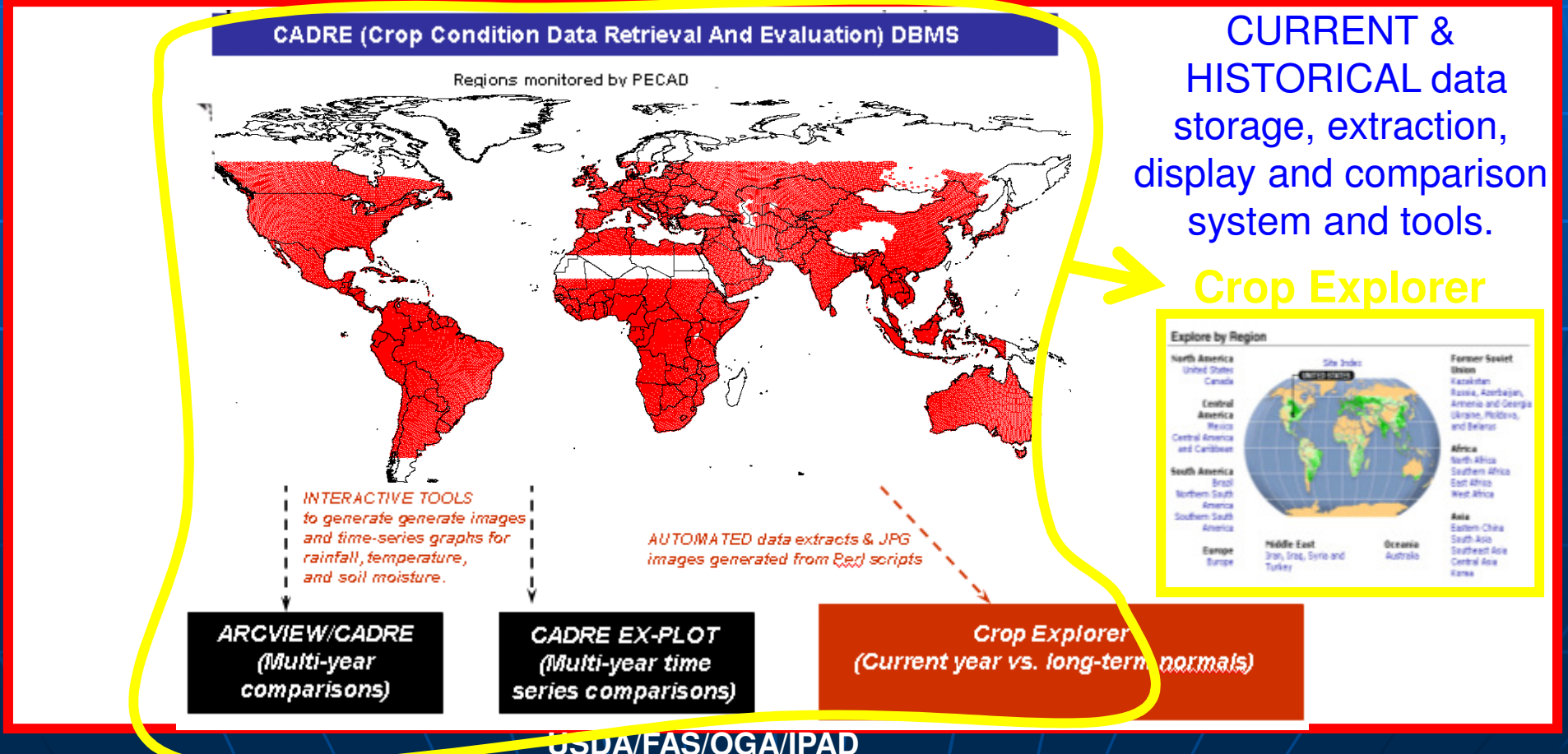
BASELINE REFERENCE DATA

- Historical crop production databases (national and provincial level)
- Administrative boundaries
- Rainfall & temp long-term averages for stations (from WMO/NOAA)
- Rainfall & temperature long-term averages for grid cells (from IIASA climate maps)
- Crop information such as crop type, start of season, avg. yields, etc.
- Soil water-holding capacity (from FAO DSMW)



Crop Assessment Database System

- Automatic: "Crop Explorer" products are displayed on the Internet every 10-days and for summer/winter growing seasons
- Interactive: Arcview GIS extractions for any region and time period.



CADRE to CROP EXPLORER DISPLAY

Foreign Agricultural Service

FAS *to the World*



Explore by Region

North America

United States
Canada

Central America

Mexico
Central America
and Caribbean

South America

Brazil
Northern South
America
Southern South
America

Europe

Europe

Middle East

Iran, Iraq, Syria and
Turkey

Oceania

Australia

Former Soviet Union

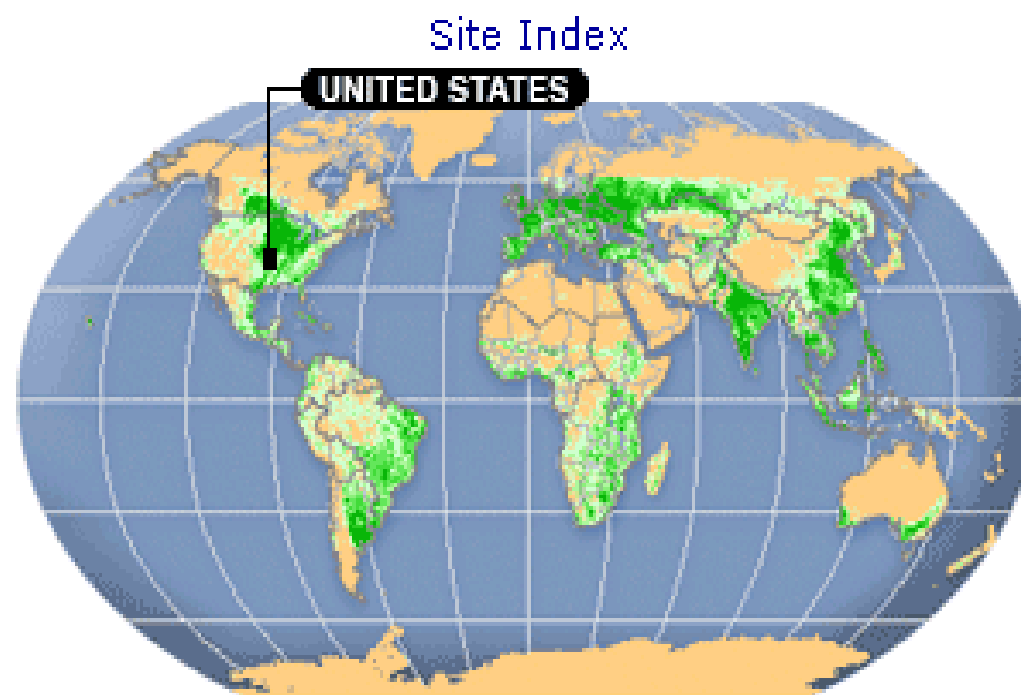
Kazakstan
Russia, Azerbaijan,
Armenia and Georgia
Ukraine, Moldova,
and Belarus

Africa

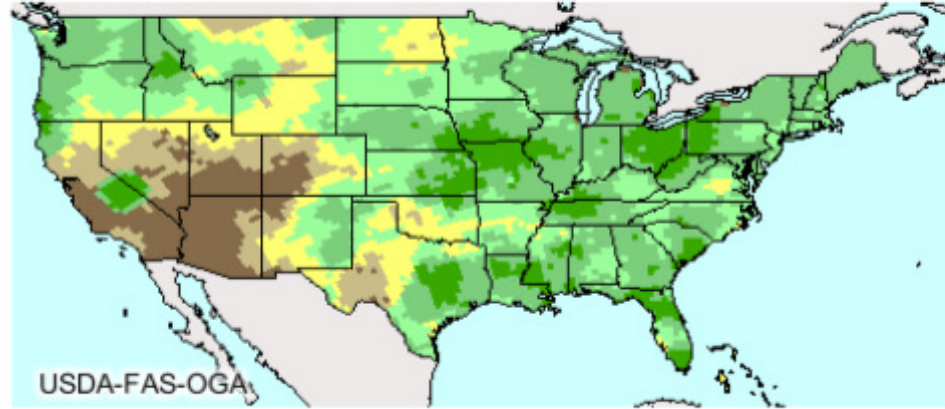
North Africa
Southern Africa
East Africa
West Africa

Asia

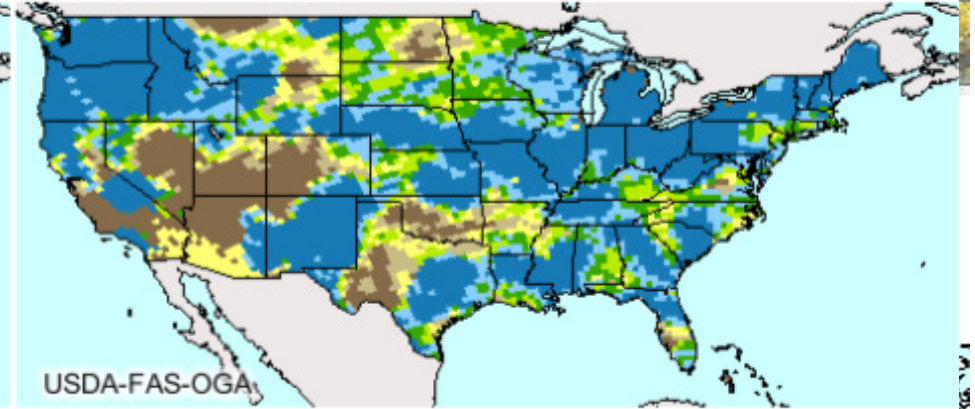
Eastern China
South Asia
Southeast Asia
Central Asia
Korea



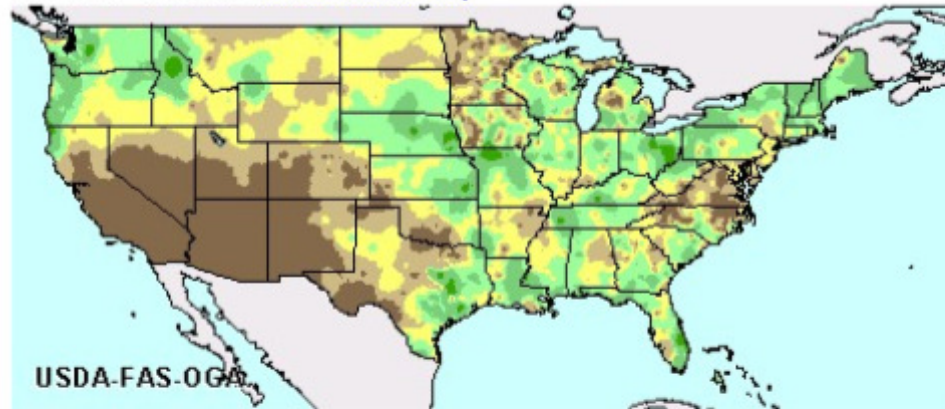
AFWA Precipitation [View in Google Earth](#)
 06/01/10 - 06/10/10 **Previous 10-day**
 Click on a U.S. region to view its thematic map.



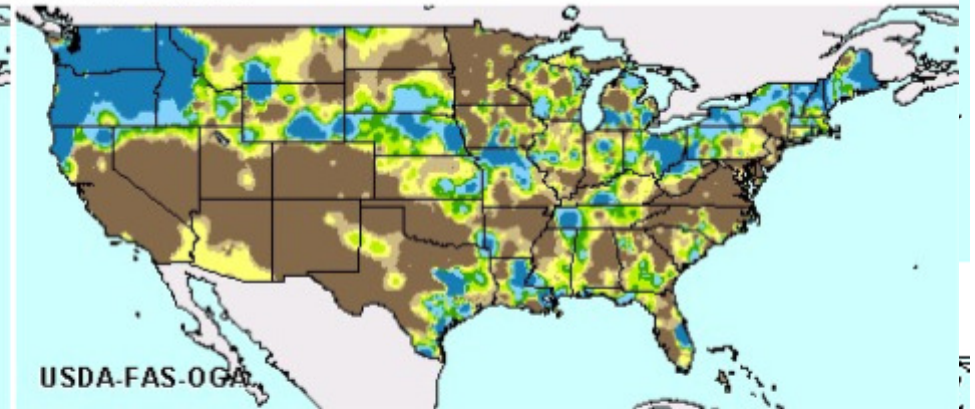
AFWA Decadal Percent Normal Precipitation [View in Google Earth](#)
 06/01/10 - 06/10/10



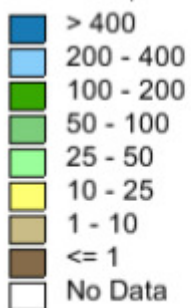
WMO Precipitation [View in Google Earth](#)
 06/01/10 - 06/10/10 **Previous 10-day**



WMO Decadal Percent Normal Precipitation [View in Google Earth](#)
 06/01/10 - 06/10/10



Precipitation (Millimeters)



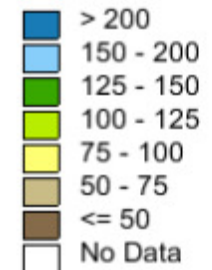
AFWA 10-day
Actual Amount

WMO 10-day
Actual Amount

AFWA 10-day
Percent Normal

WMO 10-day
Percent Normal

Decadal Percent of
Normal (%)

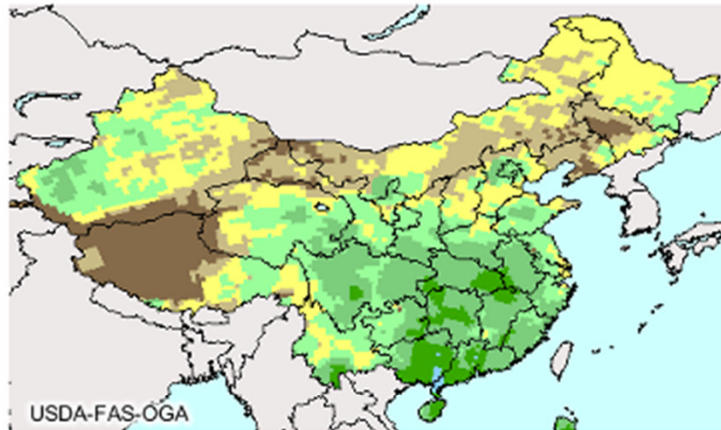


Eastern China

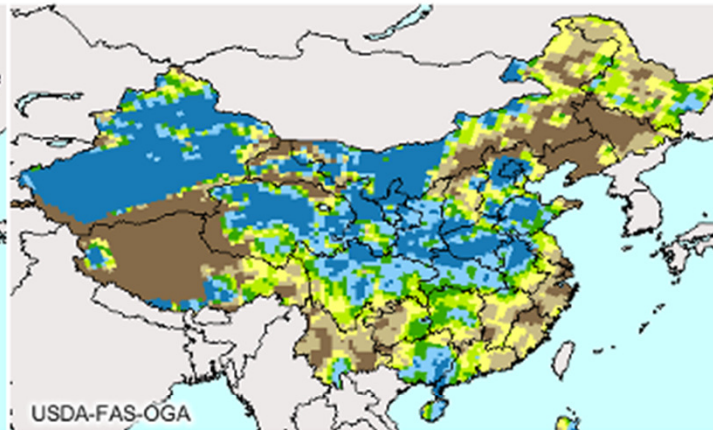
(Next Update on 06/21/2010)

AFWA Precipitation [View in Google Earth](#)
06/01/10 - 06/10/10 **Previous 10-day**

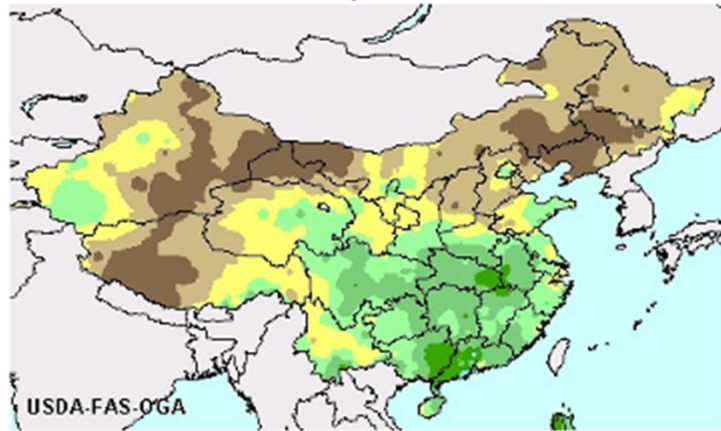
Click on a country to see charts of actual compared to normal data by sub-region.



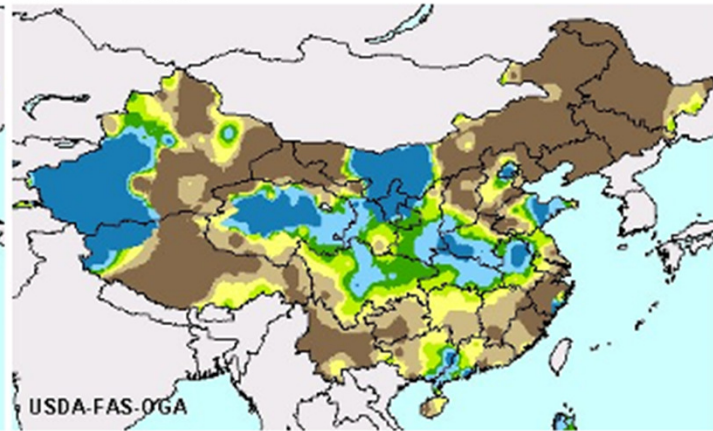
AFWA Decadal Percent Normal Precipitation [View in Google Earth](#)
06/01/10 - 06/10/10



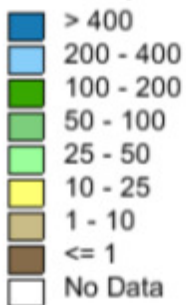
WMO Precipitation [View in Google Earth](#)
06/01/10 - 06/10/10 **Previous 10-day**



WMO Decadal Percent Normal Precipitation [View in Google Earth](#)
06/01/10 - 06/10/10



Precipitation (Millimeters)



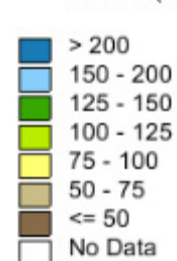
AFWA 10-day Actual Amount

AFWA 10-day Percent Normal

WMO 10-day Actual Amount

WMO 10-day Percent Normal

Decadal Percent of Normal (%)



Crop Explorer: Eastern China

Two clicks:
10 day
precipitation
analysis over
major growing
regions. Two
data sources.
Actual and
Percent Normal
Results. Click
once more for
chart
transformation.



Crop Explorer

- Toolbox
- Weather
- Soil Moisture and Crop Models
- Vegetation Index
- Satellite Data
- Growing Season
- Additional Resources
- Country

Eastern China

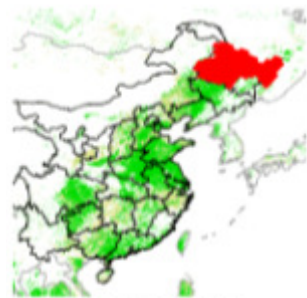
2010 Calendar Year (Jan - Dec)

China

(Last Chart Update - 06/10/10)

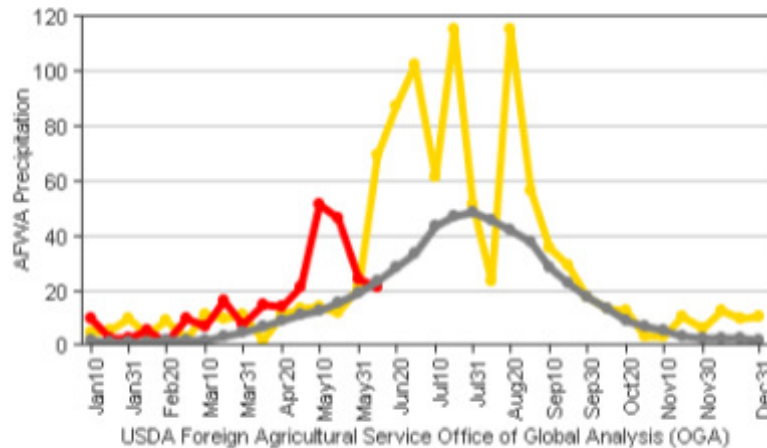
Print a Chart:

Order by: [Subregion](#) | [Wheat Production](#) | [Rice, Milled Production](#) | [Corn Production](#) | [Oilseed, Peanut Production](#) | [Oilseed, Soybean Production](#) | [Cotton Production](#)



Heilongjiang
[View Satellite Image](#)

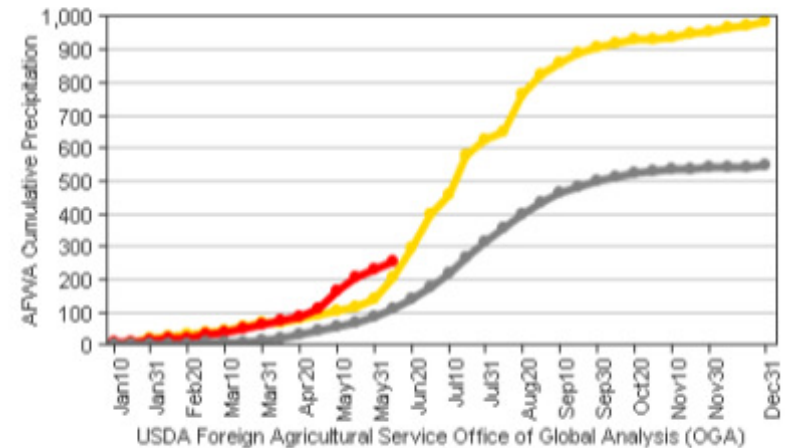
AFWA Precipitation in Heilongjiang



USDA Foreign Agricultural Service Office of Global Analysis (OGA)

2009 2010 Normal

AFWA Cumulative Precipitation in Heilongjiang



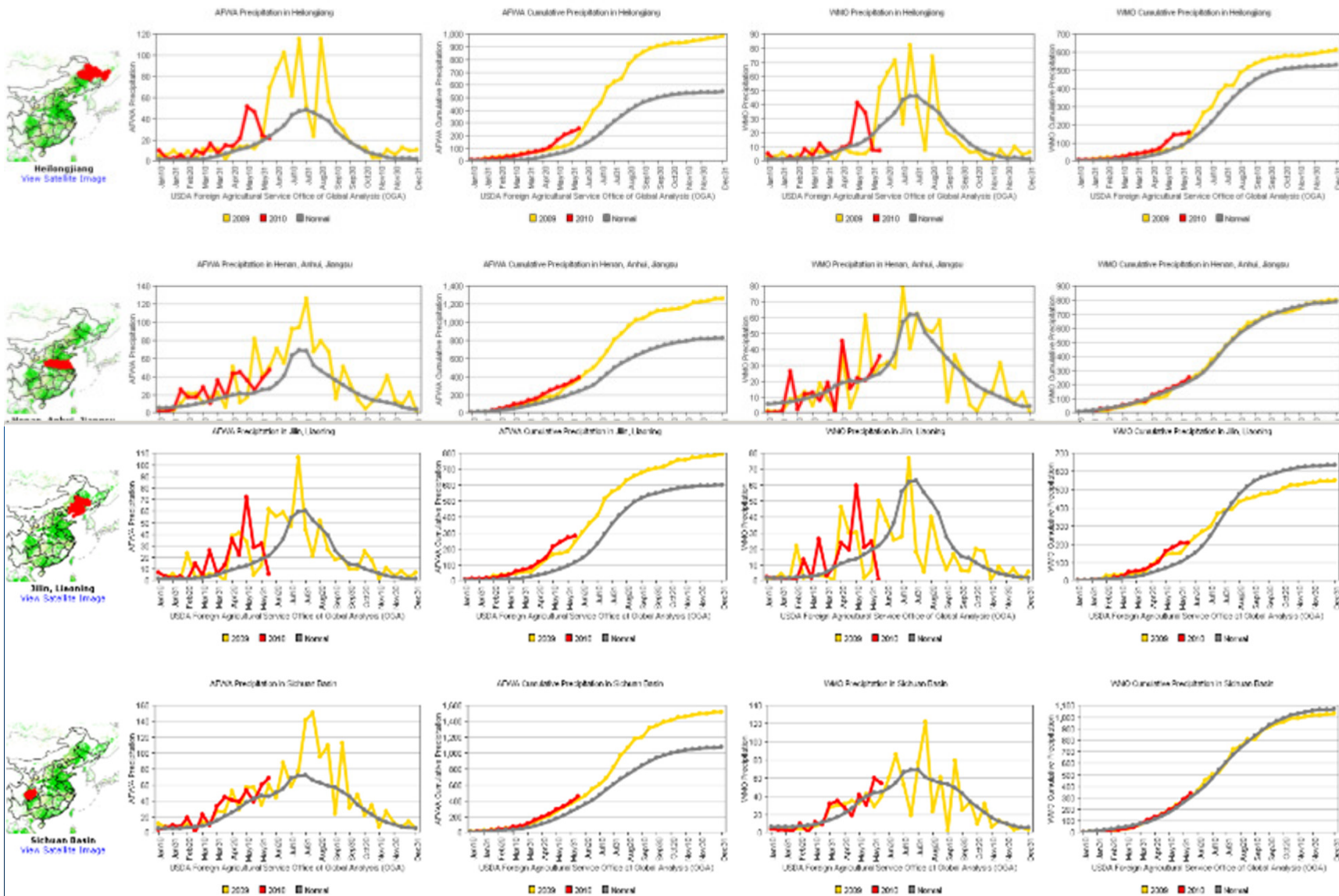
USDA Foreign Agricultural Service Office of Global Analysis (OGA)

2009 2010 Normal

Map shows AOI and charts depict rainfall events.

Eastern China
2010 Calendar Year (Jan - Dec)

China Print a Chart
 (Last Chart Update - 06/18/10)
 Order by: [Subregion](#) | [Wheat Production](#) | [Rice, Milled Production](#) | [Corn Production](#) | [Oilseed, Peanut Production](#) | [Oilseed, Soybean Production](#) | [Cotton Production](#)



China Crop Areas and Precipitation Data

Matrix of Precipitation Data

China Crop Areas and Precipitation Amounts

Summary: CROP EXPLORER

Foreign Agricultural Service

FAS *to the World*



Explore by Region

North America

United States
Canada

Central America

Mexico
Central America
and Caribbean

South America

Brazil
Northern South
America
Southern South
America

Europe

Europe

Middle East

Iran, Iraq, Syria and
Turkey

Oceania

Australia

Former Soviet Union

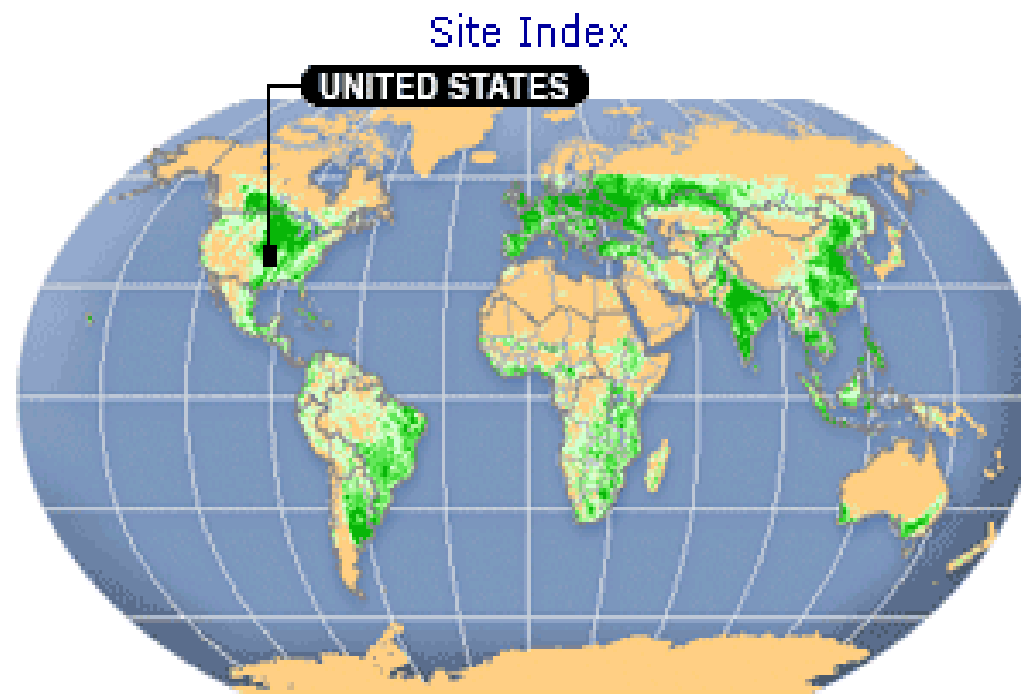
Kazakhstan
Russia, Azerbaijan,
Armenia and Georgia
Ukraine, Moldova,
and Belarus

Africa

North Africa
Southern Africa
East Africa
West Africa

Asia

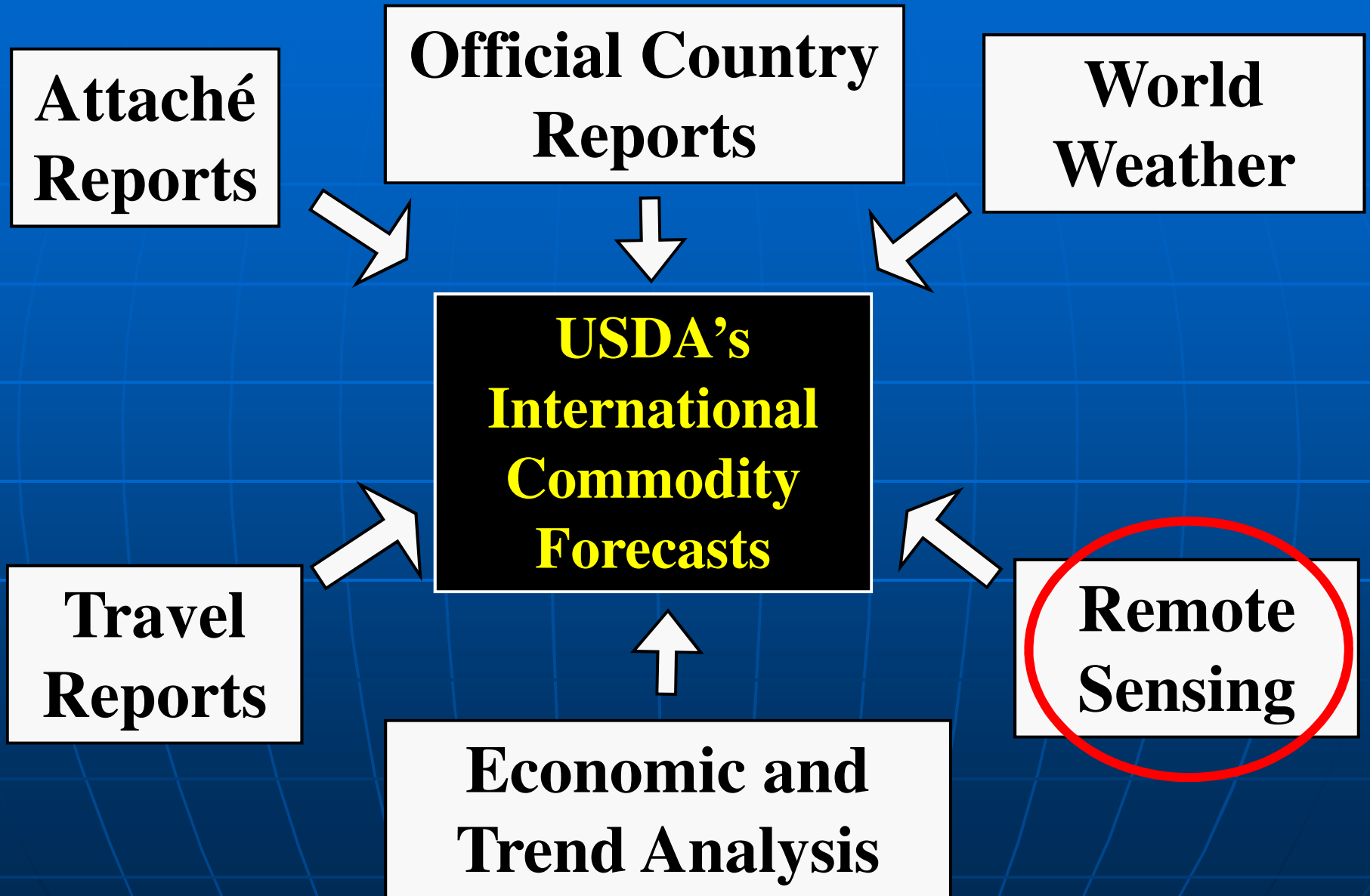
Eastern China
South Asia
Southeast Asia
Central Asia
Korea



End CE / RSGIS

11/29/2013

Inputs to USDA Monthly Forecasts



Mission: provide timely and informed estimates of world-wide crop production.

Source of satellite data and imagery ?

- It's actually not from one particular satellite but from a several satellites of different capabilities

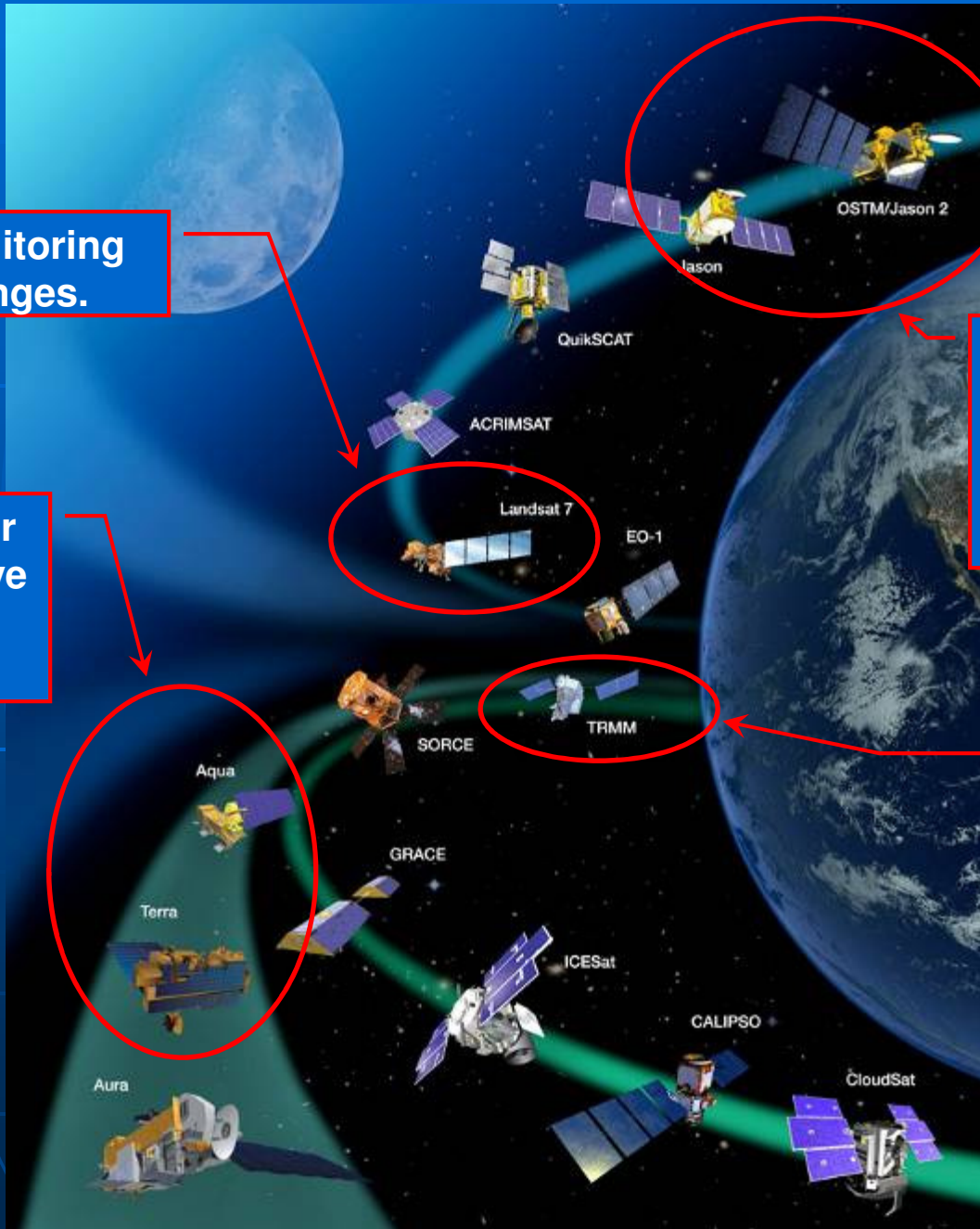
“All Sources” & “Convergence of Evidence”

Landsat for monitoring crop area changes.

MODIS sensor for monitoring relative crop conditions and yields.

Radar satellite altimeters for monitoring reservoir and lake water levels.

TRMM for monitoring seasonal precipitation



Inputs to USDA Monthly Forecasts

Low and Medium Resolution Sensors

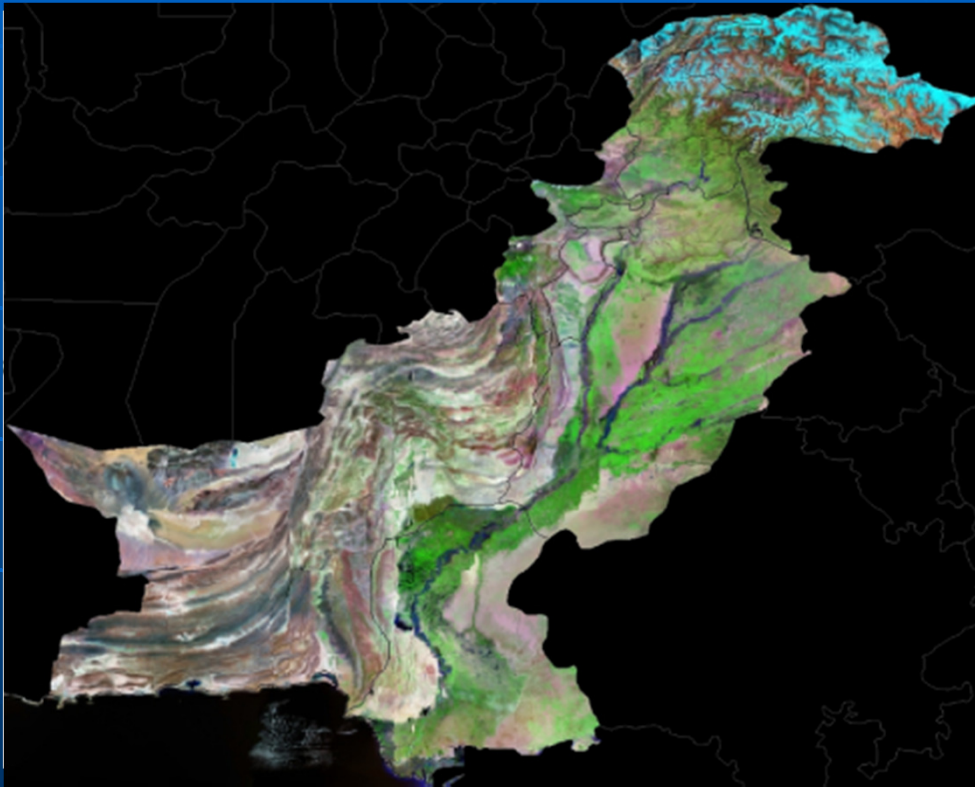
- AVHRR (8 km)
- SPOT-Vegetation (1 km)
- MODIS (250 m)
- AWIFS (56 m)
- Landsat (30 m)



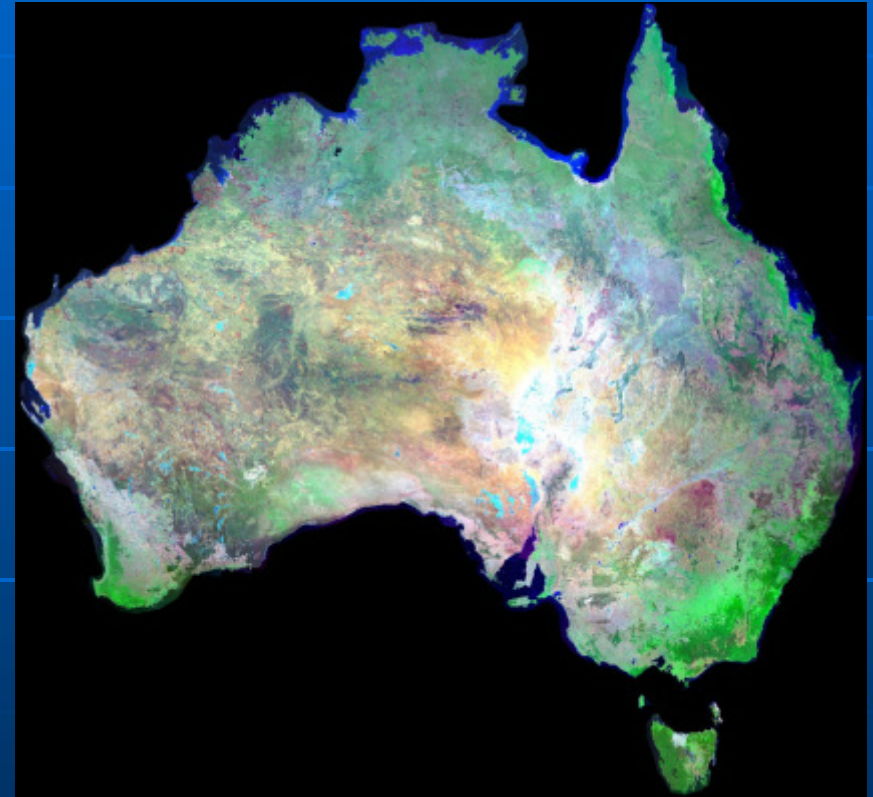
**Remote
Sensing**

Remote Sensing Analysis Strategies:

Qualitative



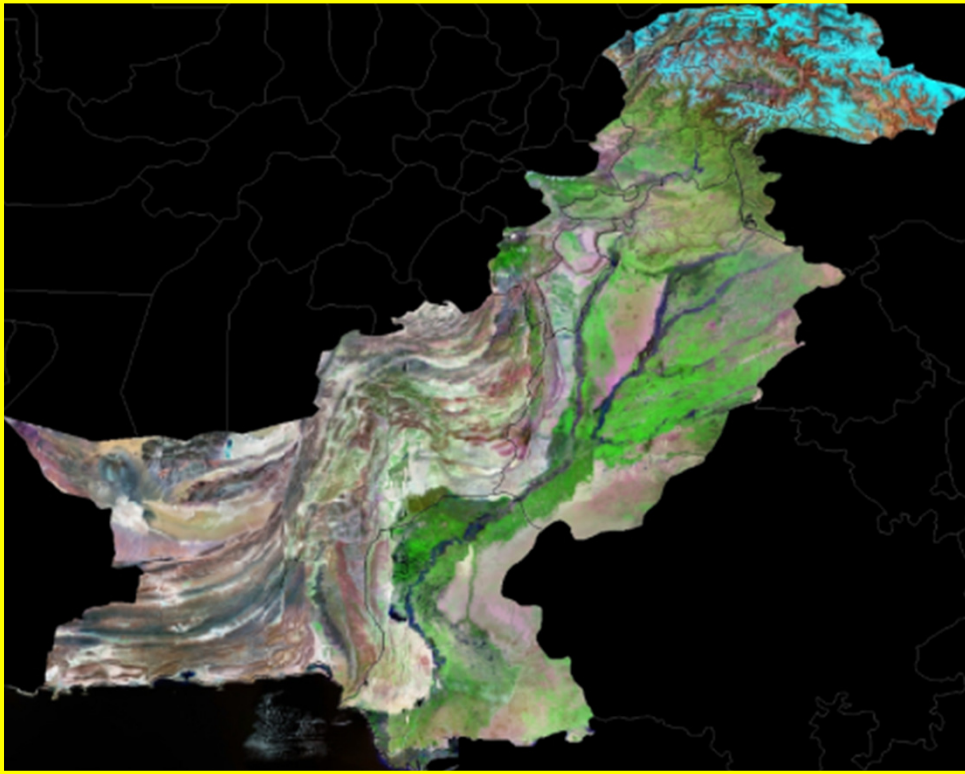
Quantitative



Two examples of techniques employed to monitor crop conditions and ultimately make a monthly forecast update of crop production for each country.

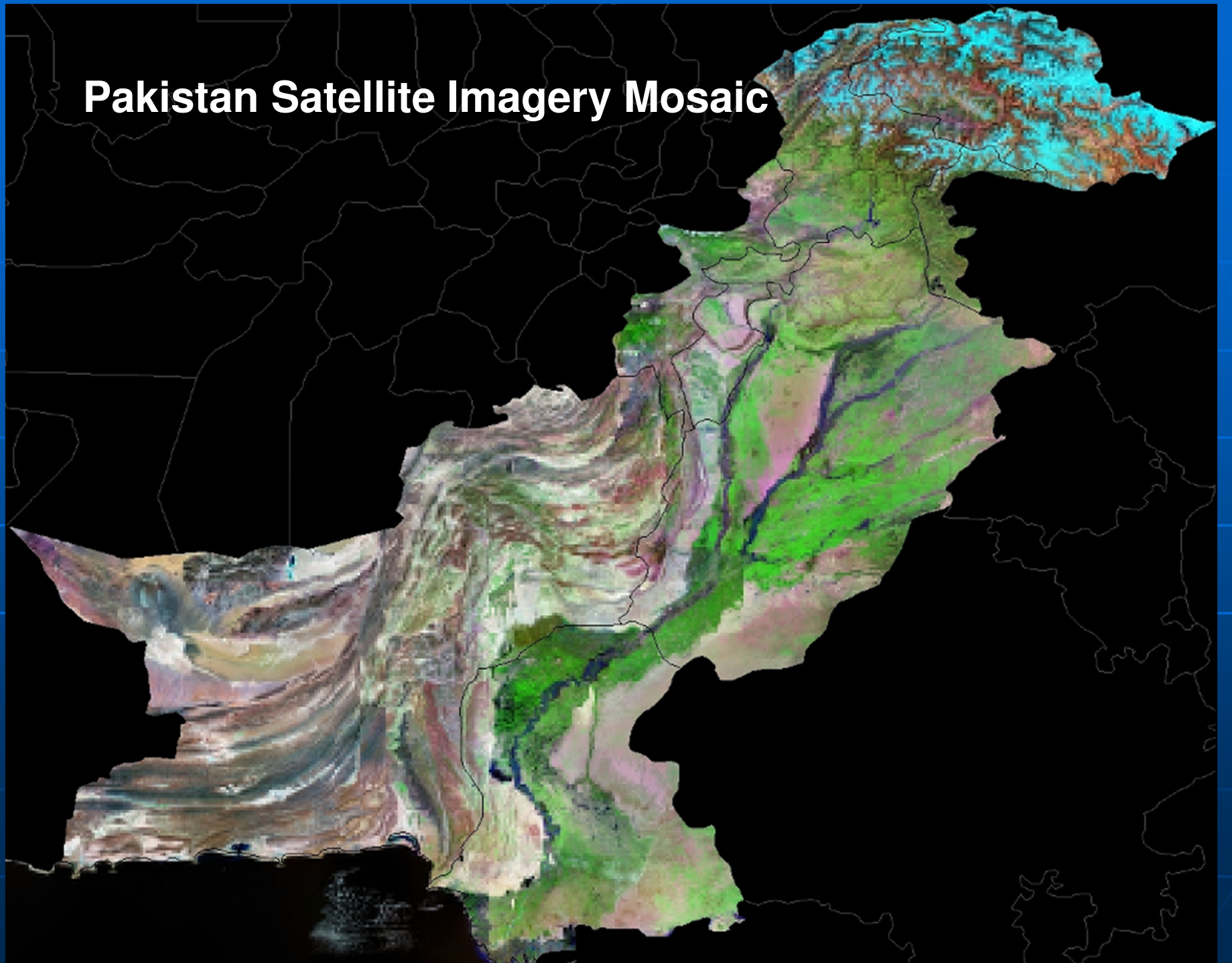
Remote Sensing Strategies:

- Qualitative Analysis Satellite Imagery
- Quantitative Analysis Satellite Imagery



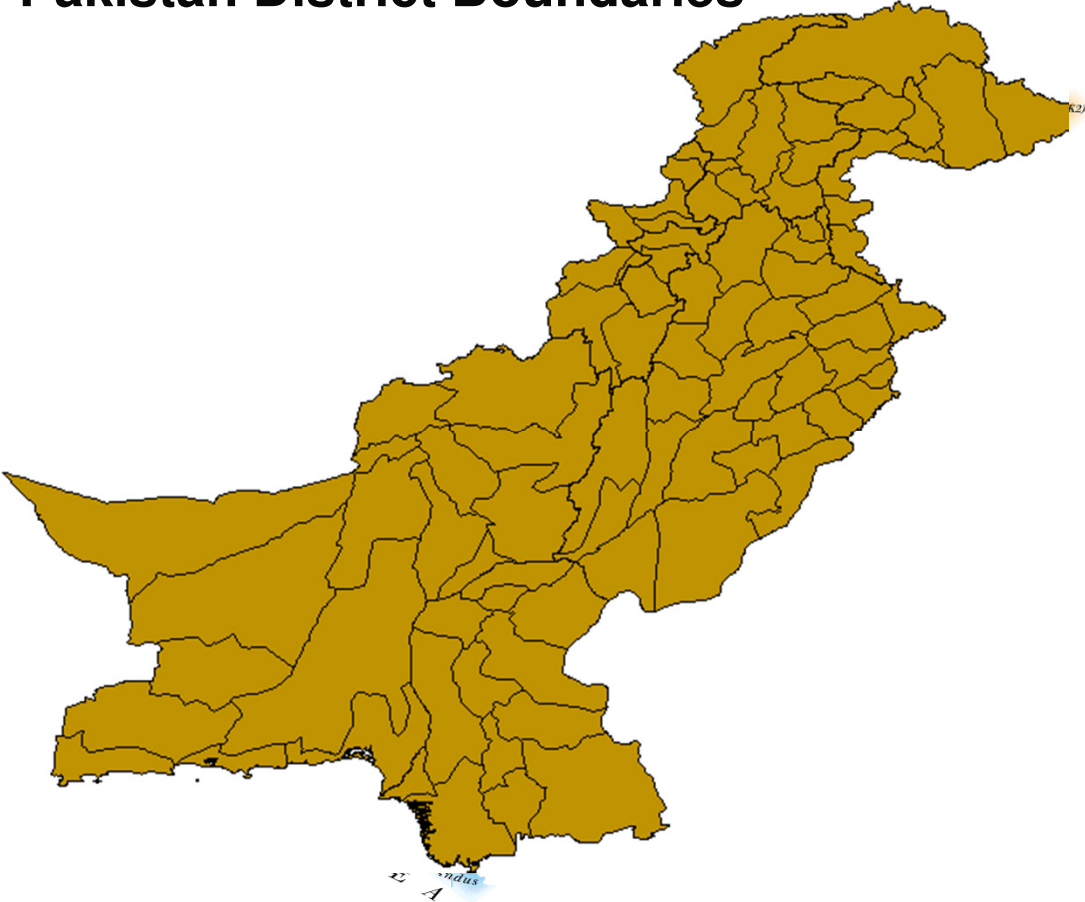
Pakistan Image Mosaic

Pakistan Satellite Imagery Mosaic



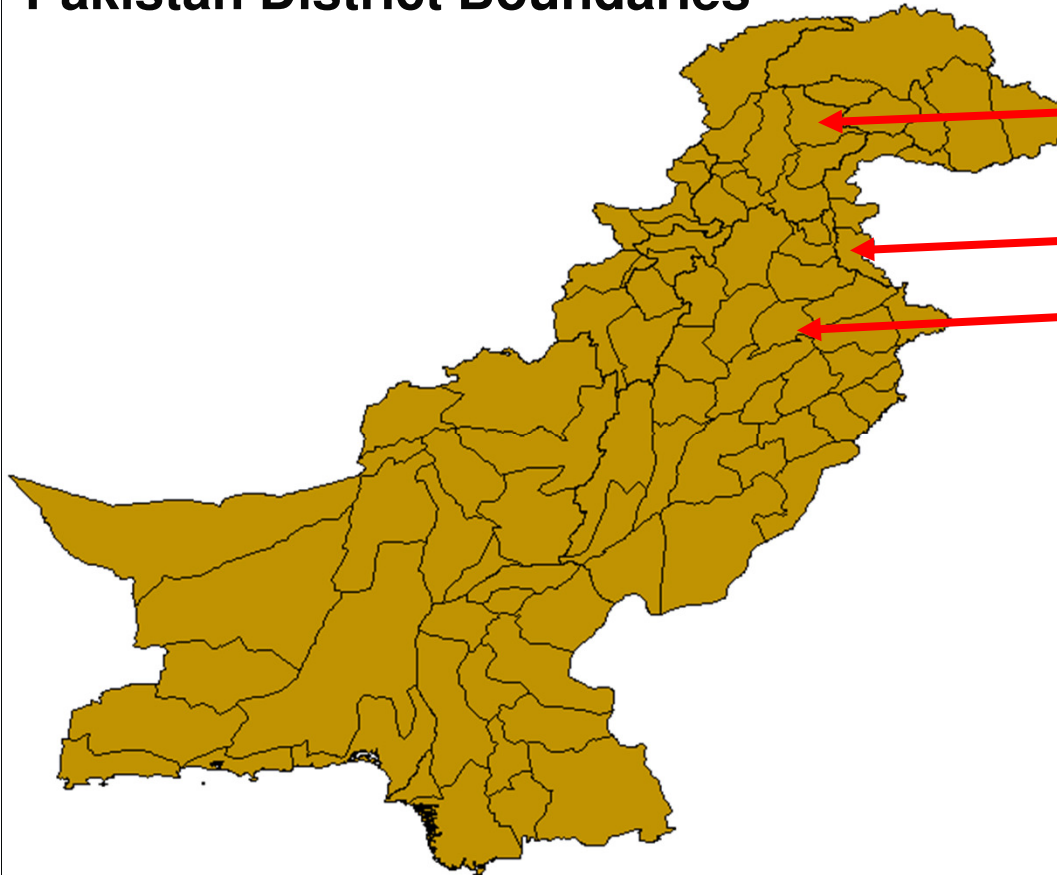
GIS and Statistical Data Identify Major Wheat Producing Areas

Pakistan District Boundaries



Identify High Production Zones: using GIS and statistical data

Pakistan District Boundaries



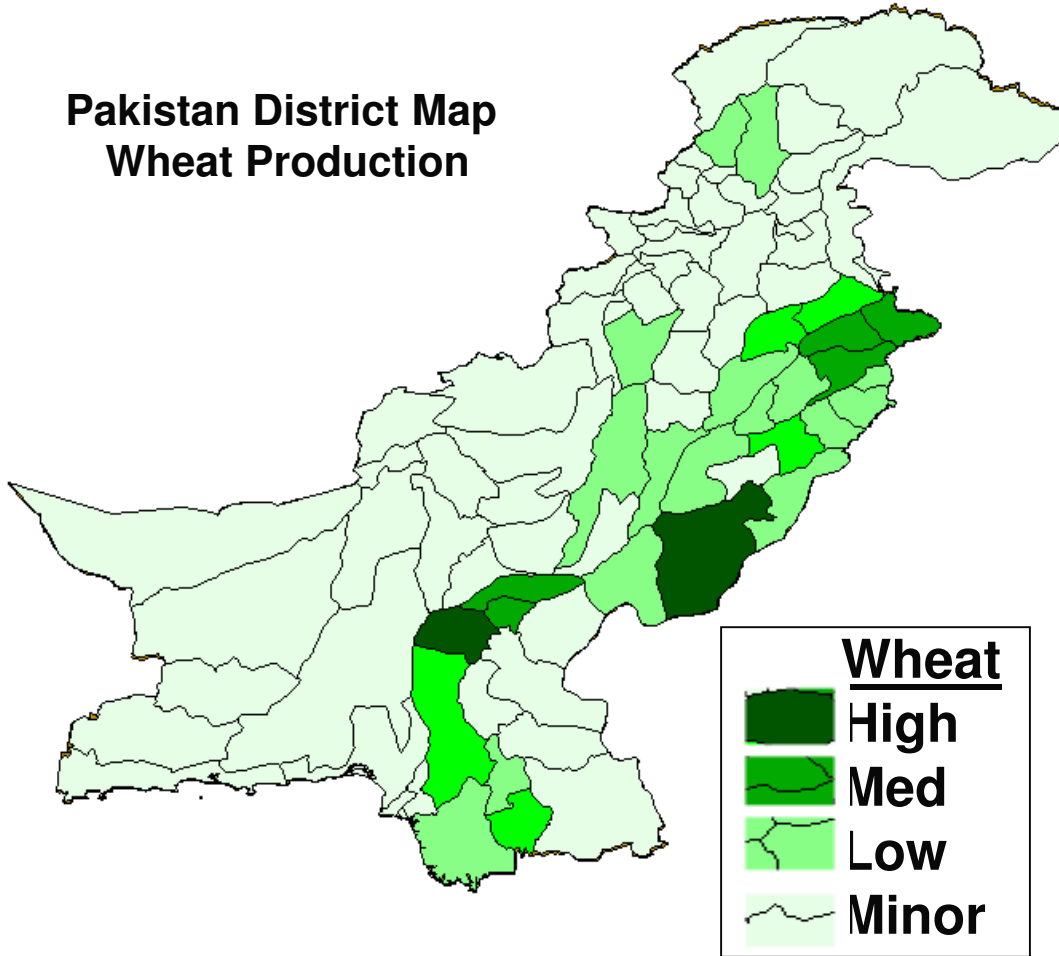
Pakistan District Statistical Data

District	Invet_88	P_prod88m	Area_sqkm	Pop_1202	Pop_sqkm	Comments	Prod	Vingc
Mansehra	4911	1113	5957	1245	AS00030005000	1113.0	PK0003	
Bajour	4100	5200	4530	335	AS00010001000	5200.0	PK0001	
Mohmand	0	0	2296	190	AS00010002000	0.0	PK0001	
Malakand	6900	12700	952	357	AS00030006000	12700.0	PK0003	
Peshawar	700	1700	4001	2970	AS00030007000	1700.0	PK0003	
Mardan	1800	3300	3137	1845	AS00030008000	3300.0	PK0003	
Abbottaba	588	9287	3565	1359	AS00030009000	9287.0	PK0003	
Khyber	0	0	3528	338	AS00010003000	0.0	PK0001	
Kurram	5000	7000	3390	341	AS00010004000	7000.0	PK0001	
Rawalpind	0	0	5286	2513	AS00040001000	0.0	PK0004	
Attock	0	0	9789	1288	AS00040002000	0.0	PK0004	
Islamabad	0	0	306	320	AS00040003000	0.0	PK0004	
Orakzai	100	100	1538	416	AS00010005000	100.0	PK0001	
Kohat	500	700	3512	488	AS00030010000	700.0	PK0003	
Karak	0	0	3500	502	AS00030011000	0.0	PK0003	
N.Wazi	400	500	4707	277	AS00010006000	500.0	PK0001	
60000	NA	0.1	NA	NA	AS00000001000	this is 0.1	PK0000	
Jhelum	800	600	5179	807	AS00040004000	600.0	PK0004	
Hazar_Ban	7810	9500	4813	301	AS00010007000	9500.0	PK0001	
Mianwali	400	500	13993	849	AS00040005000	500.0	PK0004	
Bannu	1800	3000	4391	872	AS00030012000	3000.0	PK0003	
Gujrat	72800	88800	5865	2596	AS00040006000	88800.0	PK0004	
Sialkot	193800	195000	5353	3026	AS00040007000	195000.0	PK0004	
S.Wazi	200	200	6620	359	AS00010008000	200.0	PK0001	
Khushab(6	0	0	na	1511	AS00040008000	na denote 0.0	PK0004	
D.I. Khan	NA	0.1	NA	NA	AS00010009000	code matc 0.1	PK0001	
Sargodha	51800	75200	12367	1511	AS00040009000	75200.0	PK0004	
D.I.Khan	6900	19400	9005	845	AS00030013000	19400.0	PK0003	
Gujranwal	254600	314700	5988	3427	AS00040010000	314700.0	PK0004	
Bhakkar(6	0	0	na	848	AS00040011000	na denote 0.0	PK0004	
Zhob	0	0	27129	817	AS00020001000	0.0	PK0002	
Sheikhupu	204800	203800	5960	2638	AS00040012000	203800.0	PK0004	
Jhang	37600	42200	8809	2458	AS00040013000	42200.0	PK0004	
Faisalaba	17450	20900	9108	3307	AS00040014000	20900.0	PK0004	
Lahore	22728	26064	1772	4829	AS00040015000	26064.0	PK0004	
Loralai	0	0	19071	861	AS00020002000	0.0	PK0002	
T. T. Singh	17450	20900	na	1654	AS00040016000	na denote 20900.0	PK0004	
Leiah(607	0	0	na	0	AS00040017000	na denote 0.0	PK0004	
D.G. Khan	36000	35800	24240	2185	AS00040018000	35800.0	PK0004	
Kasur	36972	41268	3995	968	AS00040019000	41268.0	PK0004	
Pishin	0	0	11112	584	AS00020003000	0.0	PK0002	
Okara(604	35000	41268	na	968	AS00040020000	na denote 41268.0	PK0004	
Sahiwal	103600	142700	10303	4916	AS00040021000	142700.0	PK0004	

Identify High Production Zones: using GIS and statistical data

Production ↓

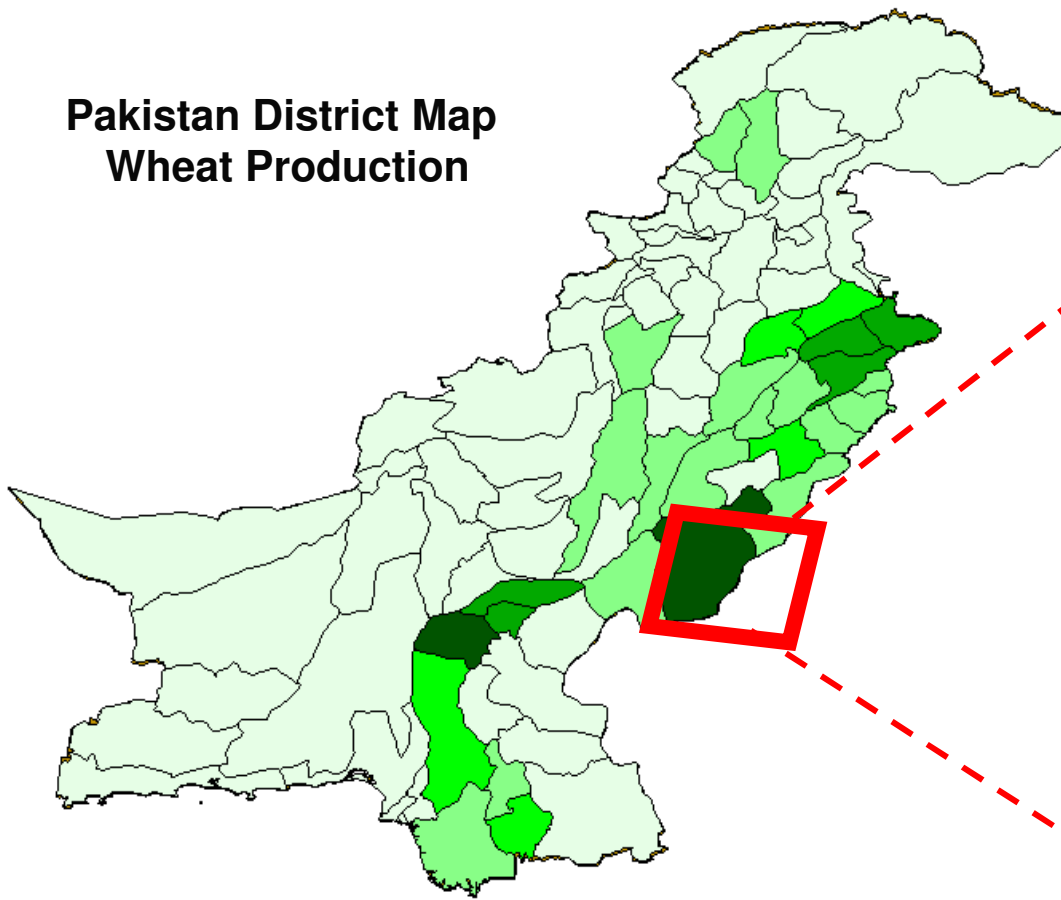
**Pakistan District Map
Wheat Production**



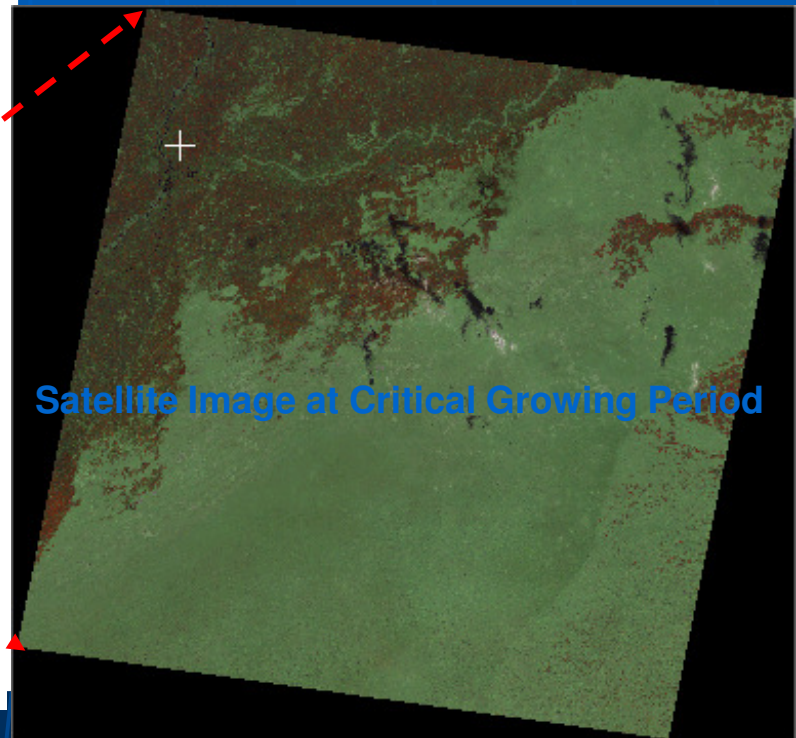
District	Invet_88	P_prod88m	Area_sqkm	Pop_x1000	Pop_sqkm	Comments	Yield	Vinys
Mansehra	4911	1113	5957	1245	AS00030005000		1113.0	PK0003
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Abbottaba	588	9287	3565	1359	AS00030009000		9287.0	PK0003
Khyber	0	0	2576	330	AS00010003000		0.0	PK0001
Kurram	5000	7000	3380	341	AS00010004000		7000.0	PK0001
Rawalpind	0	0	5286	2513	AS00040001000		0.0	PK0004
Attock	0	0	9789	1288	AS00040002000		0.0	PK0004
Islamabad	0	0	906	320	AS00040003000		0.0	PK0004
Orakzai	100	100	1538	416	AS00010005000		100.0	PK0001
Kohat	500	700	3512	488	AS00030010000		700.0	PK0003
Karak	0	0	3500	502	AS00030011000		0.0	PK0003
N Wazi	400	500	4707	277	AS00010006000		500.0	PK0001
60000	NA	0.1	NA	NA	AS00000001000	this is	0.1	PK0000
Jhelum	800	600	5179	807	AS00040004000		600.0	PK0004
Hazar_Ban	7810	9500	4813	301	AS00010007000		9500.0	PK0001
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S Wazi	200	200	6620	359	AS00010008000		200.0	PK0001
Khushab(6	0	0	na	1511	AS00040008000	na denote	0.0	PK0004
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Sargodha	51800	75200	12367	1511	AS00040009000		75200.0	PK0004
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Bhakk(6	0	0	na	848	AS00040011000	na denote	0.0	PK0004
Zhob	0	0	27129	817	AS00020001000		0.0	PK0002
Sheikhupu	204800	203800	5960	2638	AS00040012000		203800.0	PK0004
Jhang	37600	42200	8809	2458	AS00040013000		42200.0	PK0004
Faisalaba	17450	20900	9108	3307	AS00040014000		20900.0	PK0004
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Leiah(607	0	0	na	0	AS00040017000	na denote	0.0	PK0004
D. G. Khan	36000	35800	24240	2185	AS00040018000		35800.0	PK0004
Kasur	36972	41268	3995	968	AS00040019000		41268.0	PK0004
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Sahiwal	103600	142700	10303	4916	AS00040021000		142700.0	PK0004

Identify High Wheat Production Zones

**Pakistan District Map
Wheat Production**



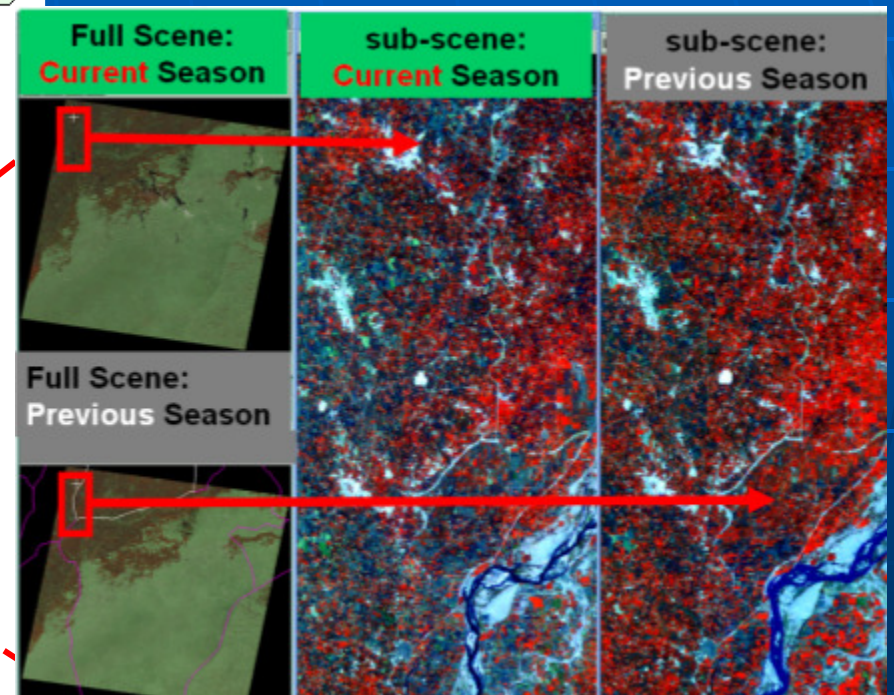
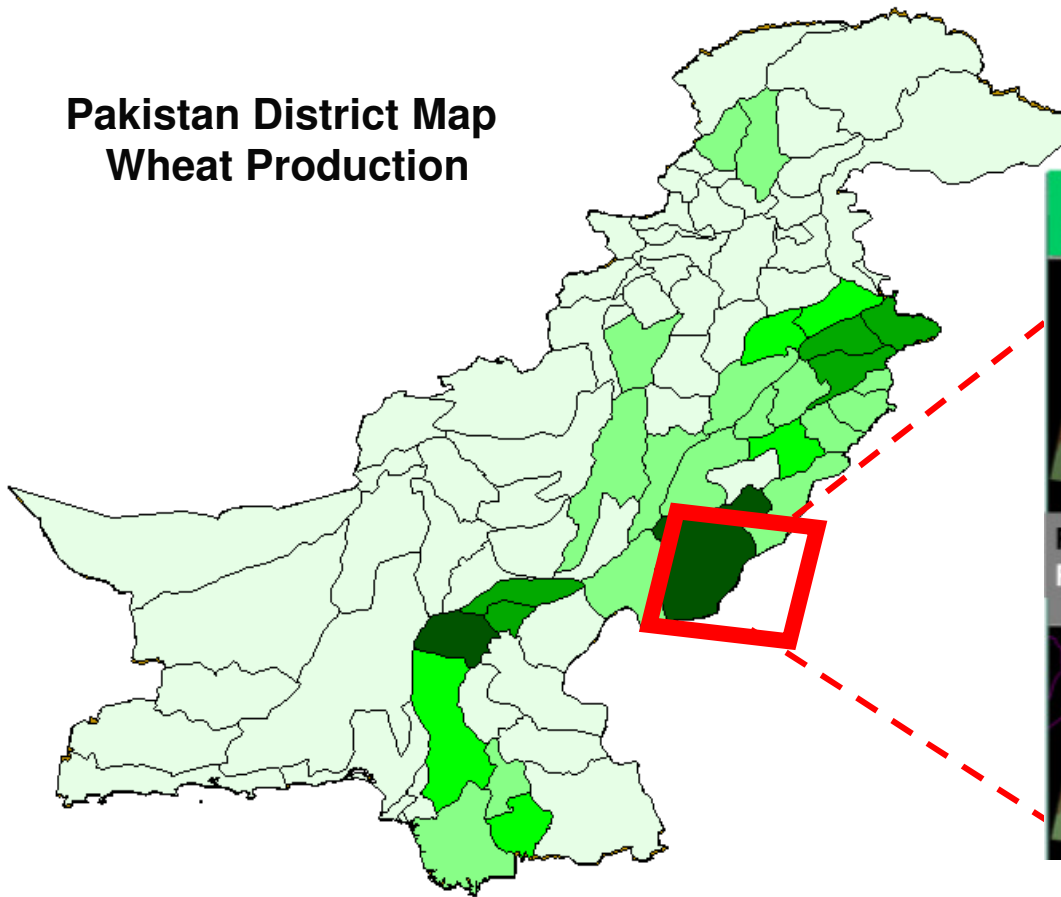
Acquire Satellite Data



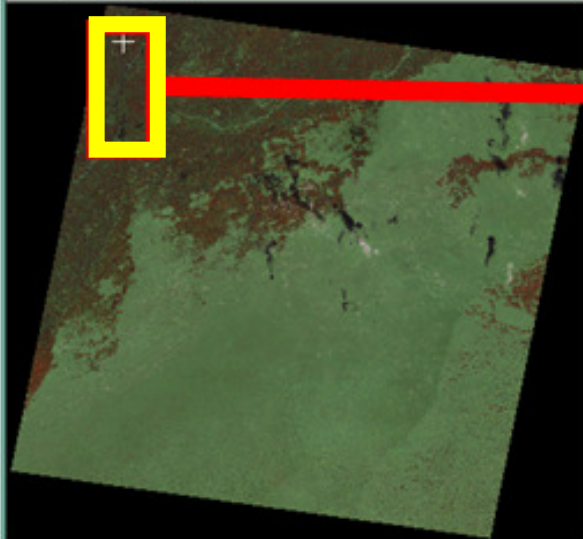
Satellite Image at Critical Growing Period

Wheat Production Zones to Imagery Analysis and Qualitative Interpretation

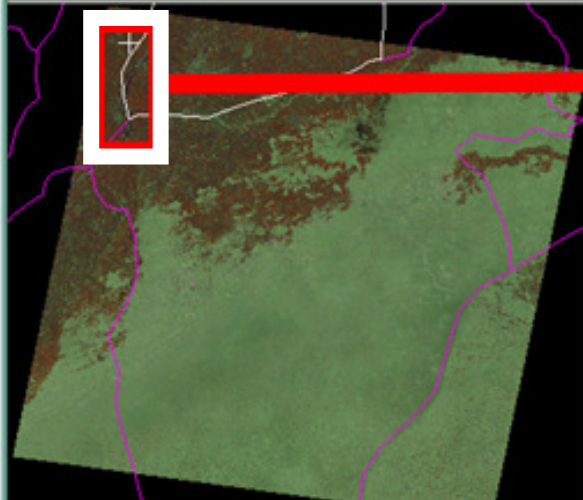
Pakistan District Map
Wheat Production



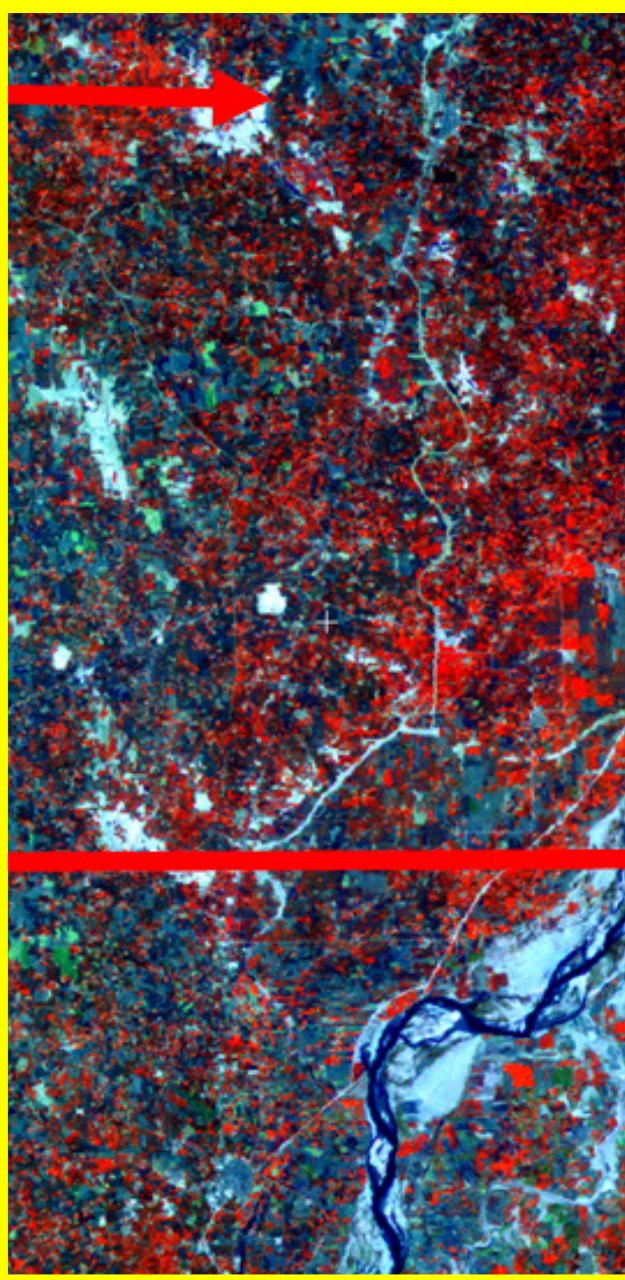
**Full Scene:
Current Season**



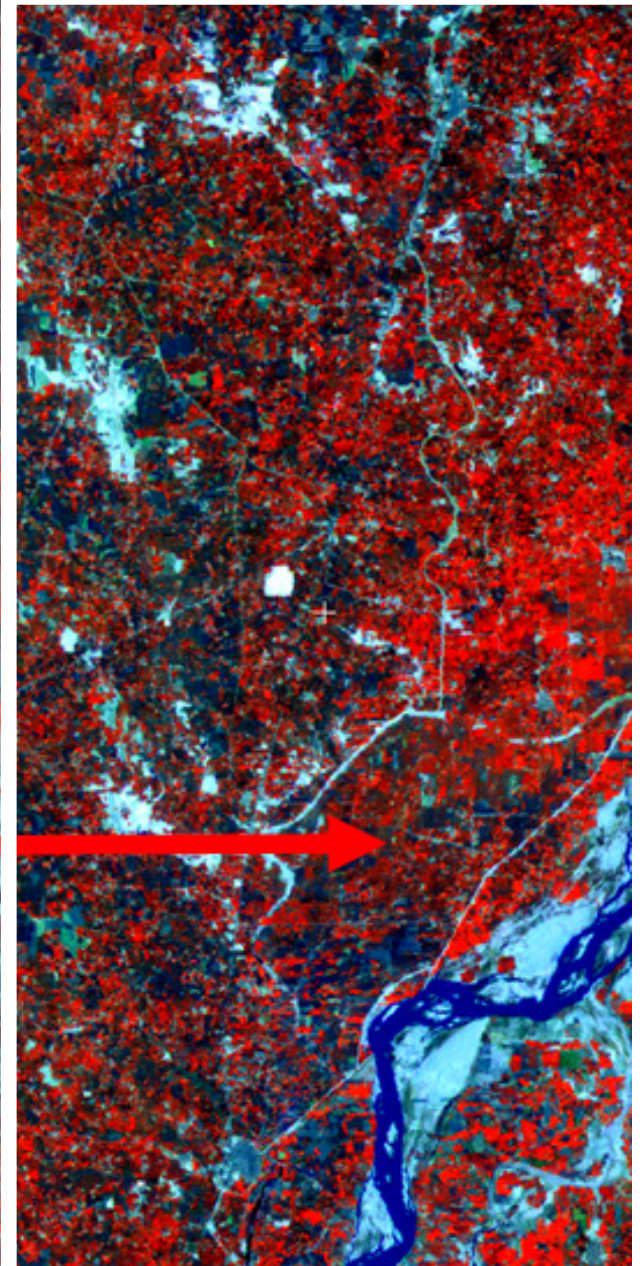
**Full Scene:
Previous Season**



**sub-scene:
Current Season**



**sub-scene:
Previous Season**



Visual Interpretation:

Landsat Satellite Imagery:
Vegetation including field crops are displayed in red.
Darker tones interspersed in predominantly red areas are fallow fields or non-vegetated areas.

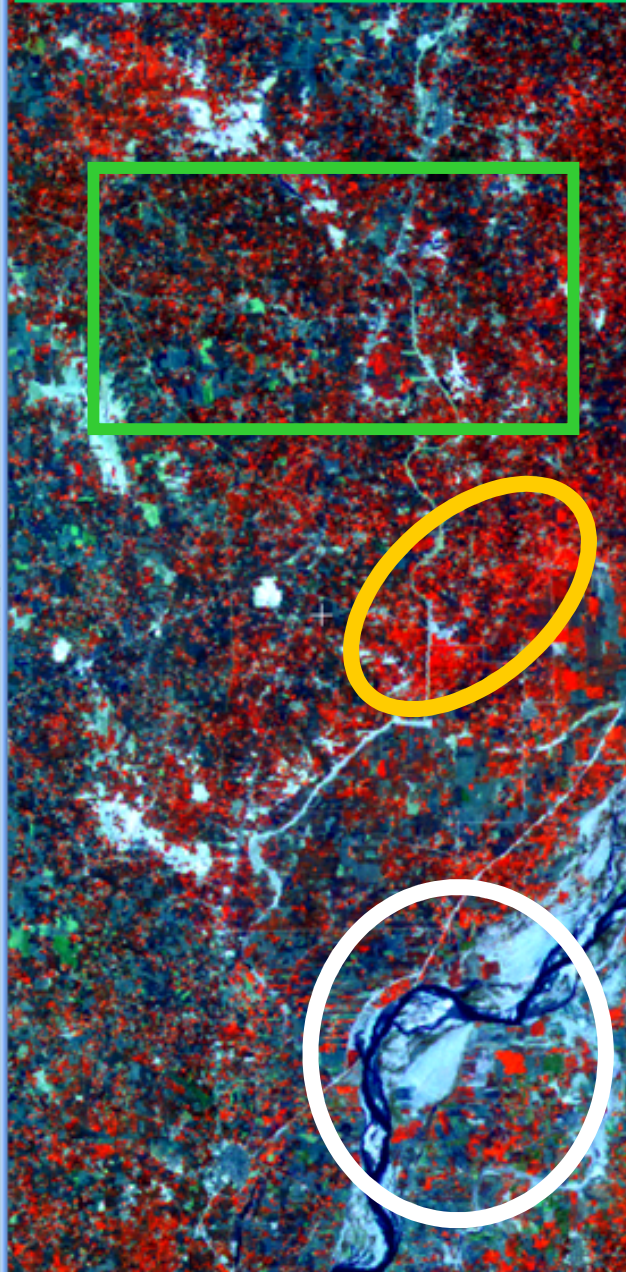
Red: dense crop canopy

- Agricultural Density
- Relative Crop Health
- Water Availability

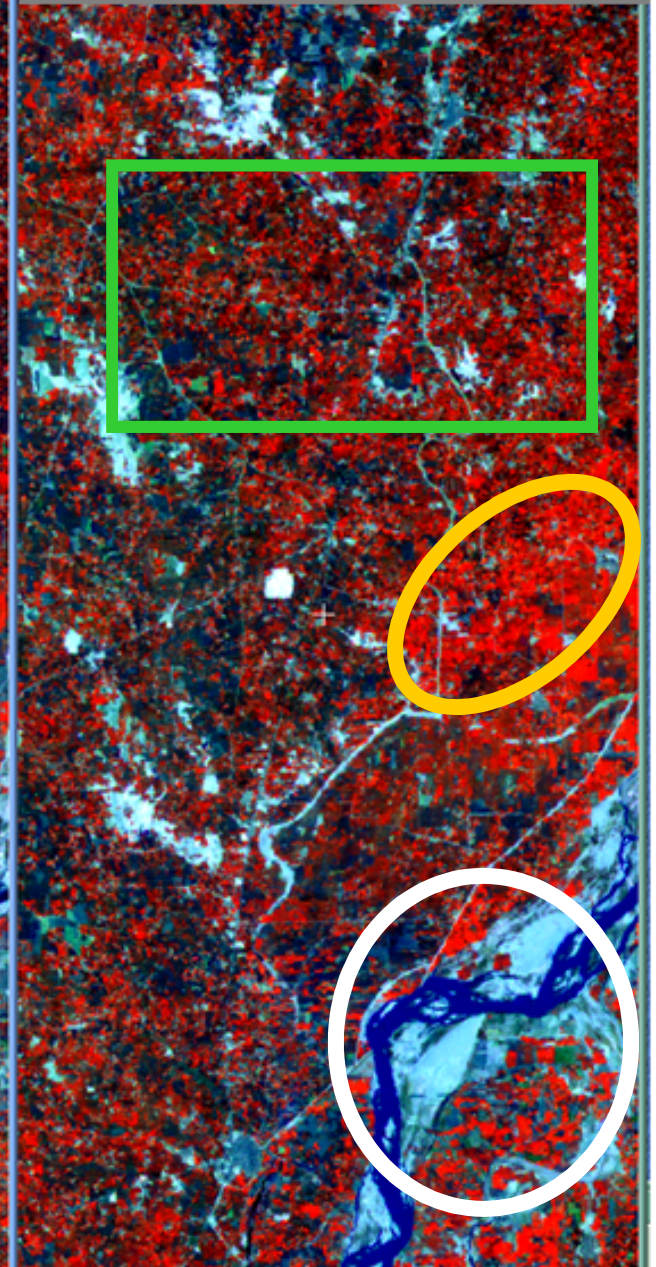
Comparison of two seasons (same crop stage) →

11/29/2013

Full Scene: Current Season



Full Scene: Previous Season



Visual Interpretation:

Pakistan Winter crops, in particular wheat, are largely grown under irrigated conditions. In this scene the differences between river are apparent in capacity and flow rate.

River Characteristics:

- Width
- Volume
- Turbidity
- Rate of flow

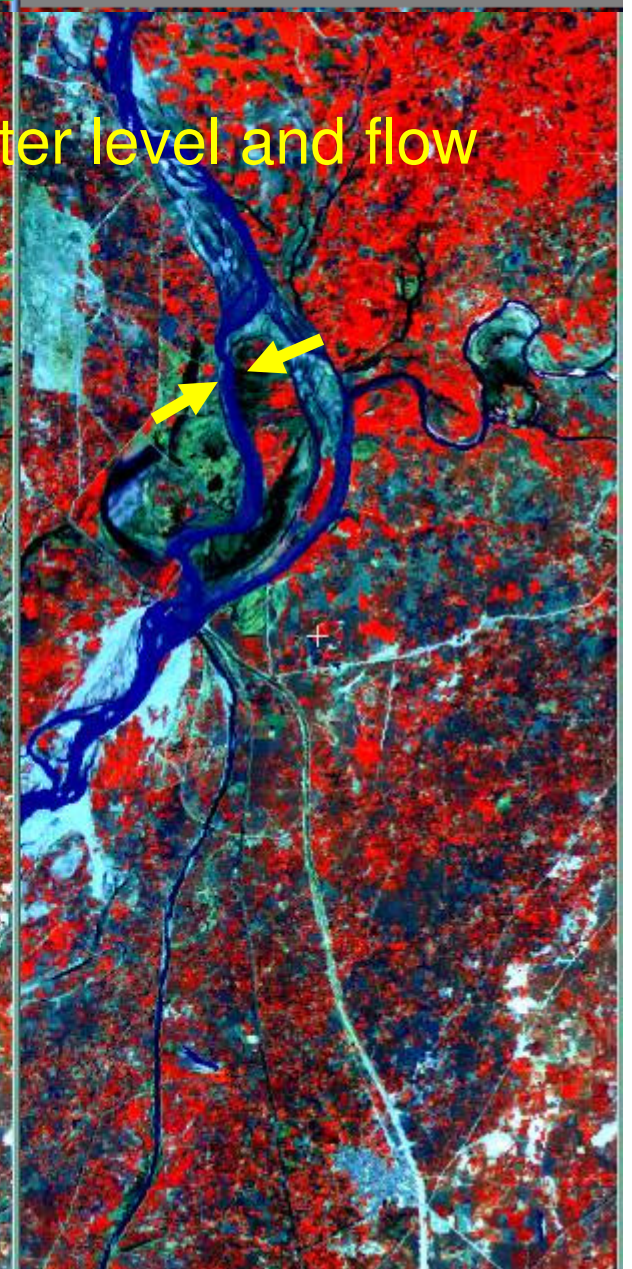
11/29/2013

Full Scene: Current Season



Differences in water level and flow

Full Scene: Previous Season



Visual Interpretation:

Pakistan Winter crops, in particular wheat, are largely grown under irrigated conditions. In this scene the differences between river are apparent in capacity and flow rate.

Irrigation Availability:

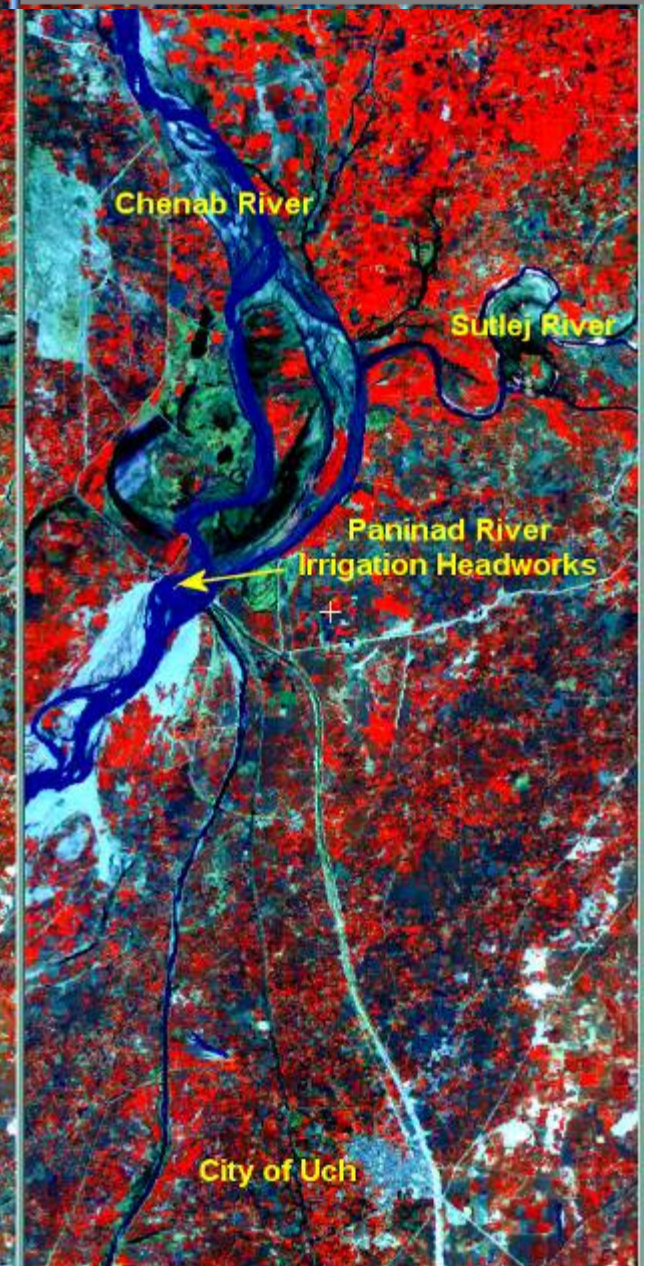
- Water Storage behind dam
- Control Location
- Major Irrigation River

11/29/2013

**Full Scene:
Current Season**



**Full Scene:
Previous Season**



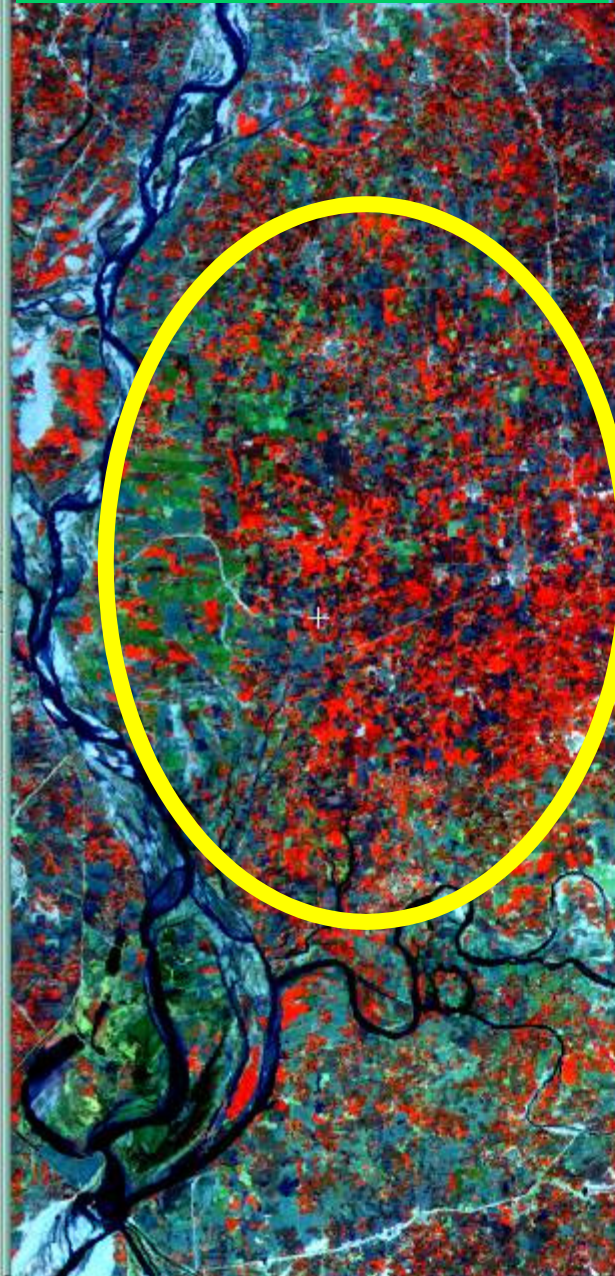
Pakistan Wheat and Irrigation

Visual Comparison Same week different years

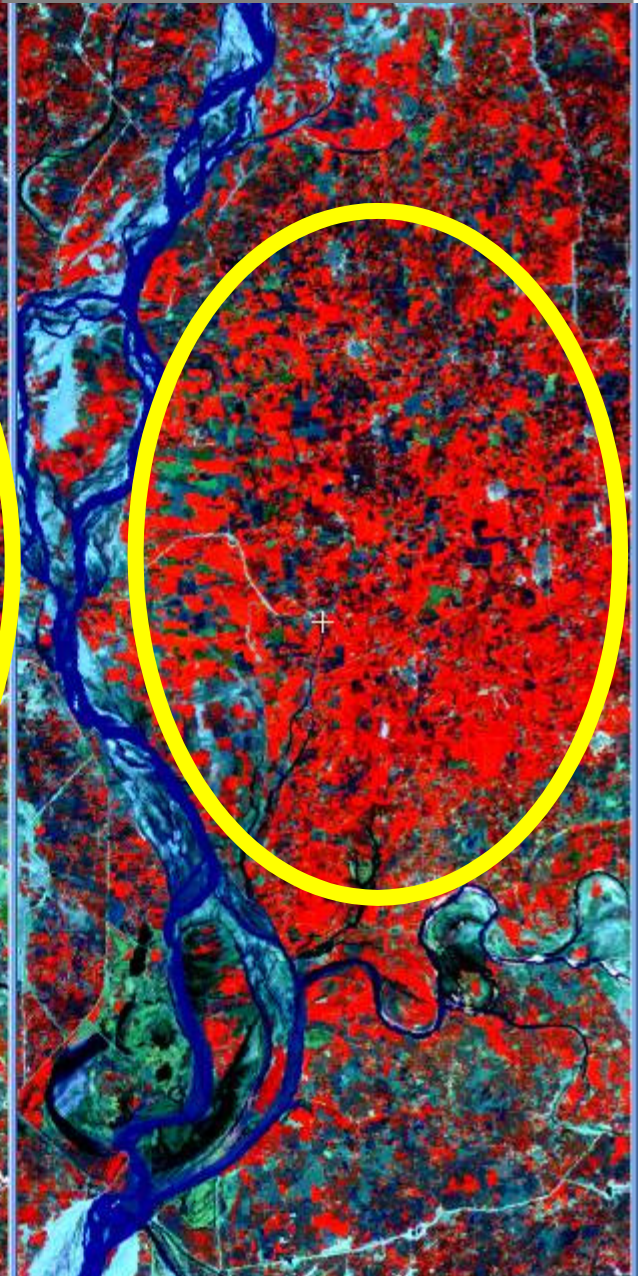
This important wheat growing area is clearly showing a very large difference in conditions and vegetation health year-to-year. Given the river level at the irrigation headwork in the lower left of the scenes this lower crop health is mostly likely a result of a reduction in irrigation water availability.

11/29/2013

Full Scene: Current Season

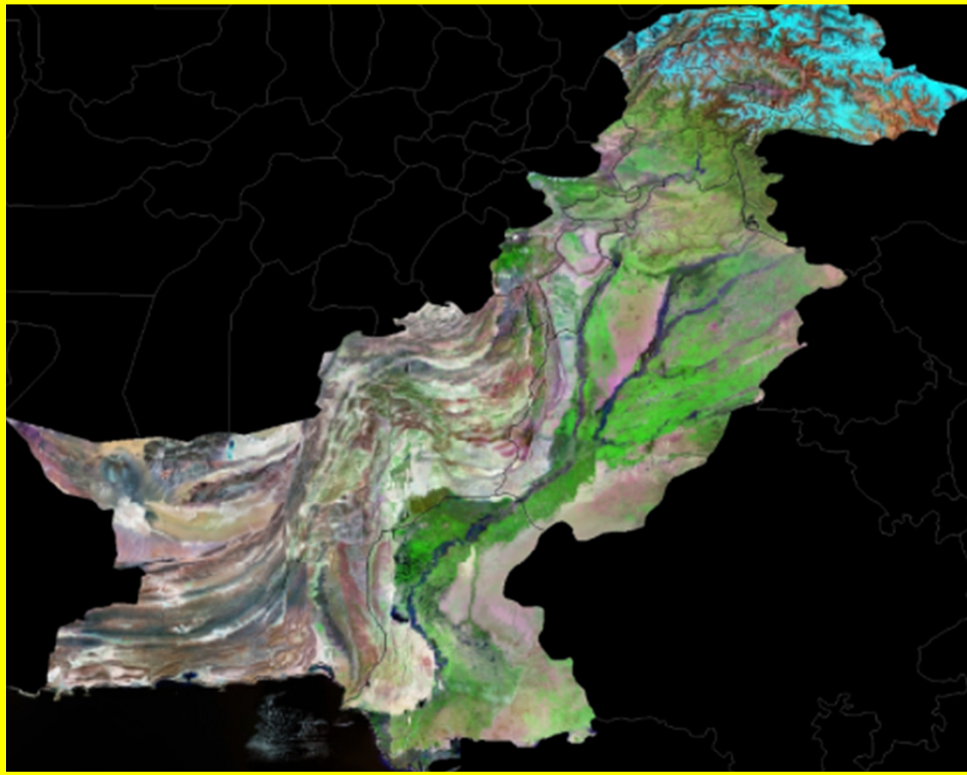


Full Scene: Previous Season

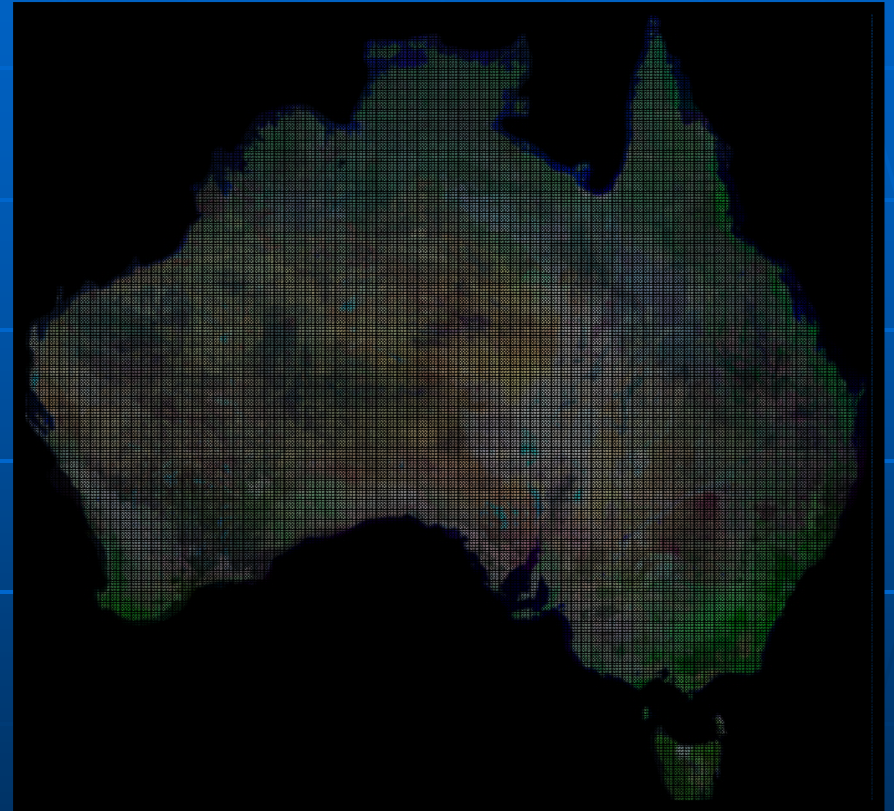


Remote Sensing Strategies:

- Qualitative Analysis Satellite Imagery
- Quantitative Analysis Satellite Imagery

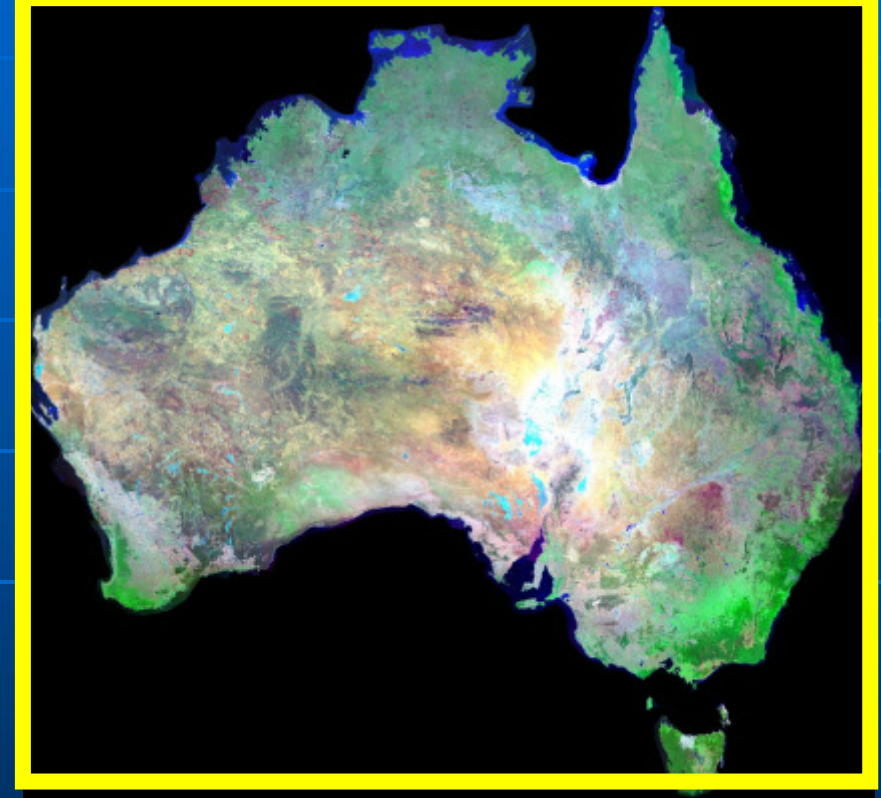
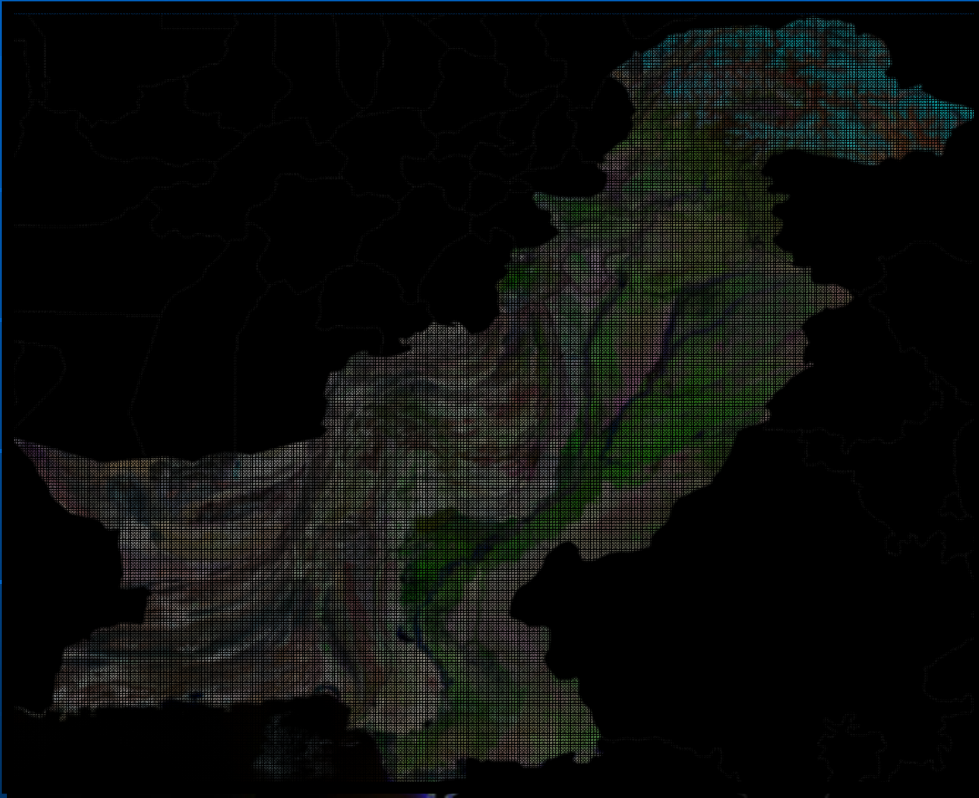


Pakistan



Remote Sensing Strategies:

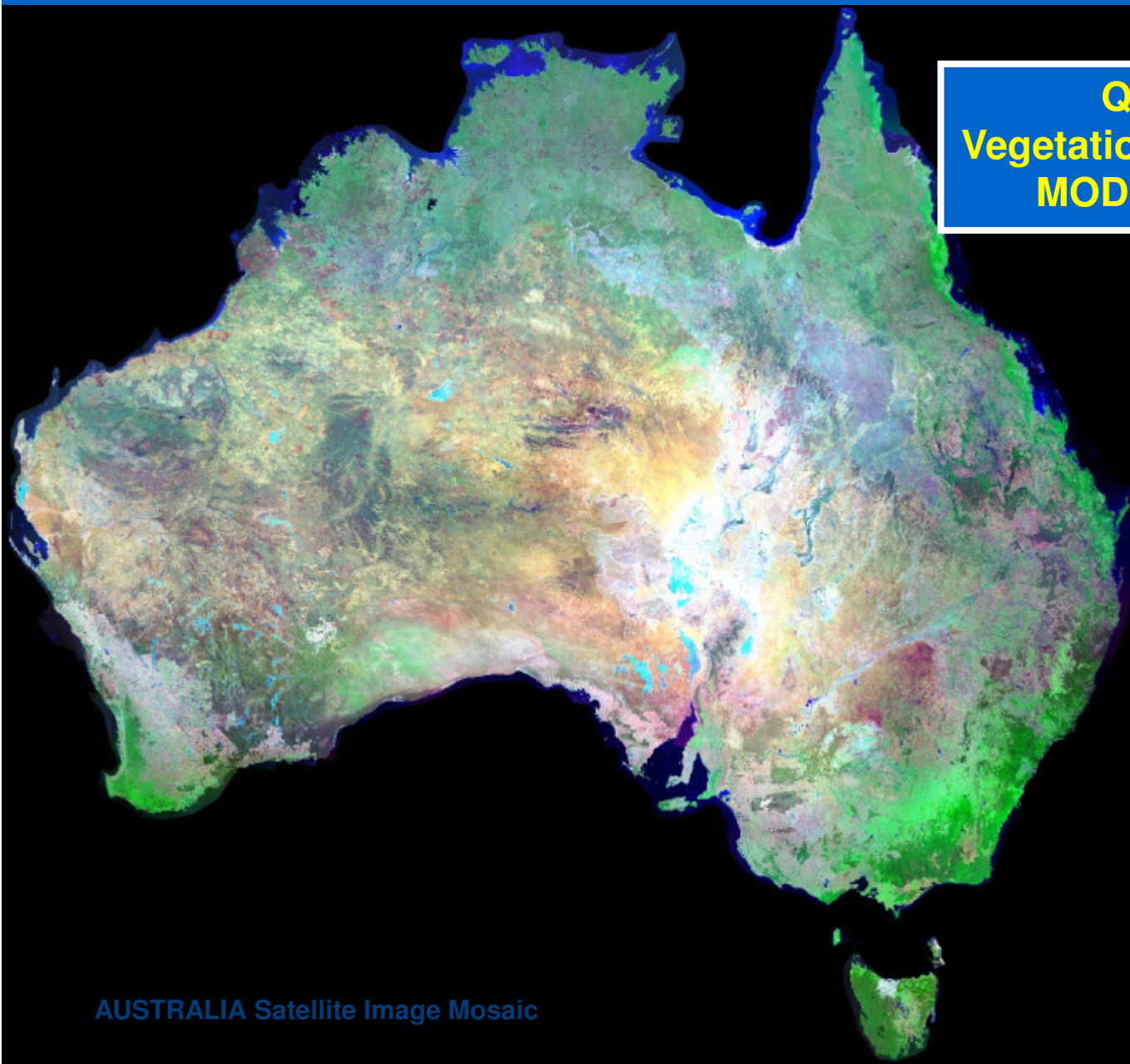
- Qualitative Analysis Satellite Imagery
- Quantitative Analysis Satellite Imagery



Australia

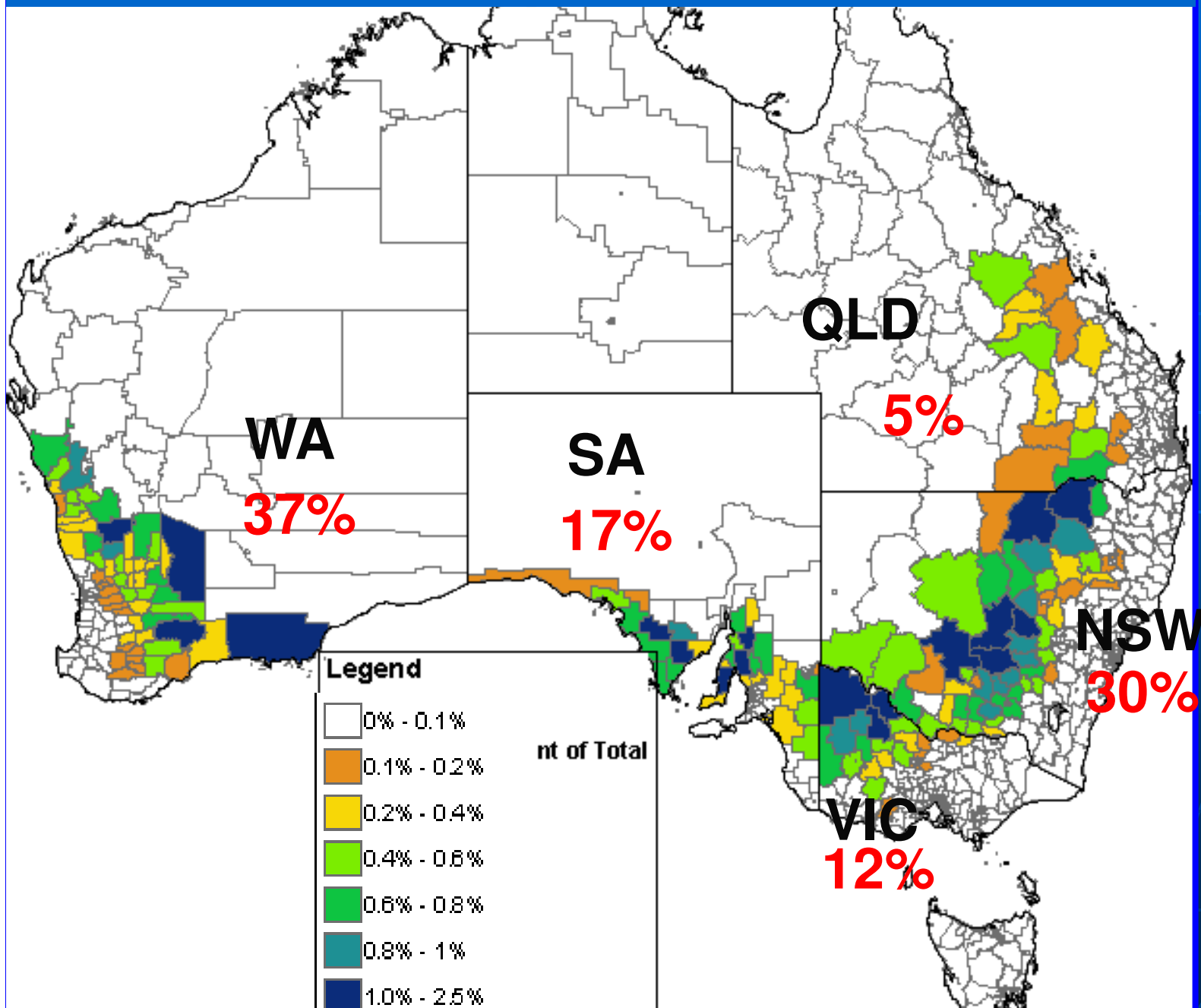
MODIS Satellite Imagery

Quantification of
Vegetation Conditions based on
MODIS Satellite Imagery

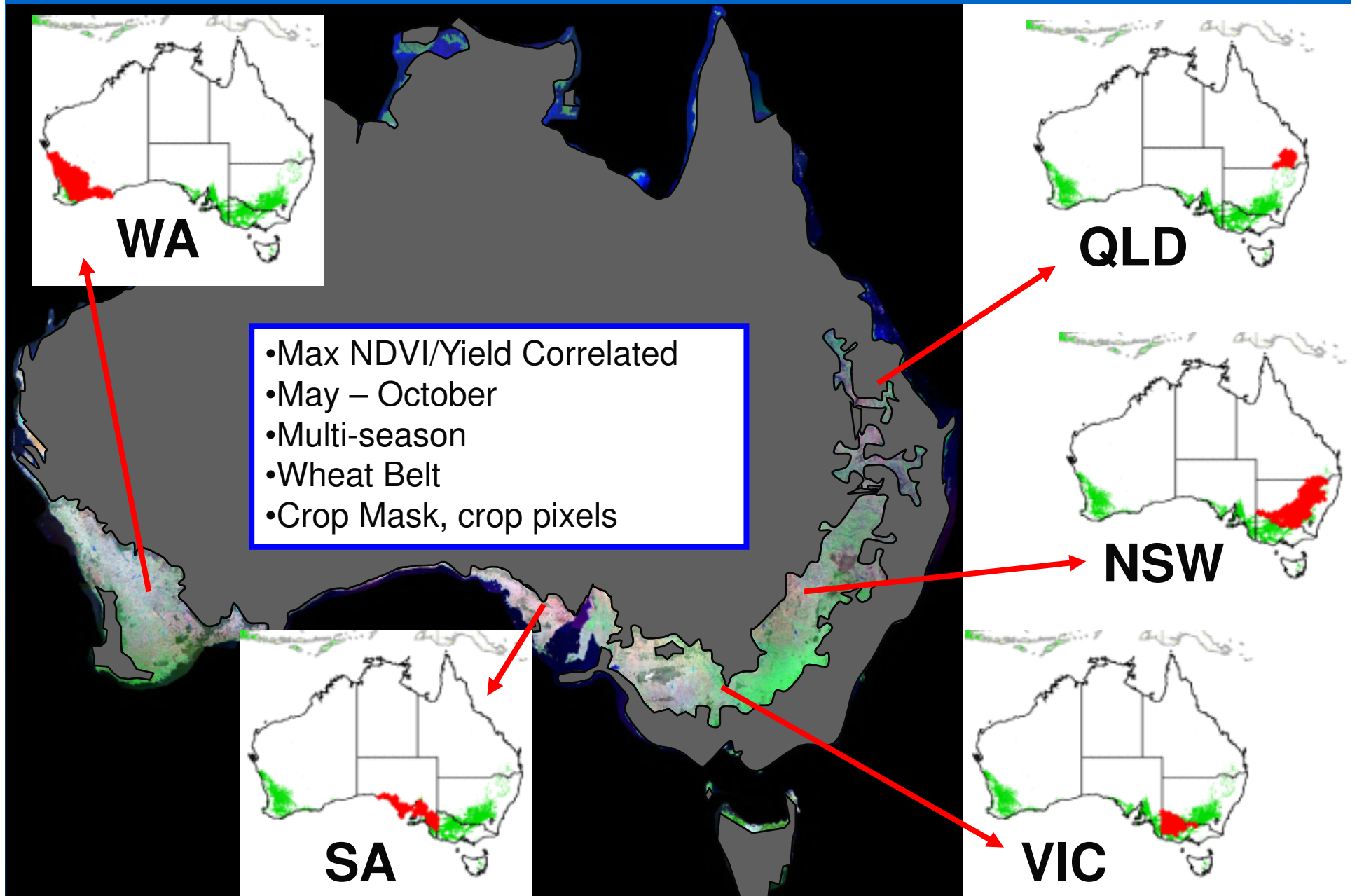


AUSTRALIA Satellite Image Mosaic

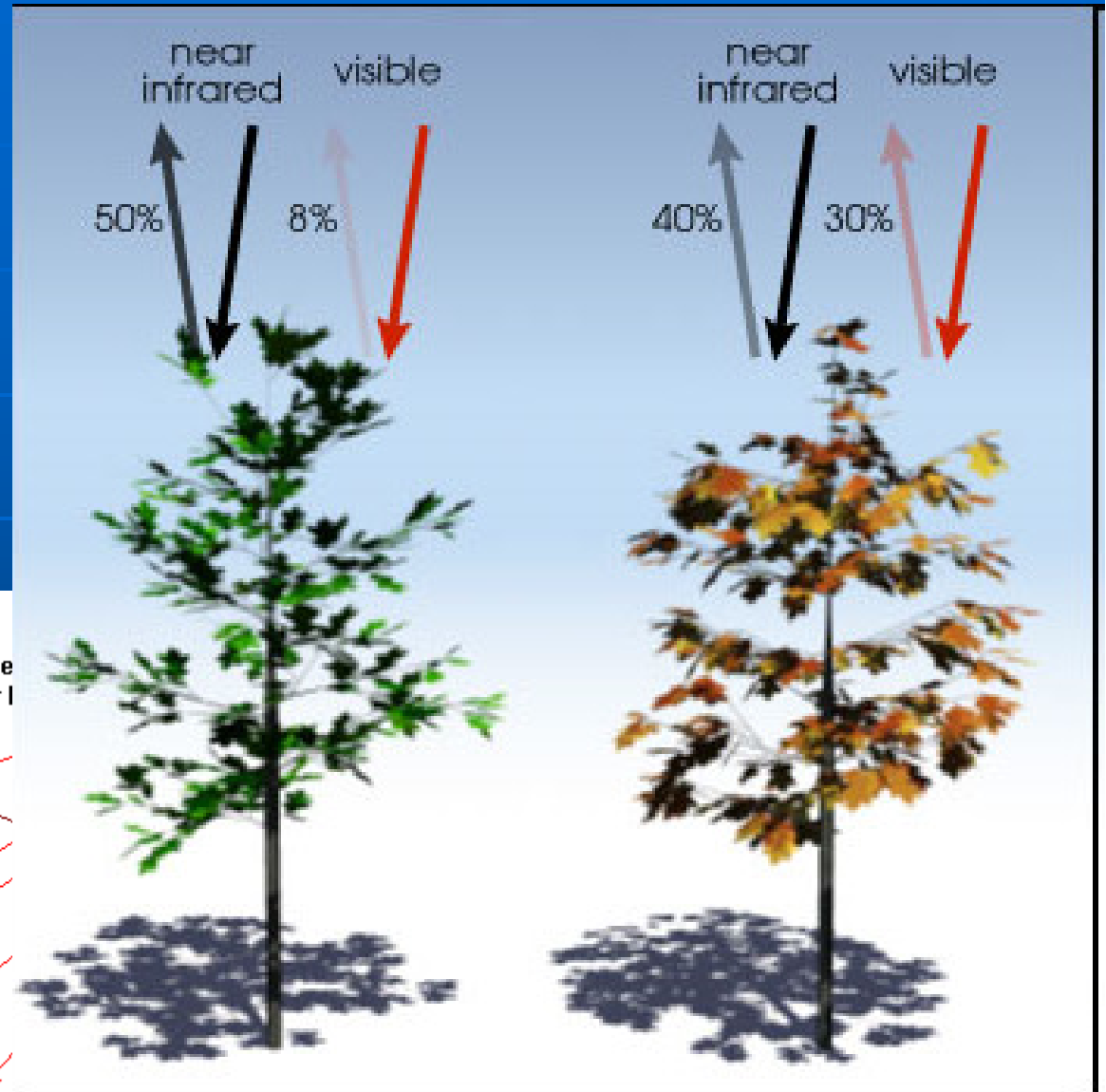
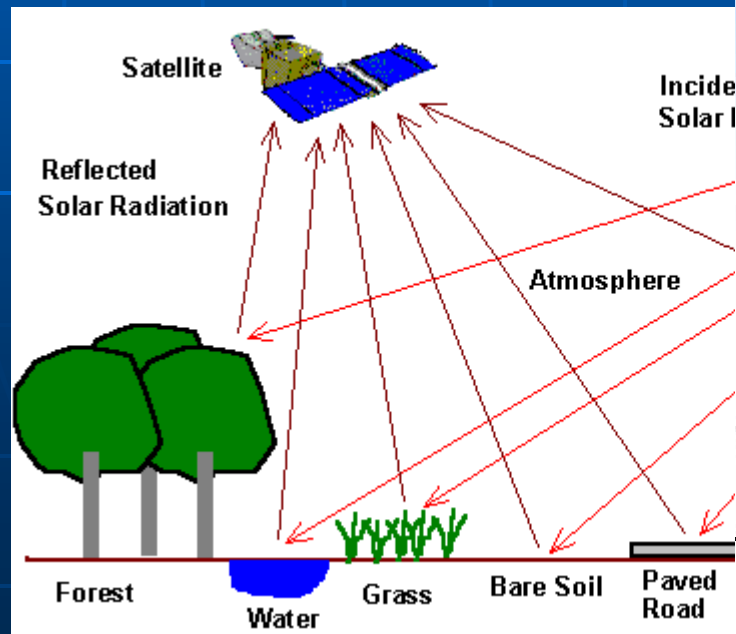
Australia Wheat Production by Shire



Quantification of MODIS NDVI over Wheat Areas



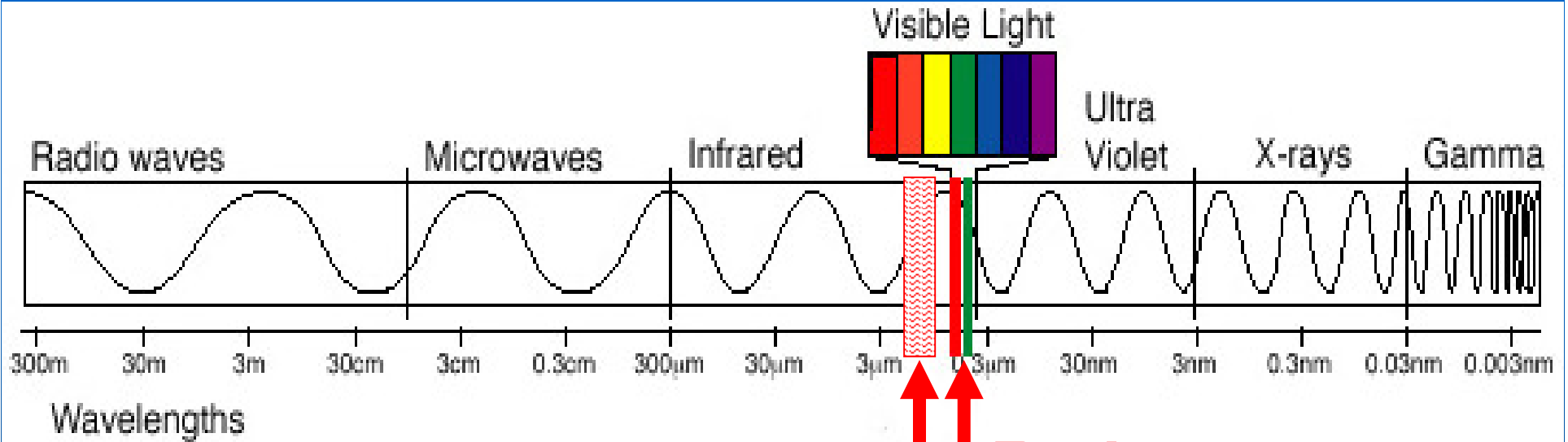
Vegetation Health and Satellite Imagery



$$\frac{(0.50 - 0.08)}{(0.50 + 0.08)} = 0.72$$

$$\frac{(0.4 - 0.30)}{(0.4 + 0.30)} = 0.14$$

The Electromagnetic Spectrum



Near-infrared

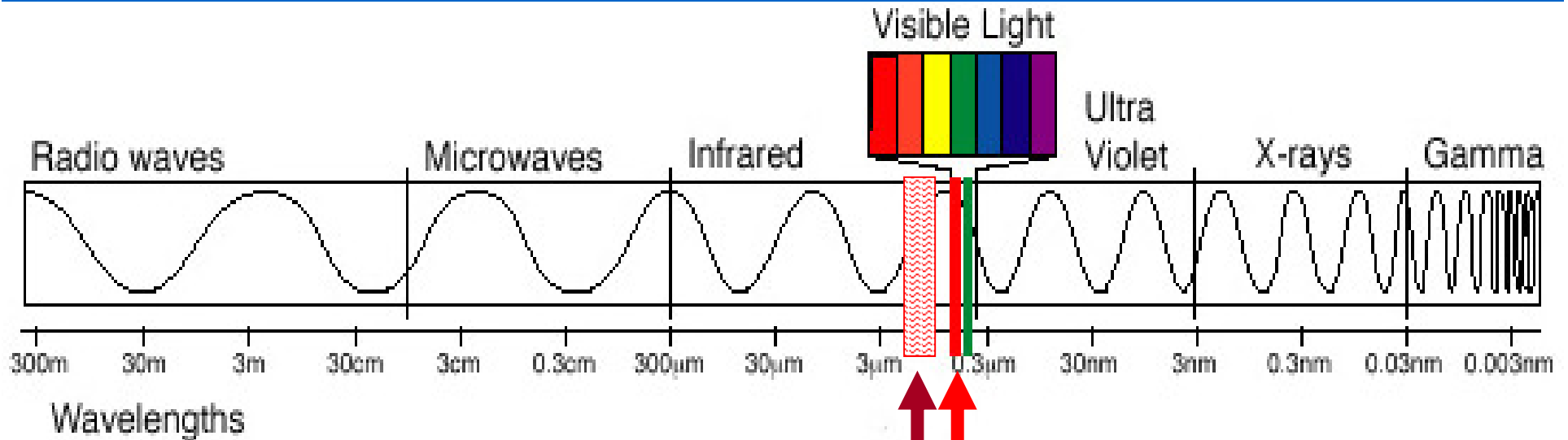
Not visible to eye but
recorded by satellite

Red

Visible to eye

The relationship between absorption of light energy by plants (specifically near infrared and red light) is the underlying principle in the use of satellite imagery to study vegetation.

Vegetation Index = Ratio

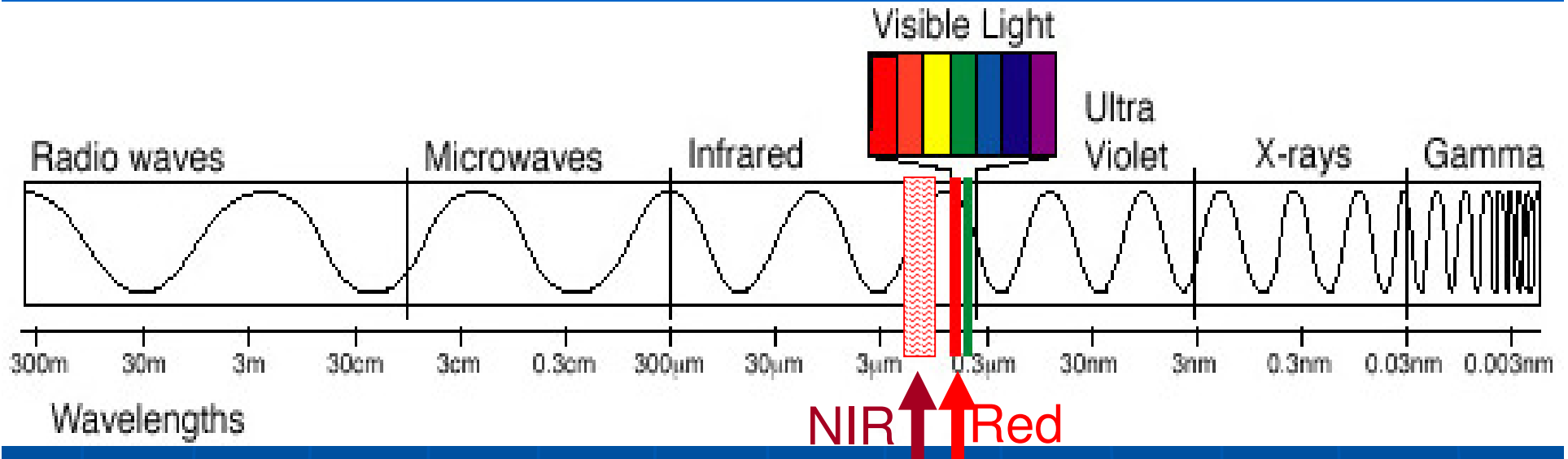


Near-Infrared | Red

The ratio of reflectance (and absorption) of Near **Infrared** and **Red light** is a measure of the photosynthetic activity or health of the plant. A commonly accepted ratio is the:
Normalized Difference Vegetation Index (NDVI)

11/29/2013

Normalized Difference Vegetation Index (NDVI)



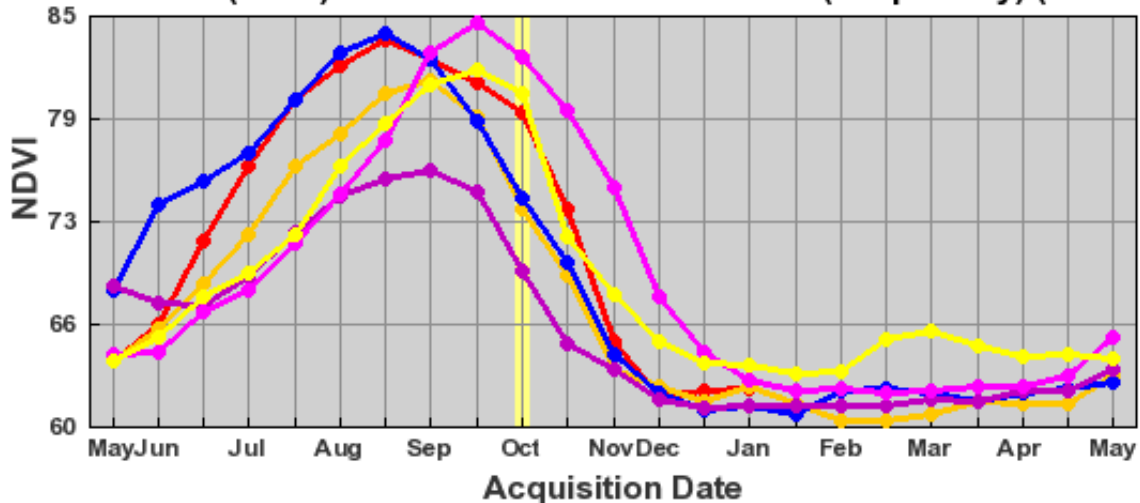
The NDVI is calculated from the reflectance values as follows:

$$\text{NDVI} = \frac{(\text{NIR} - \text{RED})}{(\text{NIR} + \text{RED})}$$

11/29/2013

Vegetation Index (Wheat Belt+Crop Mask) VICTORIA

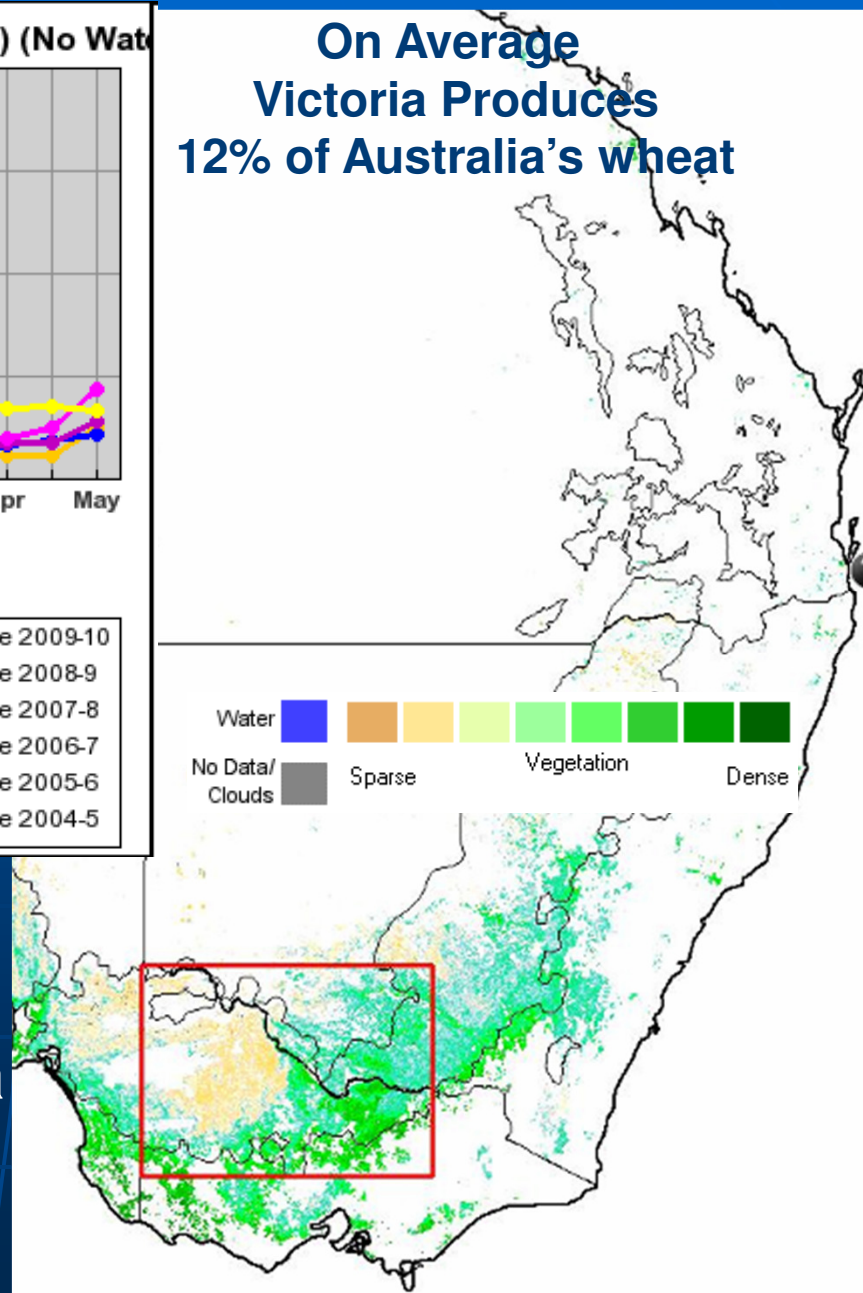
MODIS NDVI (Terra) : Australia Wheatbelt: Victoria (Crops Only) (No Water)



Region: Australia, East
 Date Range: 2009-Sep-30 to Oct-15
 Shape: Australia Wheatbelt: Victoria
 Detail Point: -34.05165 140.96654
 Cropmask: Standard (MOD12)
 Watermask: Standard (MOD12)
 Greenness Threshold: 56.25
 Source: USDA/NASA/UMD GLAM project

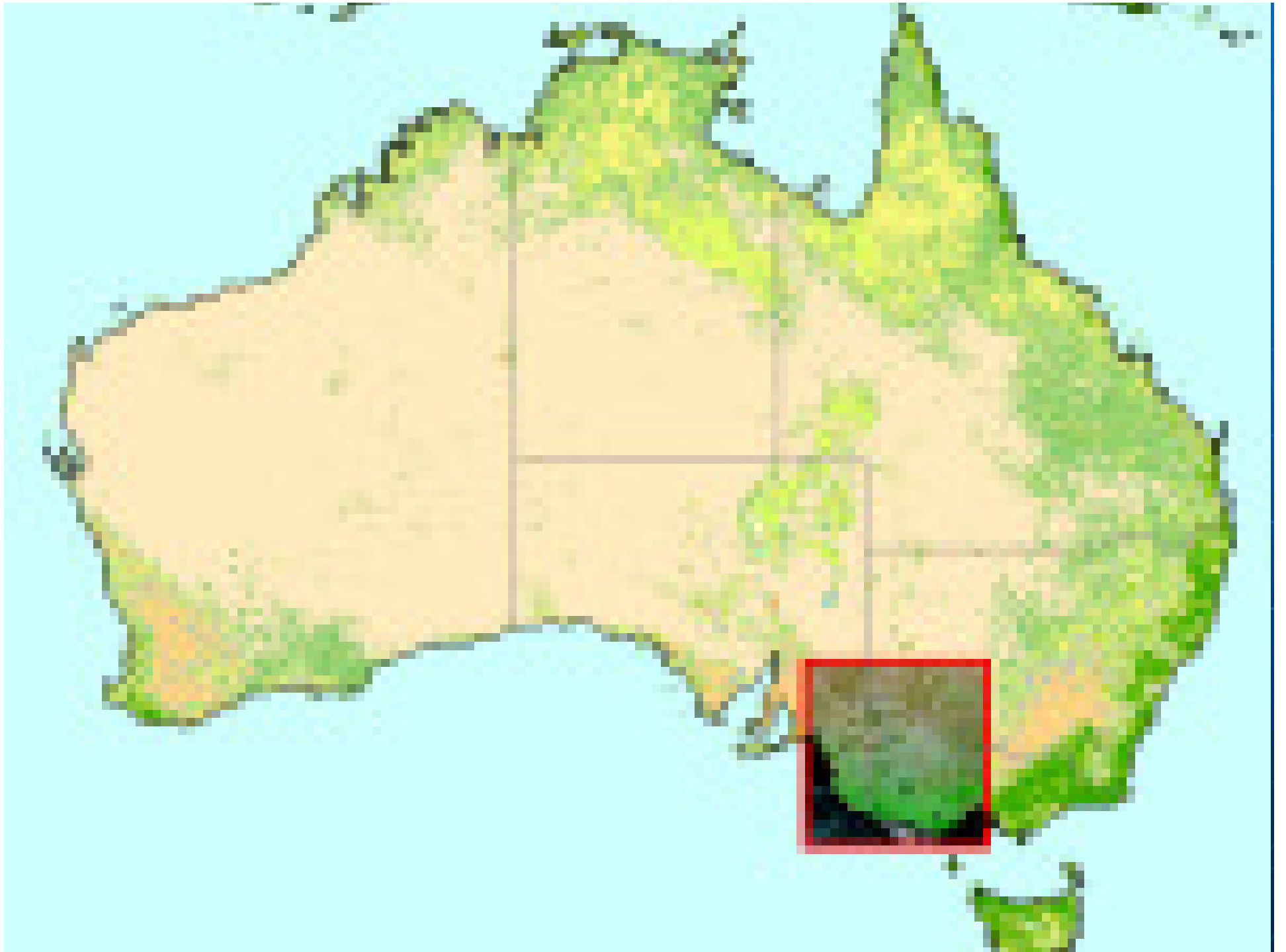
- Detail Shape 2009-10
- Detail Shape 2008-9
- Detail Shape 2007-8
- Detail Shape 2006-7
- Detail Shape 2005-6
- Detail Shape 2004-5

**On Average
 Victoria Produces
 12% of Australia's wheat**



Country: Australia
State: Victoria
Bounding area: Cropping Area
Interior selection: Crop Pixels

11/29/2013

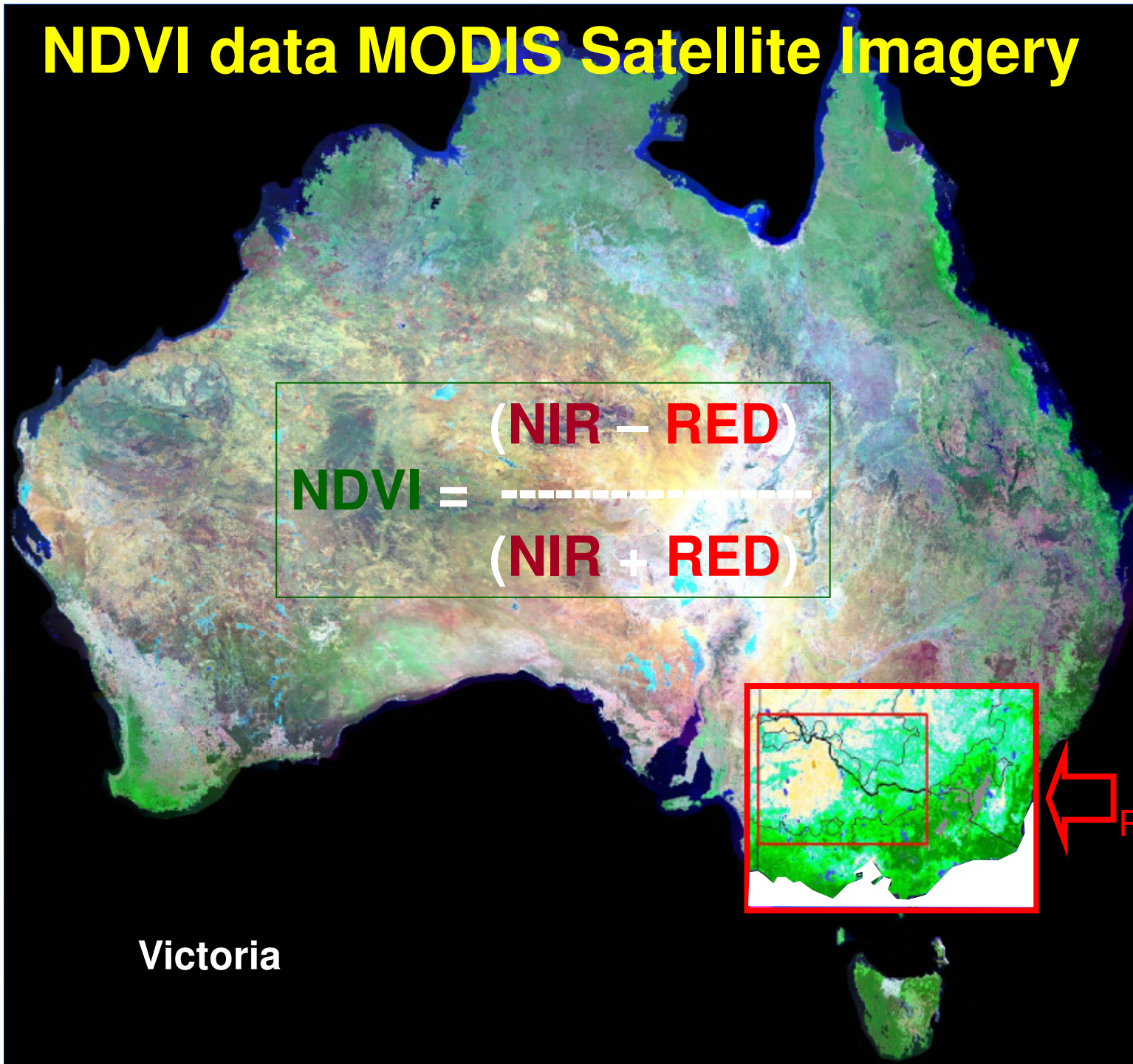


NDVI data MODIS Satellite Imagery

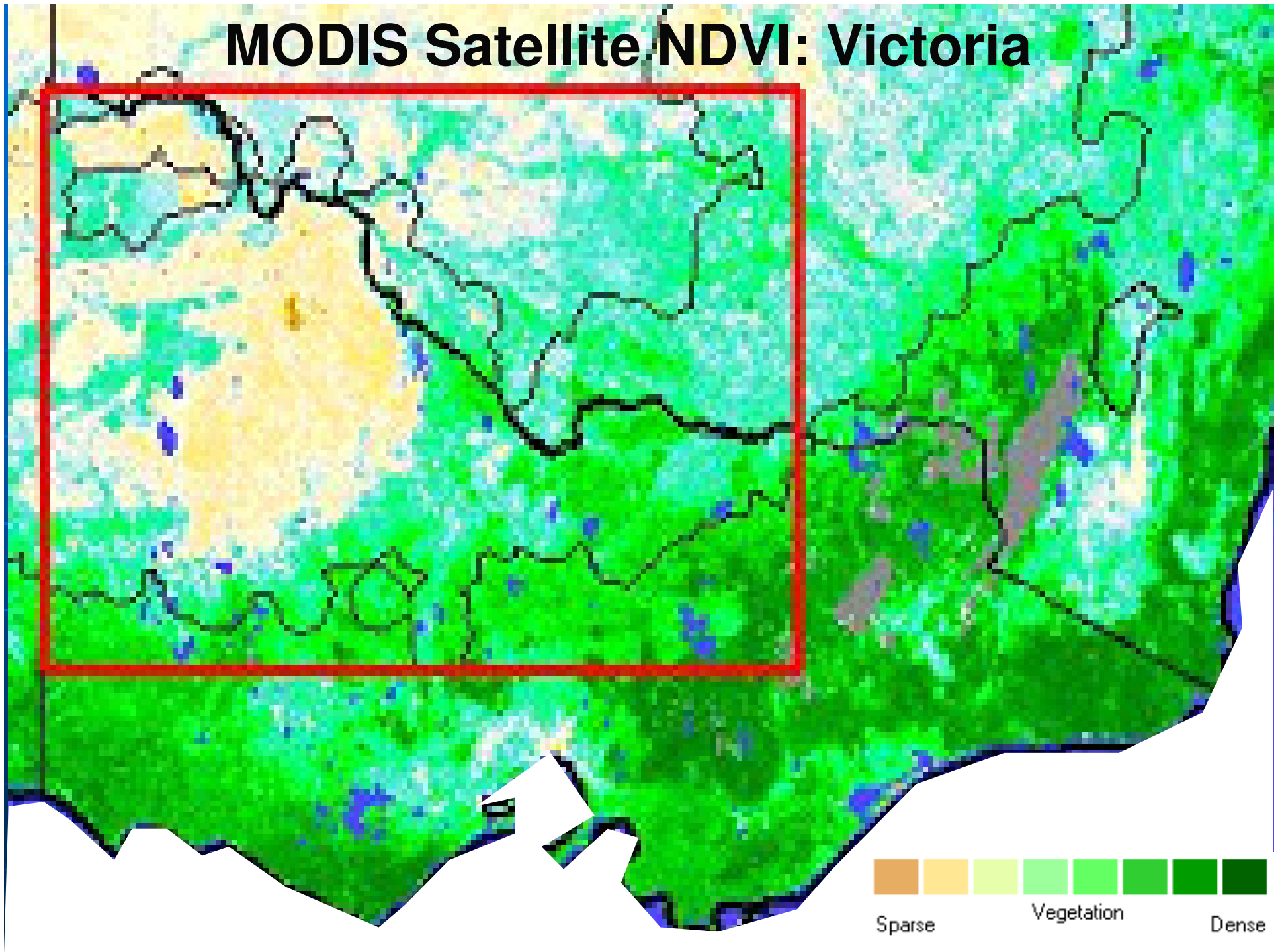
$$\text{NDVI} = \frac{(\text{NIR} - \text{RED})}{(\text{NIR} + \text{RED})}$$

Victoria

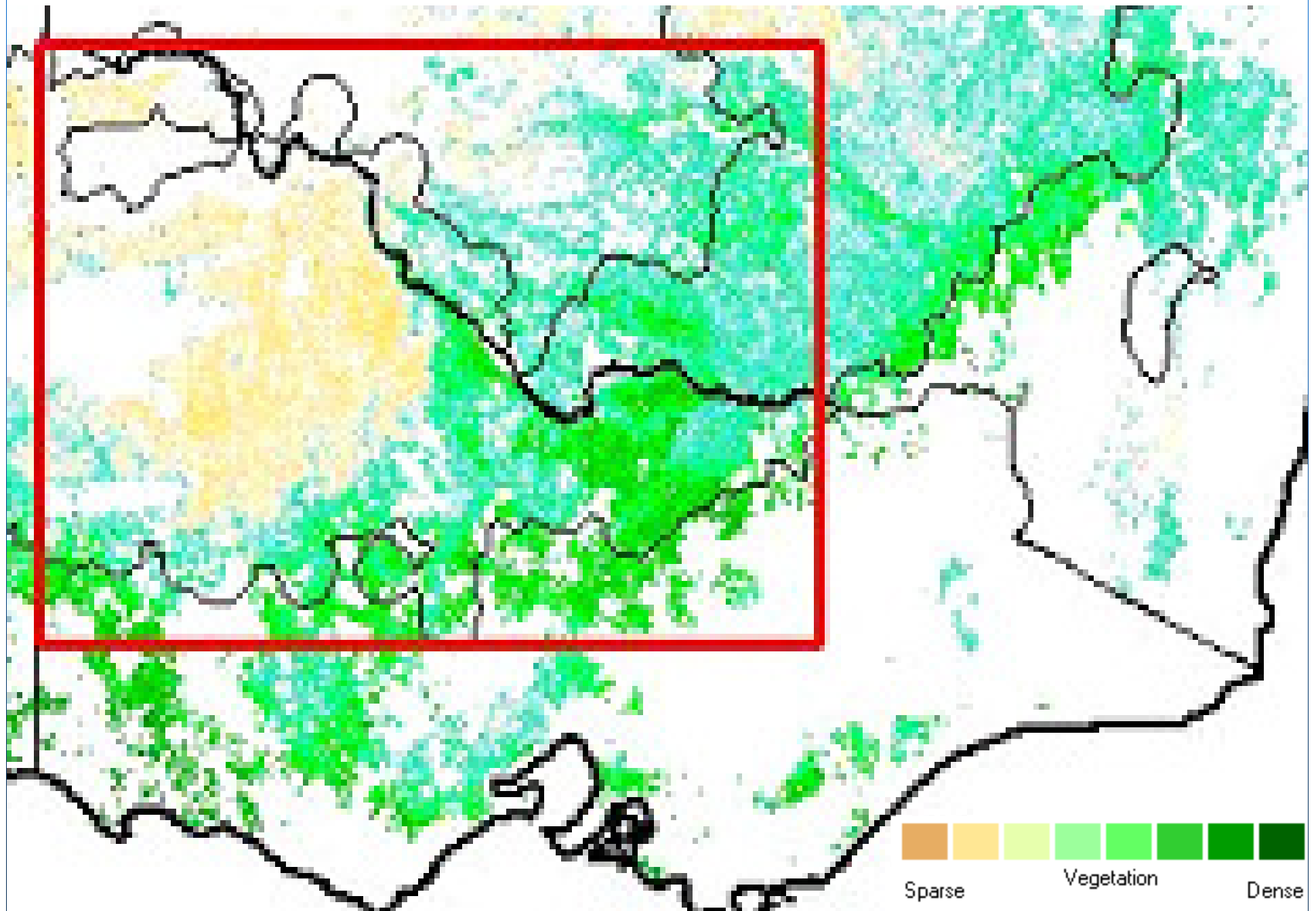
NDVI Value
Calculated from
Red and Infrared
Reflectance



MODIS Satellite NDVI: Victoria

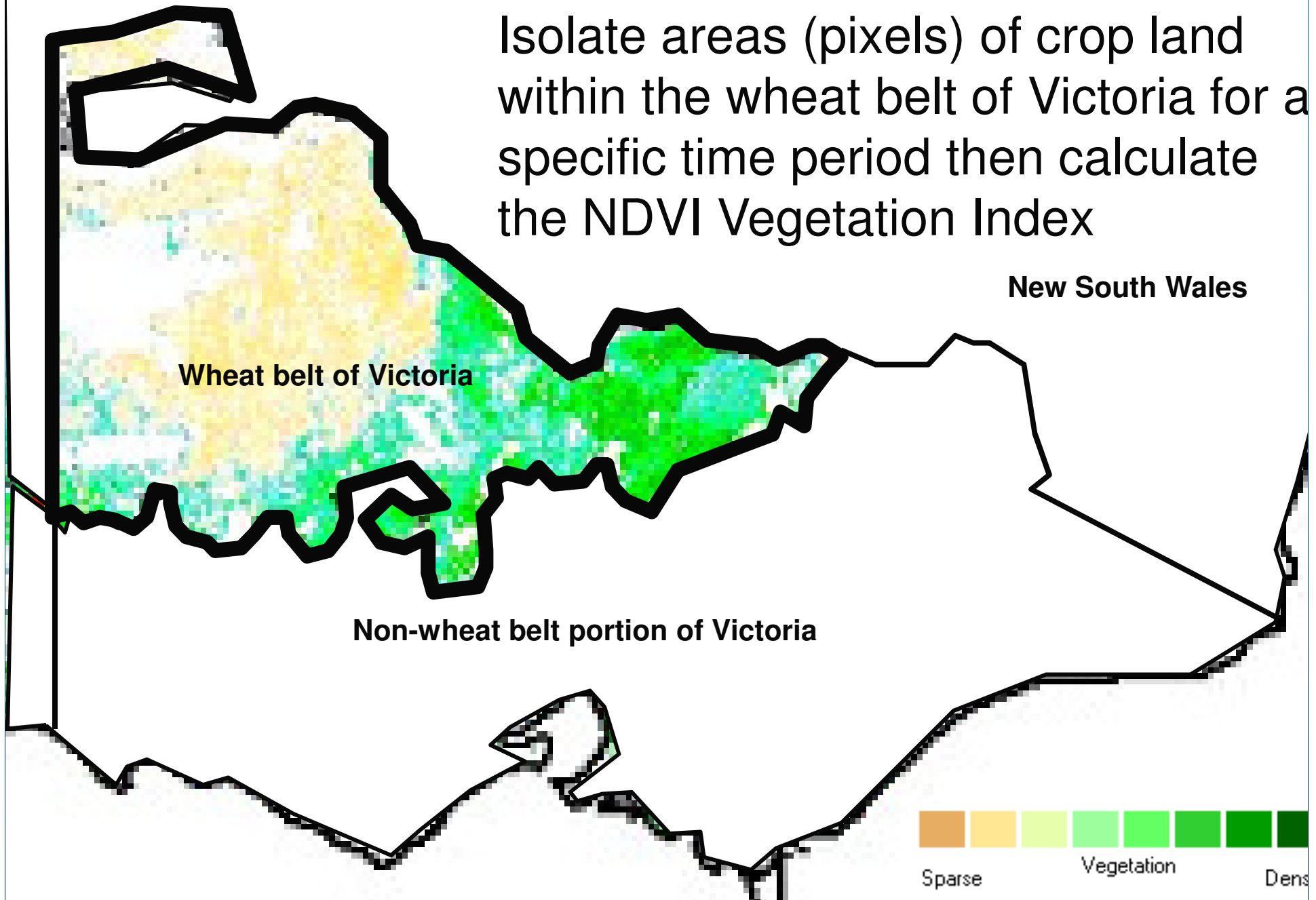


MODIS NDVI for Cropland Only

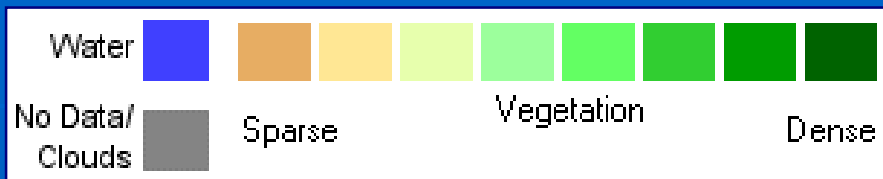


MODIS NDVI: Extraction

Isolate areas (pixels) of crop land within the wheat belt of Victoria for a specific time period then calculate the NDVI Vegetation Index



NDVI value calculated for each MODIS Satellite Image



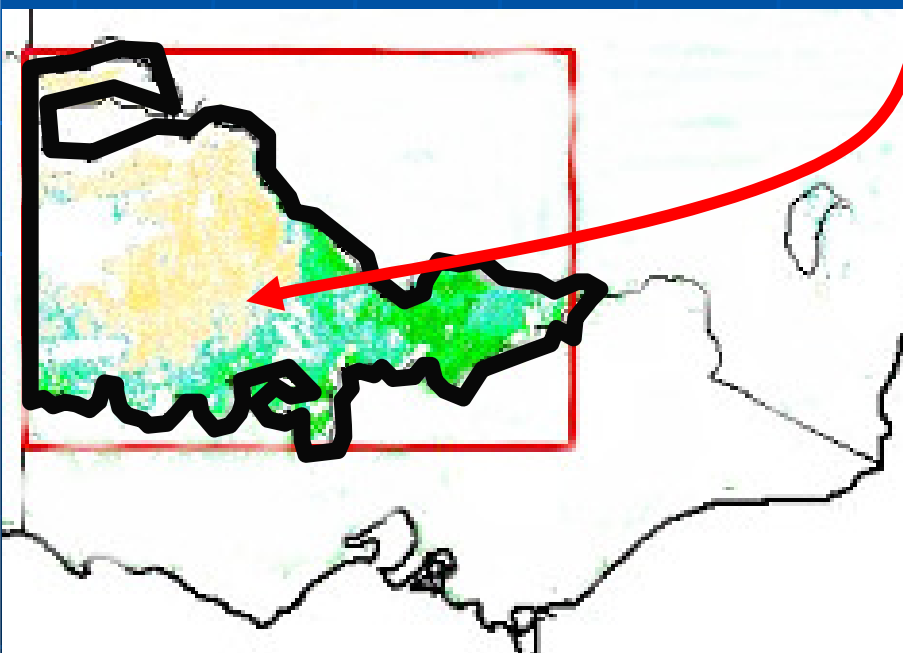
Regional Image Date Select

Click to Select Regional Image Date

2008-Sep-13 to Sep-28	● = 82
2008-Aug-28 to Sep-12	●
2008-Aug-12 to Aug-27	●
2008-Jul-27 to Aug-11	●
2008-Jul-11 to Jul-26	●
2008-Jun-25 to Jul-10	●
2008-Jun-09 to Jun-24	●
2008-May-24 to Jun-08	●
2008-May-08 to May-23	●
2008-Apr-22 to May-07	●
2008-Apr-06 to Apr-21	●
2008-Mar-21 to Apr-05	●
2008-Mar-05 to Mar-20	●
2008-Feb-18 to Mar-04	●
2008-Feb-02 to Feb-17	●
2008-Jan-17 to Feb-01	●
2008-Jan-01 to Jan-16	●
2007-Dec-19 to Jan-03	●
2007-Dec-03 to Dec-18	●
2007-Nov-17 to Dec-02	●
2007-Nov-01 to Nov-16	●
2007-Oct-16 to Oct-31	●
2007-Sep-30 to Oct-15	●
2007-Sep-14 to Sep-29	●

Pixels color coded to NDVI legend on crop condition for specific area of interest, in this case Victoria and which crop statistical data is available.

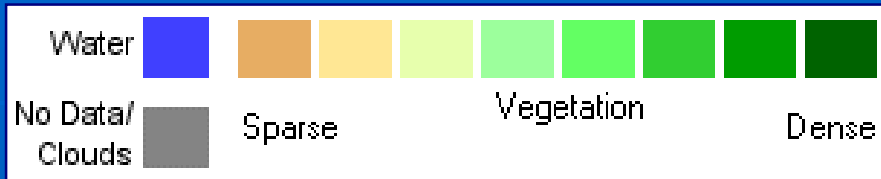
This image is the compilation of NDVI values for controlled time period. In this case September 13, 2008 to September 28, 2008; a 16 day composite.



Each image date has a corresponding scene. The numerical NDVI values can then be graphed.

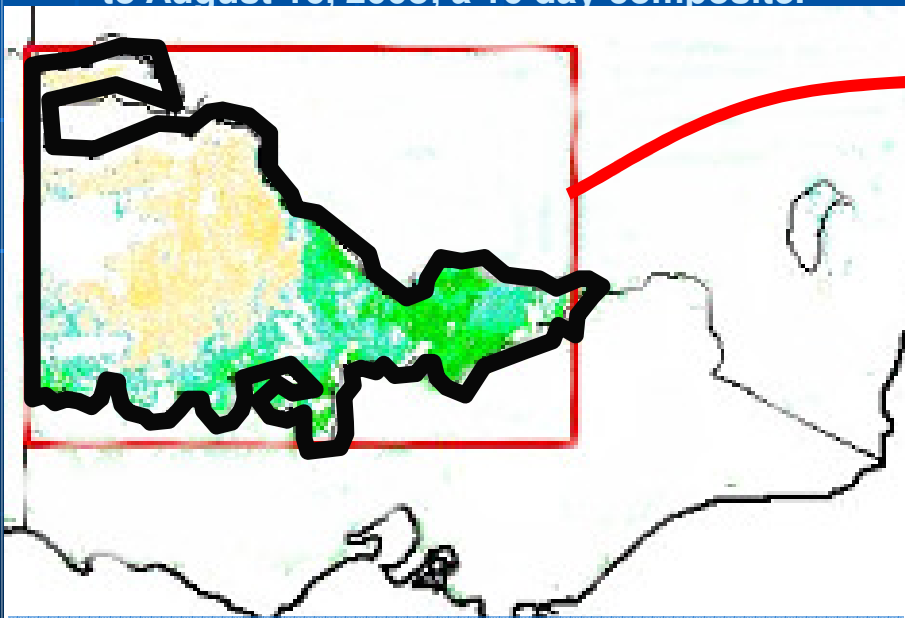
11/29/2013
Cropland pixels of Victoria wheat belt

NDVI value calculated for each MODIS Satellite Image



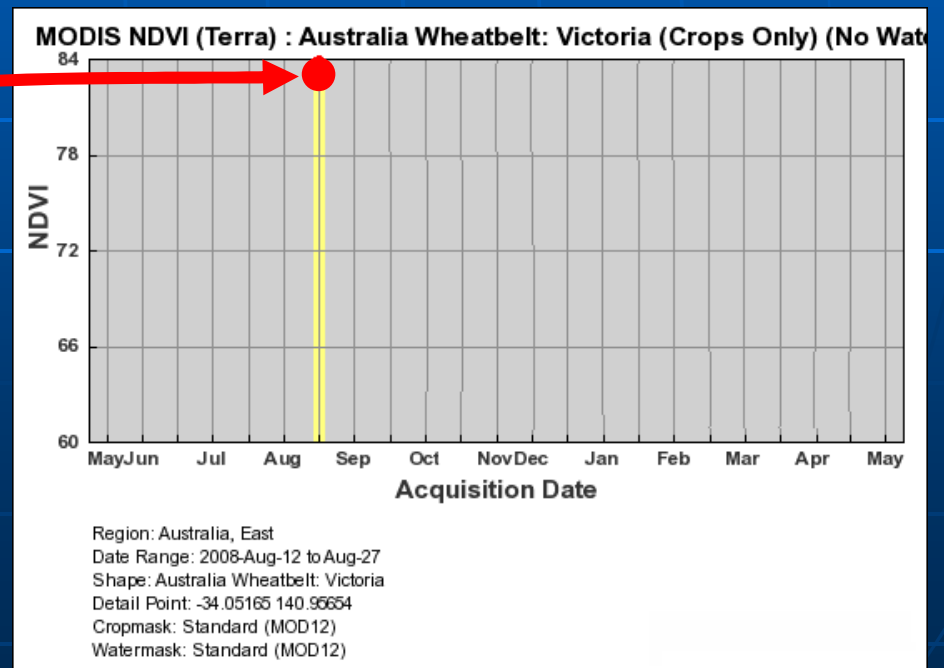
Pixels color coded to NDVI legend on crop condition for specific area of interest, in this case Victoria and which crop statistical data is available.

This image is the compilation of NDVI values for controlled time period. In this case August 1, 2008 to August 16, 2008; a 16 day composite.



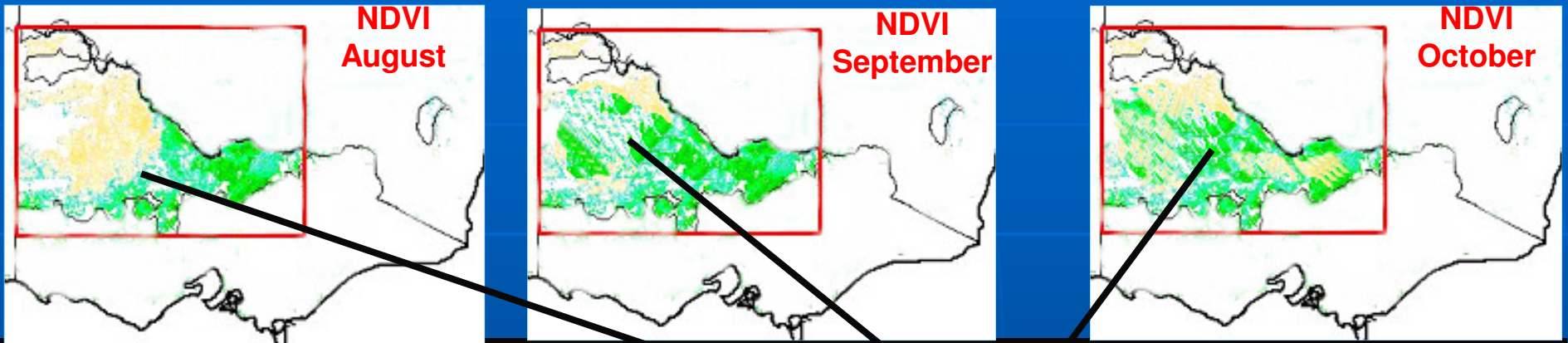
Cropland pixels of Victoria wheat belt

1 date = 1 NDVI value = 1 data point

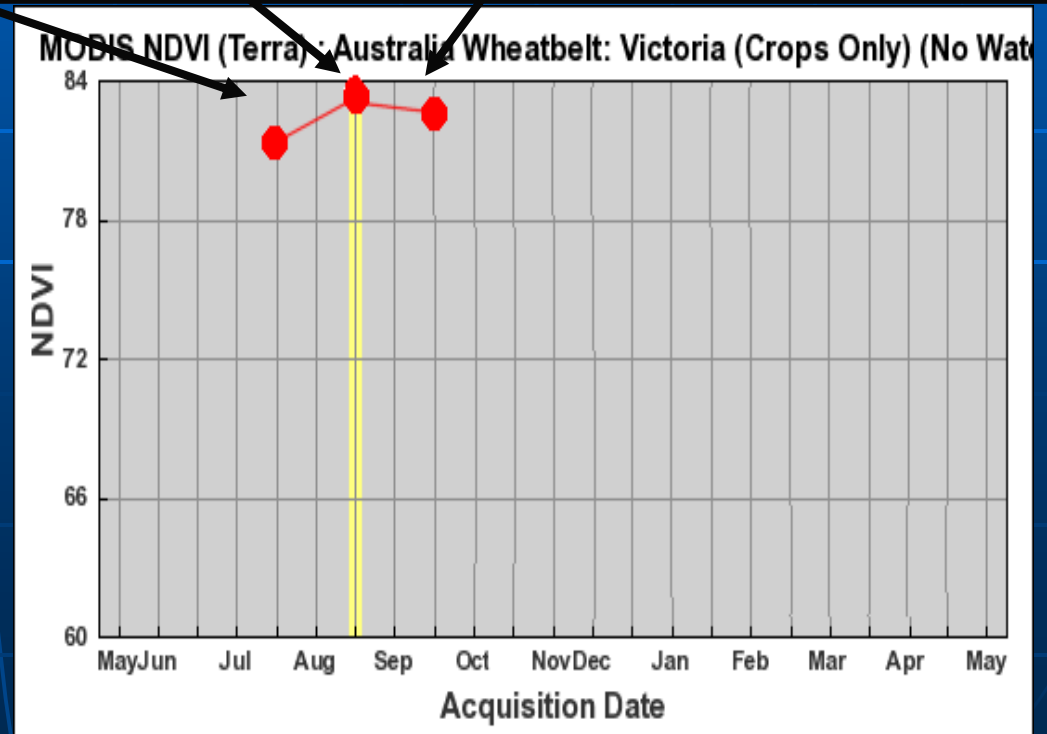


NDVI data MODIS Satellite Imagery

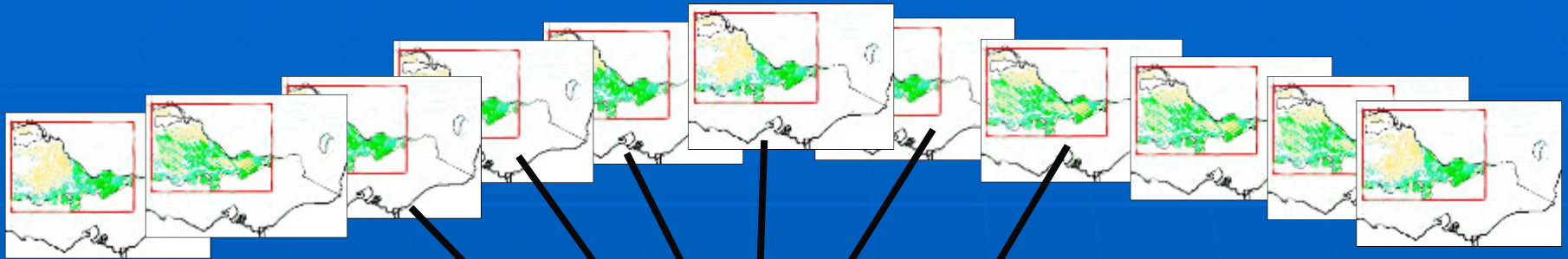
Cropland pixels of Victoria wheat belt



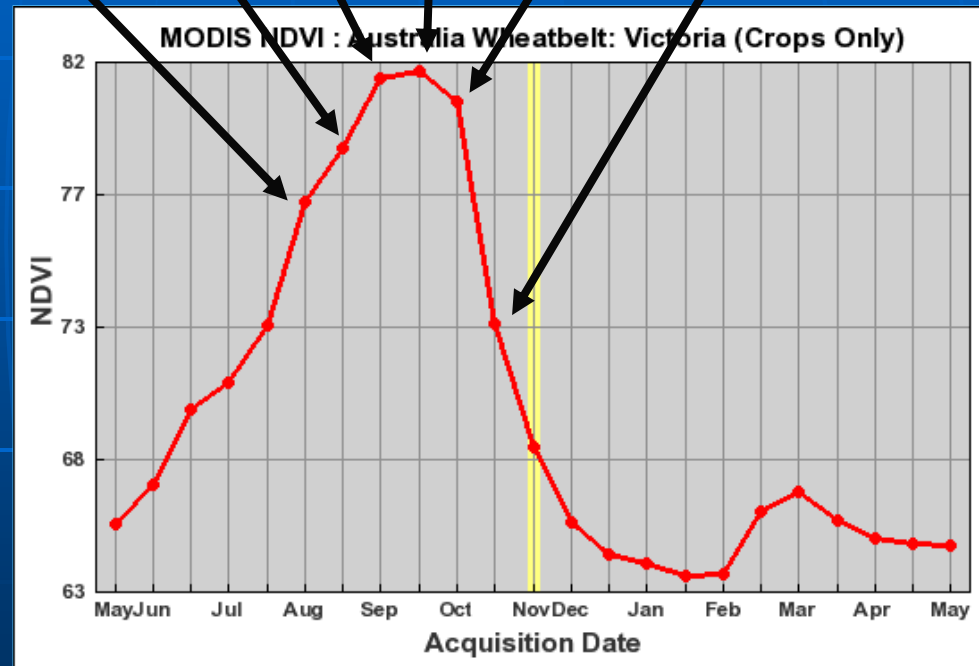
Scenes from multiple time periods creates a time series. Each scenes NDVI value is plotted.



Cropland vegetation index Victoria wheat belt

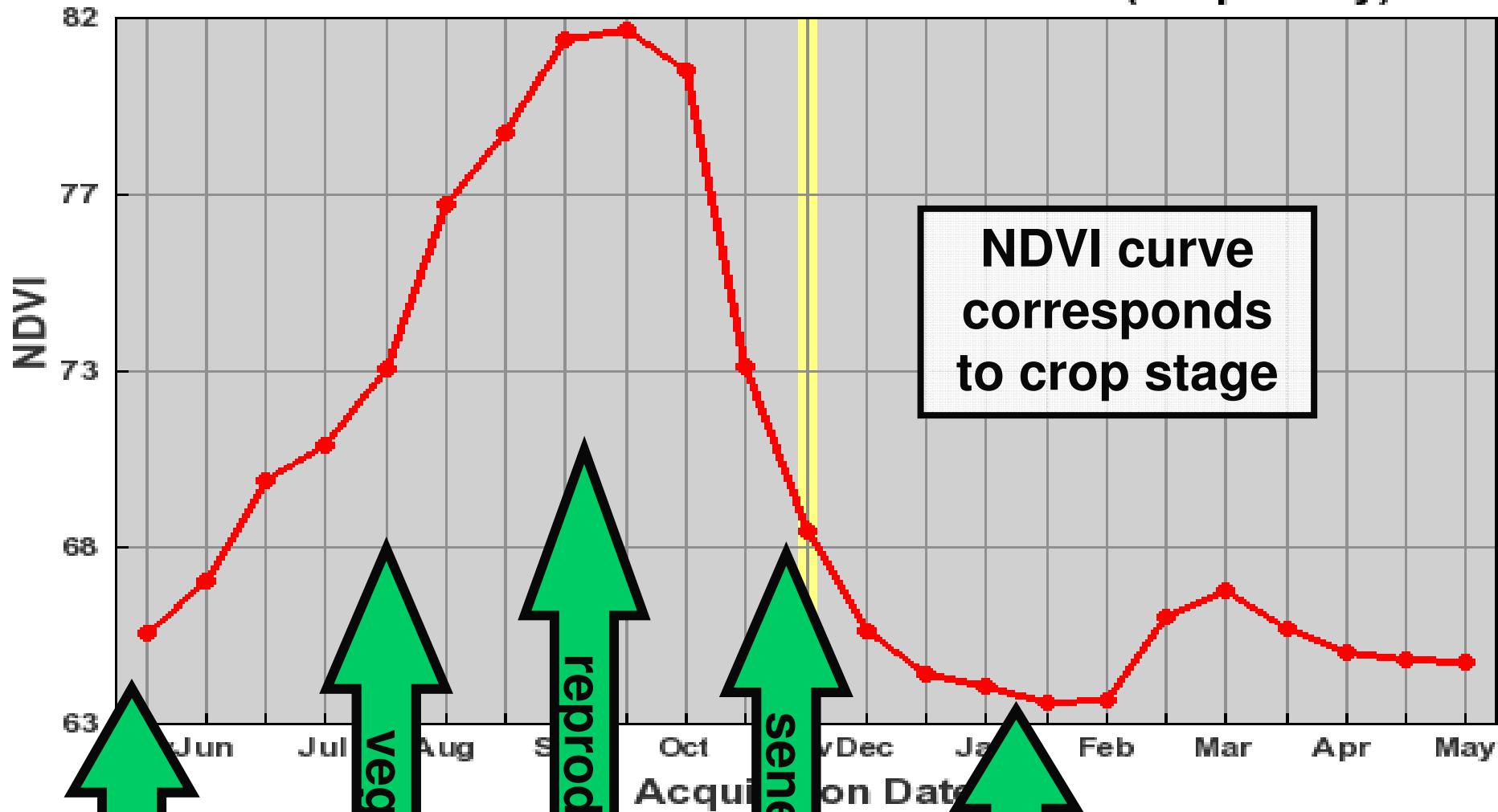


The NDVI value for each scene is plotted on graph

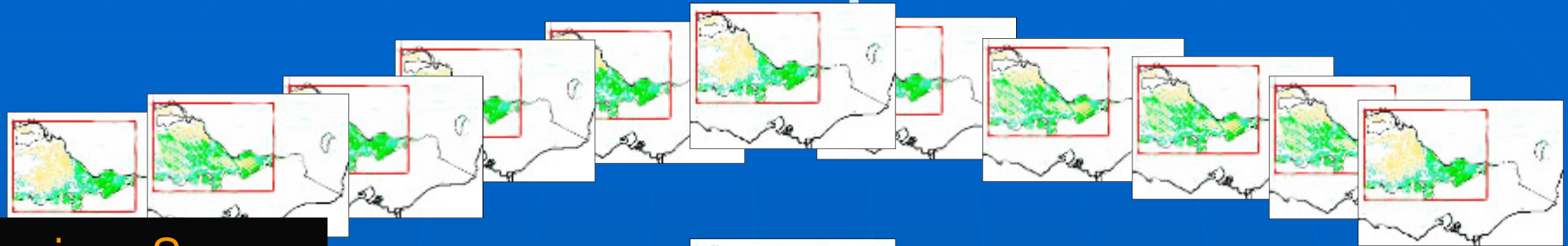


Multiple MODIS satellite scenes from across the season creates a time series curve.

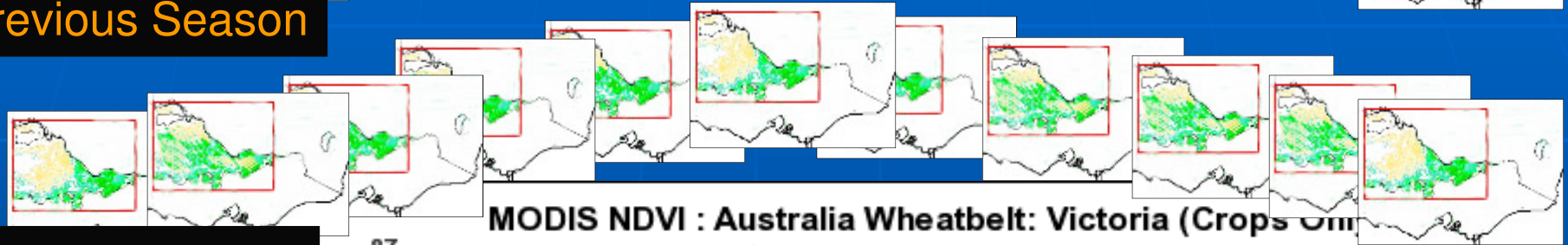
MODIS NDVI : Australia Wheatbelt: Victoria (Crops Only)



Additional NDVI curves from past seasons are added

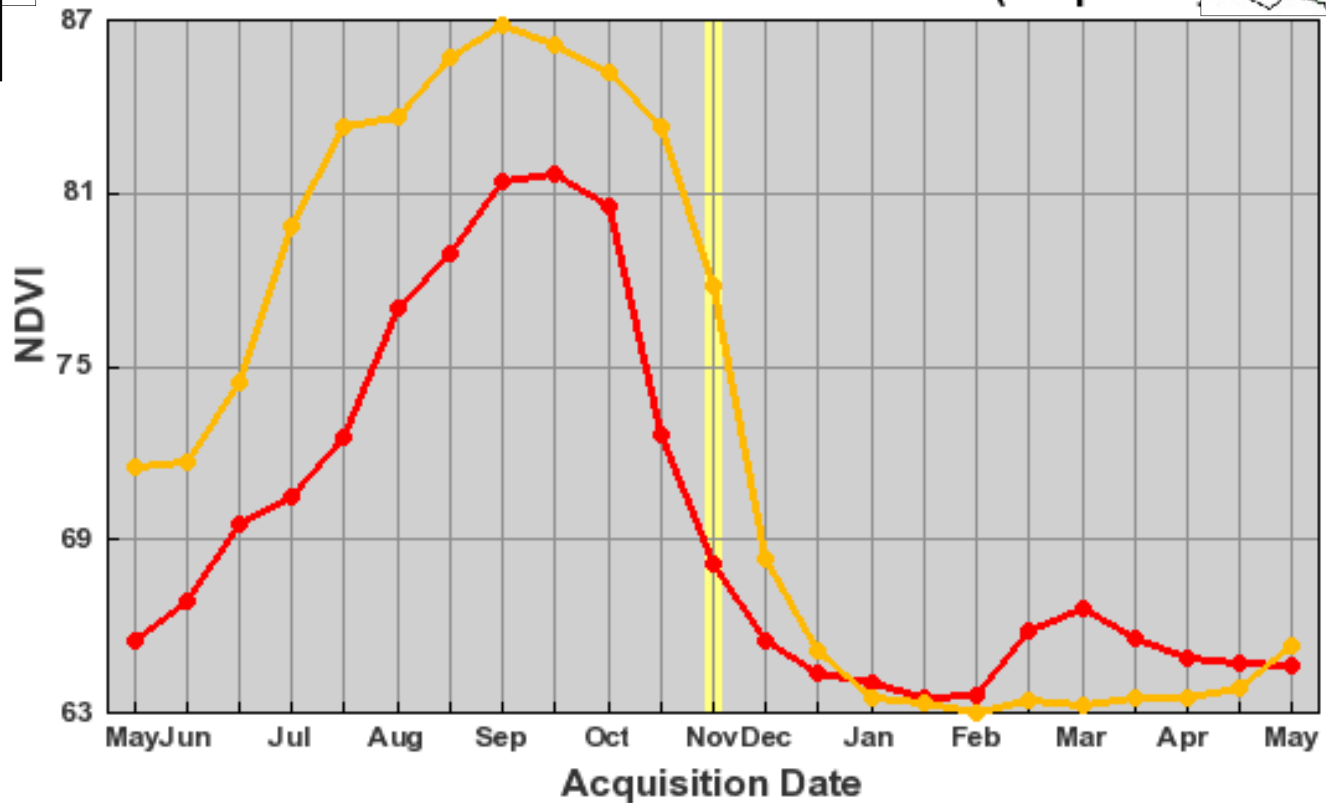


Previous Season



Current Season

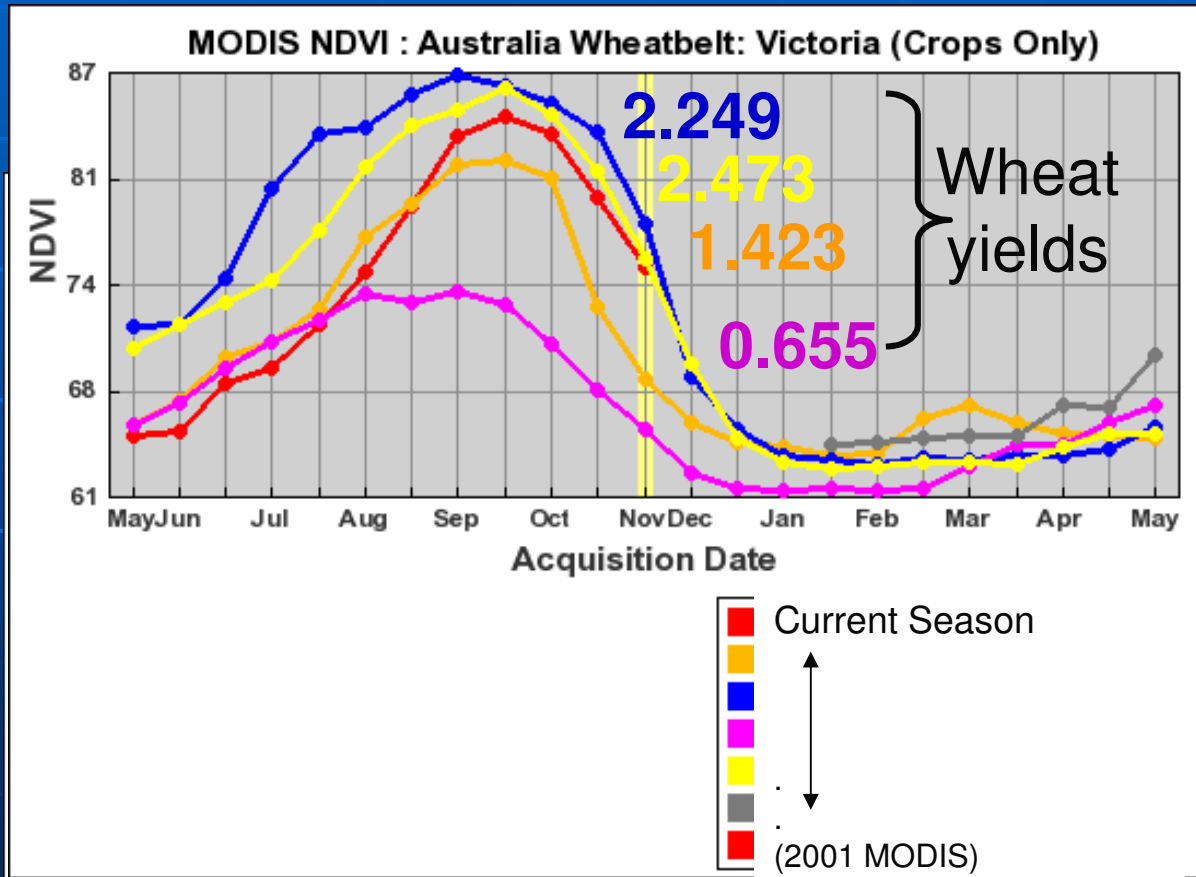
MODIS NDVI : Australia Wheatbelt: Victoria (Crops Om



A season to season comparison is a powerful tool for monitoring relative crop health yield.

NDVI data MODIS Satellite Imagery

Further analysis reveals statistically relevant relationship between NDVI curve and final yield



STATE	YIELD	MODIS MaxVal
NSW	2.36	84.65948
NSW	0.66	72.40938
NSW	1.86	85.01674
NSW	1.79	83.79363
SA	2.50	86.67430
SA	1.00	77.29022
SA	1.84	83.84105
SA	1.30	81.18666
VIC	2.47	86.05391
VIC	0.66	73.65309
VIC	2.25	86.81867
VIC	1.42	81.64797
WA	1.81	83.78145
WA	0.94	80.00797
WA	2.23	86.66313
WA	1.70	83.72837
QLD	1.51	70.89202
QLD	1.18	68.40743
QLD	1.44	74.46566
QLD	1.68	68.73388

Excel Forecast Function using Yield-NDVI Relationship

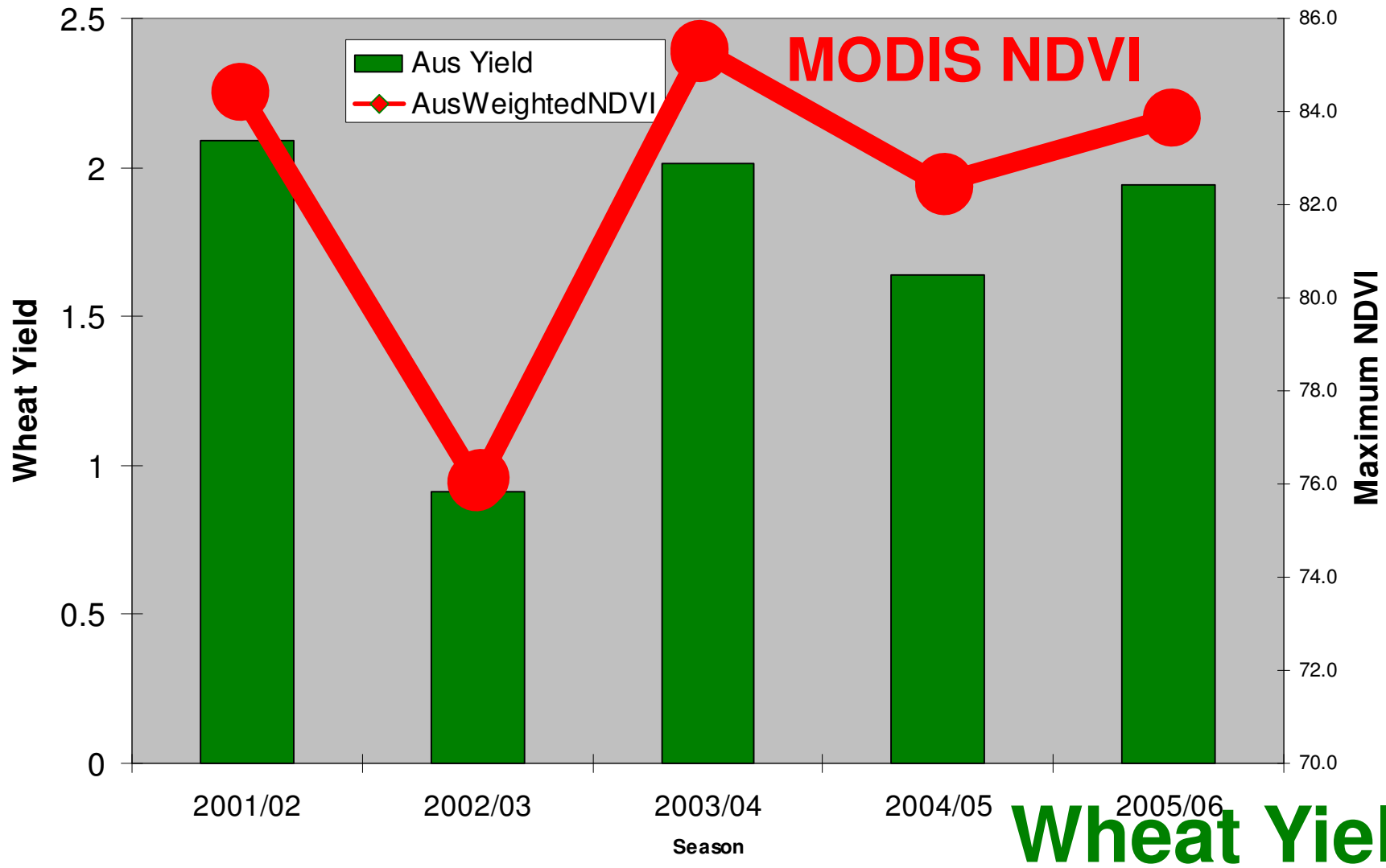
	A	B	C	D	E	F	G	H	I	J	K
1	STATE	season	a	y	p	MODIS MaxVal					
2	NSW	2001/02	3.50	2.36	8.16	84.66					
10	SA	2004/05	2.07	1.30	2.69	81.19					
11	SA	2005/06	1.96	2.07	3.49	81.95					
12	VIC	2001/02	1.14	2.47	2.71	86.05					
13	VIC	2002/03	1.23	0.66	0.88	73.65					
14	VIC	2003/04	1.42	2.25	3.20	86.82					
15	VIC	2004/05	1.37	1.42	1.94	81.65					
16	VIC	2005/06	1.24	2.13	2.64	84.33					
17	WA	2001/02	4.38	1.81	7.73	83.78					
18	WA	2002/03	4.43	0.94	3.98	80.01					
19	WA	2003/04	4.98	2.23	11.09	86.66					
20	WA	2004/05	5.19	1.70	8.80	83.73					
21	WA	2005/06	5.07	1.83	9.26	84.39					
27	QLD	curr 06/07 fest	0.750			66.530693	67.65	69.12			
28	NSW	curr 06/07 fest	2.850			77.356492	78.14	79.73			
29	VIC	curr 06/07 fest	1.350			75.89276925	76.45	77.26			
30	SA	curr 06/07 fest	2.300			77.4506055	77.58	78.04			
31	WA	curr 06/07 fest	4.250			78.148611	78.93	80.33			
32			11.500								
33	using current VI value for latest date				use historical AVG VI increase date to date			using historical Max VI increase date to date			
34		current Mx		curr Mx		SIM avg	SIM avg inc VI	SIM Max VI inc	SIM avg Mx inc VI		
35		FRCST Y	Area	st PROD		FRCST Y	st PROD	FRCST Y	st PROD		
36	QLD	1.333	0.750	1.000	QLD	1.359	1.019	QLD	1.392	1.044	
37	NSW	1.216	2.850	3.467	NSW	1.306	3.722	NSW	1.489	4.244	
38	VIC	0.891	1.350	1.204	VIC	0.968	1.306	VIC	1.076	1.453	
39	SA	0.991	2.300	2.279	SA	1.012	2.328	SA	1.084	2.493	
40	WA	0.614	4.250	2.608	WA	0.767	3.260	WA	1.039	4.418	
41	AUSTRALIA	0.918	11.500	10.558		1.012	11.635		1.187	13.651	
42											
43		correlation	r-sq								
44	a	0.20	0.04								
45	p	0.55	0.30								
46	y	0.92	0.85								
47	CORREL FUNCTION GIVES SAME RESULT AS PEARSON FUNCTION										
48	Returns the Pearson product moment correlation coefficient, r, a dimensionless index that ranges										
49	from -1.0 to 1.0 inclusive and reflects the extent of a linear relationship between two data sets.										

$$a = \bar{Y} - b\bar{X}$$

$$b = \frac{n\sum xy - (\sum x)(\sum y)}{n\sum x^2 - (\sum x)^2}$$

Australia Wheat Yield and MODIS NDVI

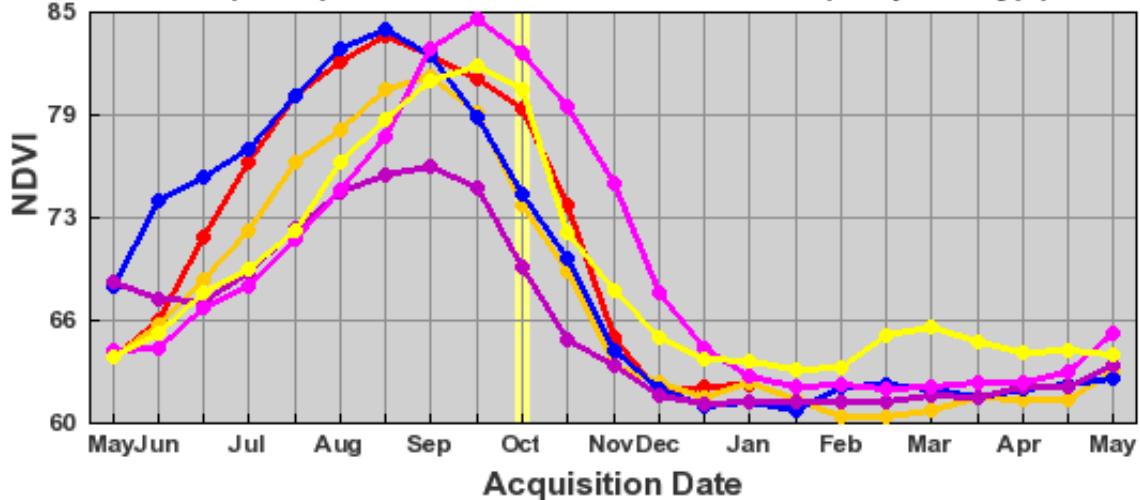
Australia Wheat: Yield vs. MODIS NDVI



Wheat Yield

Vegetation Index (Wheat Belt+Crop Mask) VICTORIA

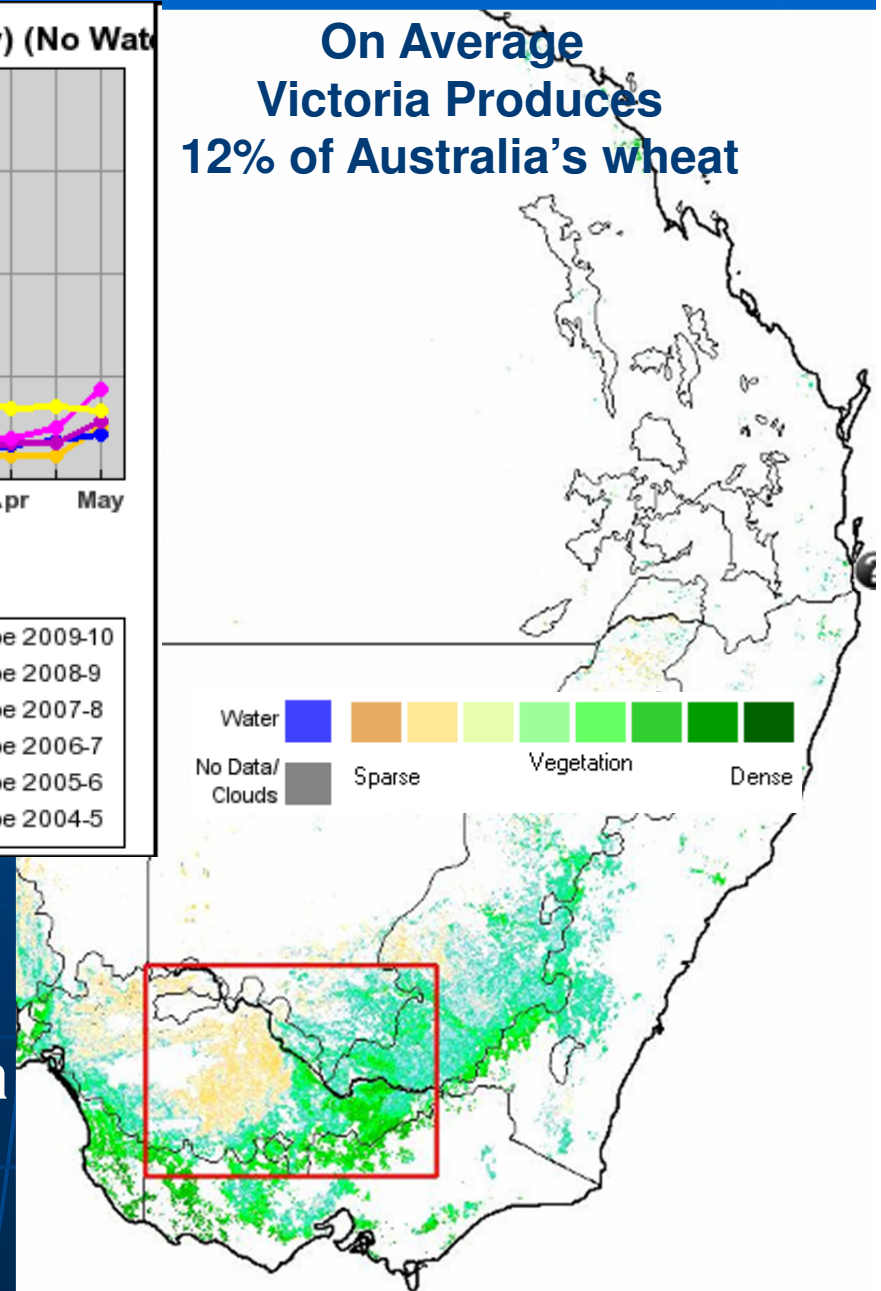
MODIS NDVI (Terra) : Australia Wheatbelt: Victoria (Crops Only) (No Water)



Region: Australia, East
 Date Range: 2009-Sep-30 to Oct-15
 Shape: Australia Wheatbelt: Victoria
 Detail Point: -34.05165 140.96654
 Cropmask: Standard (MOD12)
 Watermask: Standard (MOD12)
 Greenness Threshold: 56.25
 Source: USDA/NASA/UMD GLAM project

- Detail Shape 2009-10
- Detail Shape 2008-9
- Detail Shape 2007-8
- Detail Shape 2006-7
- Detail Shape 2005-6
- Detail Shape 2004-5

**On Average
 Victoria Produces
 12% of Australia's wheat**

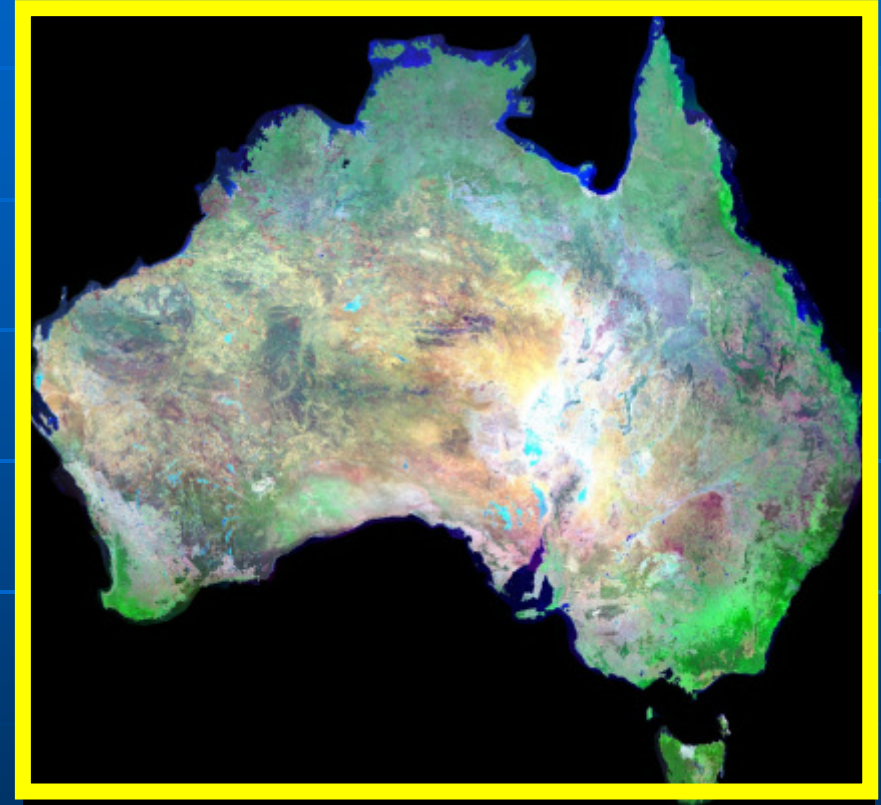
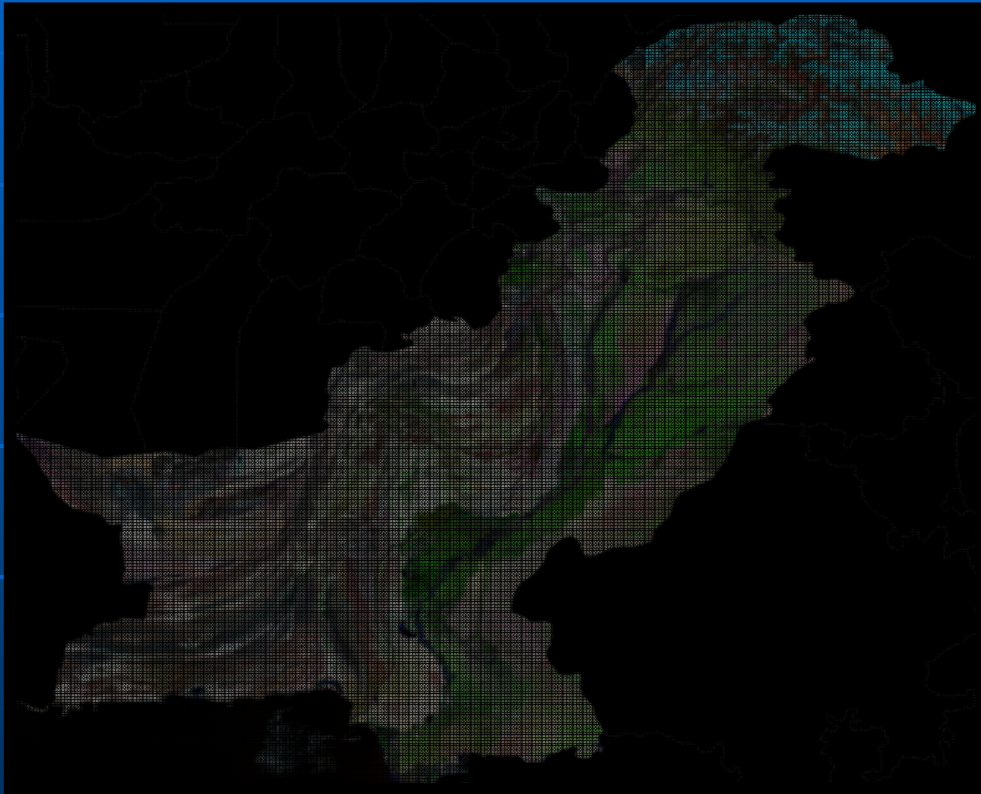


Country: Australia
State: Victoria
Bounding area: Cropping Area
Interior selection: Crop Pixels

11/29/2013

Remote Sensing Strategies:

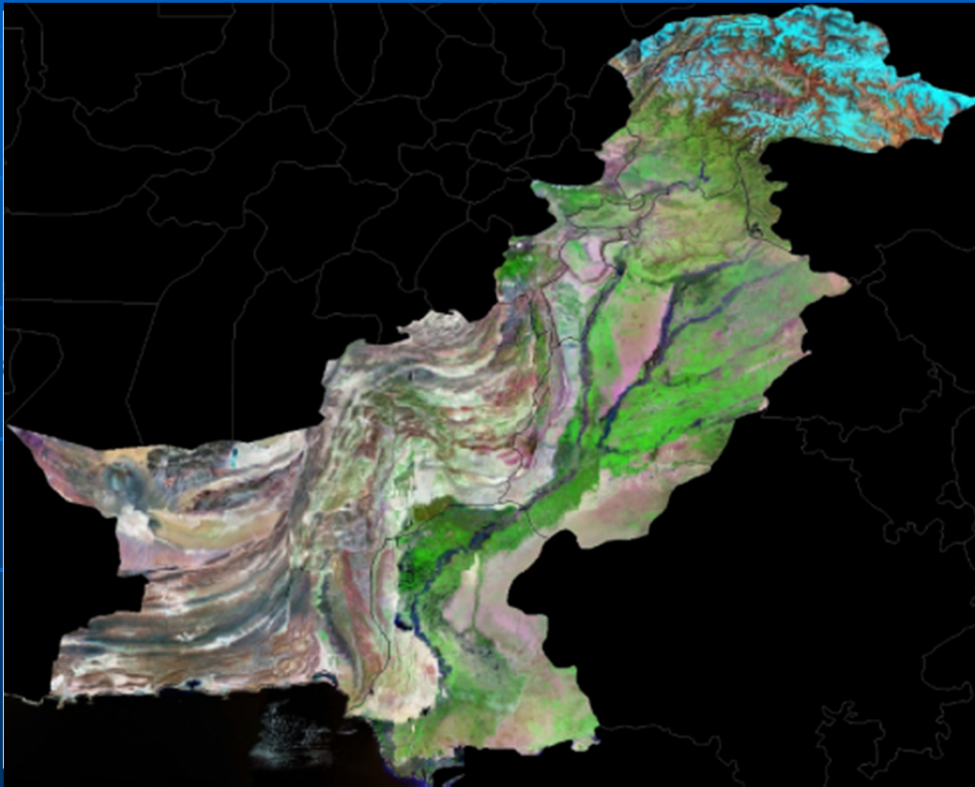
- Qualitative Analysis Satellite Imagery
- **Quantitative Analysis Satellite Imagery**



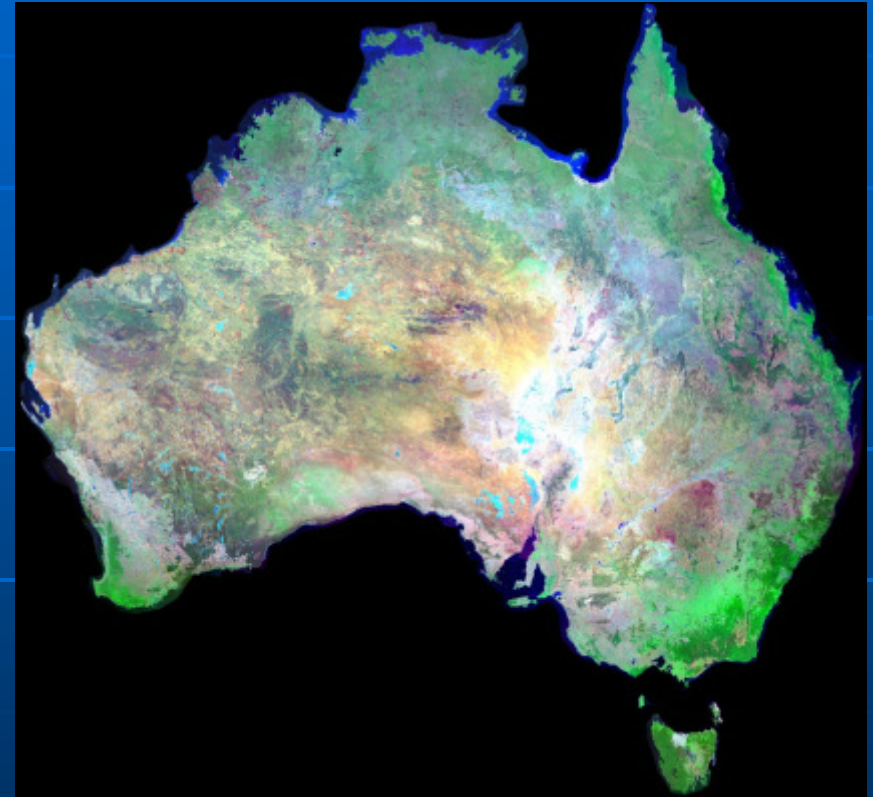
Australia

Remote Sensing Analysis Strategies:

Qualitative



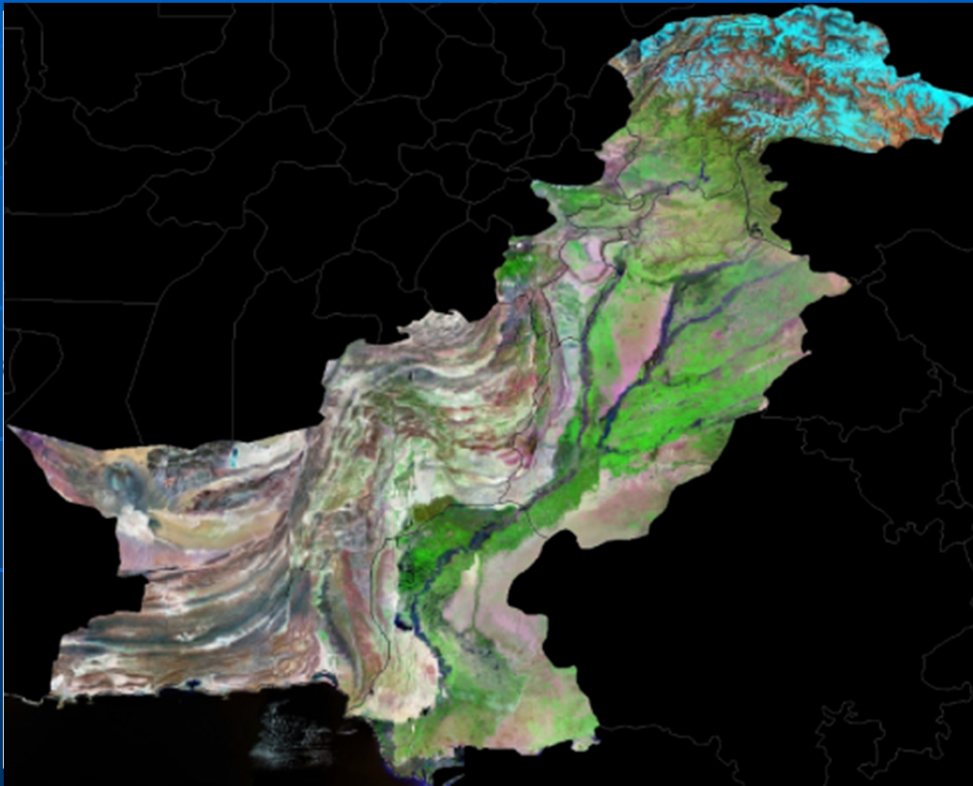
Quantitative



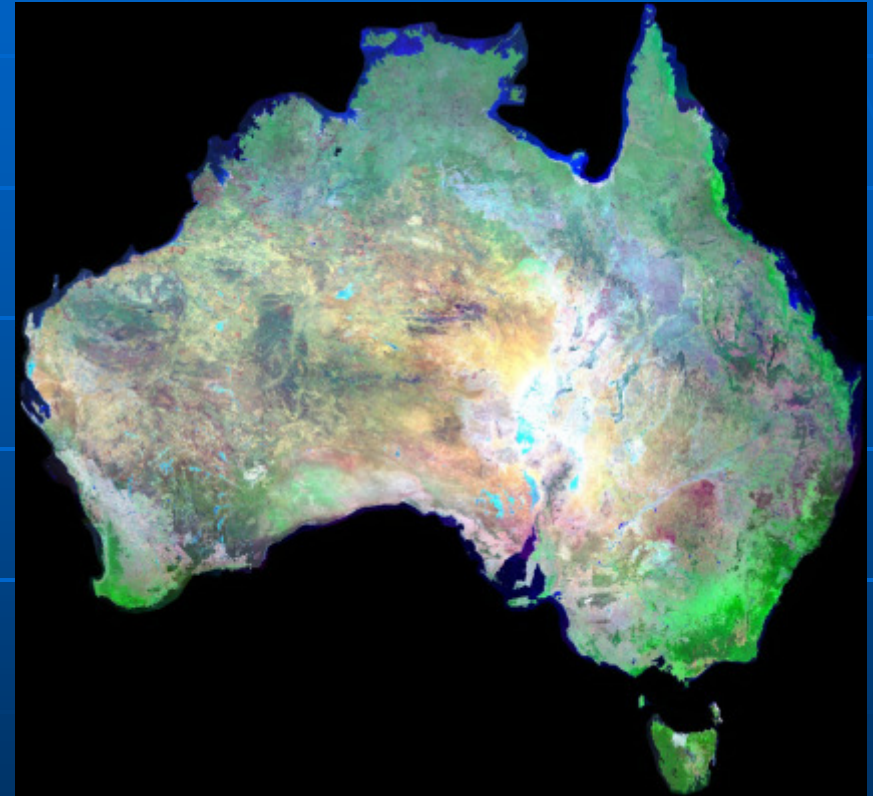
Two techniques employed to monitor crop conditions and assist in making a monthly forecast update of crop production for each country.

Summary: Remote Sensing Analysis Strategies

Qualitative



Quantitative



- These analytical techniques provide exceptional value in representing data visually thereby enhancing the user and analyst experience.
- Enables analysts to more quickly and clearly discern trends, patterns and changes occurring in dynamic agricultural situations.

Contact

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james.crutchfield@fas.usda.gov

202-690-0135

Foreign Agricultural Service (FAS)

Office of Global Analysis (OGA)

International Production Assessment Division (IPA)

- <http://www.pecad.fas.usda.gov/cropexplorer/>
- <http://www.pecad.fas.usda.gov/ogamaps/>

End / CE

11/29/2013