Chapter 5. Focus and perspectives

This focus section complements CropWatch analyses presented in chapters 1 through 4 by providing additional information about topics of interest to global agriculture. Section 5.1 includes a production outlook for 2015, while the other three sections focus on disaster events (5.2), agricultural developments in South America (section 5.3), and an update on El Nino (5.4).

5.1 Production outlook for 2015

The CropWatch production outlook for 2015 is presented for groups of countries (table 5.1) and the 31 countries more specifically monitored by CropWatch. Both outlooks are based on estimates of various types, as some pertain to crops already harvested and being harvested, while others are projections (for crops not yet harvested) based on an assumption that the period after April 2015 will be "average" (i.e., characterized by average values of NDVI, which is the main CropWatch predictor). For minor producers, estimates are based on trends. Additional detail about the various estimates is provided in the notes to tables 5.1 and 5.2.

It is also stressed that El Niño conditions are now considered to be almost certain for the end of this year (see section 5.4), which means the current projections will likely need regular revision. Although El Niño is theoretically associated with favorable rainfall in east Africa and drought in southern Africa, the phenomenon is never typical; nevertheless, the situation in Ethiopia is characteristic of a perturbed climate system.

Country groupings

According to CropWatch global estimates (table 5.1), the level of production of maize will be down 1.3% this year in comparison to the output of 2014; rice and wheat production will increase by about 1% (1.0% and 0.9%, respectively), and soybean production will drop 1.1% compared to 2014.

When focusing on the main producing countries alone, maize will undergo a decrease of 1.8%; rice will increase (+1.0%), and wheat and soybean will drop 1.6% and 1.7%, respectively.

If the analysis is restricted to the countries where harvest is currently ongoing or completed (which is the case in about one-fourth to half of the major producing countries), the estimates suggest changes of -0.6% (-0.3%)[5] for maize, +1.2% (+1.2%) for rice, -1.8% (-1.4%) for wheat, and +0.0% (+0.2%) for soybean, which describes a slightly better situation than the global prediction. The percentages do not vary significantly if minor producers are included.

Rather interesting projections are achieved when considering only the three major exporting countries of each commodity, i.e., the United States, Argentina, and Brazil for maize; Thailand, Vietnam, and Pakistan for rice; the United States, France, and Canada for wheat, and the United States, Brazil, and Argentina for soybean. In this case, both maize and soybean production are down (-2.9% and -1.7%, respectively), while rice achieves a spectacular 6.2% increase, and wheat production grows 1.5%. The situation in the remaining countries is virtually unchanged for maize and rice (0.0% and 0.3%), while wheat (+0.8%) and soybean (+1.4%) undergo modest increases.

[5]Numbers between brackets also include minor producers of the southern hemisphere.

Table 5.1. 2015 production estimates and forecasts for maize, rice, wheat, and soybean (thousand tons) according to various country groupings

	Maize		Rice		Wheat		Soybean	
	2015	Δ%	2015	Δ%	2015	Δ%	2015	Δ%
Repetition of the last three lines of table 5.2								
Total	947614	-1.3	750216	1.0	712292	0.9	285879	-1.1
CNTR31	838491	-1.8	676378	1.0	614372	-1.6	266336	-1.7
OTS+OTN (*)	109123	2.4	73838	1.5	97920	1.7	19543	7.9
Four major producers in the southern hemisphere and remaining countries								
ARG+AUS+BRA+ZAF	115784	-0.9	15567	3.4	45087	-1.0	142511	0.2
CNTR27 (**)	722707	-1.9	660811	0.9	569285	0.9	123825	-3.8
Four major producers in the southern hemisphere together with other southern hemisphere countries								
ARG+AUS+BRA+ZAF+OTS	137609	-0.4	30335	2.5	64671	-0.2	146420	0.4
CNTR27+OTN	810005	-1.5	719881	1.0	647621	1.0	139459	-2.6
Estimated and forecast productions for major producers (CNTR31)								
Estimated (="Harvesting")	230778	-0.6	387948	1.2	133238	-1.8	155729	0.0
Forecast ="To be harvested")	607713	-2.3	288430	0.7	481134	-1.5	110607	-4.0
"Harvesting" countries where harvest takes place during the months from January to April (***) including minor producers (OTS for Estimated, OTN for Forecast)								
Estimated	252603	-0.3	402716	1.2	152822	-1.4	159638	0.2
Forecast	695011	-1.7	347500	0.9	559470	-1.1	126241	-2.7
Percent harvested (****)	27		54		20		56	
Three major exporters								
3 major exporters	424672	-2.9	98361	6.2	131750	1.5	227413	-1.7
CNTR28+OTR (**)	522942	0.0	651855	0.3	580542	0.8	58466	1.4

Notes: (*) OTR stands for the 130 countries that are not part of the 31 main producers monitored by CropWatch (see chapter 3) and listed in table 5.2.; OTN and OTS stand for "other north" and "other south," separating these 130 countries in "north" and "south" based on the latitude of their centroid (OTR=OTN+OTS). In total, 80% of OTRs fall under OTN. (**) CNTR27 includes the major producers (CNTR31) minus Argentina (ARG), Australia (AUS), Brazil (BRA), and South Africa (ZAF).CNTR28 covers the 31 countries minus the three major producers for each crop. (***) This includes all countries where the respective crops were being harvested during at least one of the months between January and April, including areas where harvest ended in January, areas where it started in April, as well as all intermediate situations. (These same countries are shown in *italics*in table 5.2.) Countries that grow multiple crops over the season were nevertheless assigned to this group; this applies mostly to equatorial countries, for instance Indonesia where a first rice crop is harvested from November to January, and the second from June to December. (****) The approach described under (***) above overestimates actual harvest progress in countries with multiple cropping, except for rice.

Individual countries

In China, due to favorable conditions so far, all grain production is up close to 1.0% (1.1% for wheat and an increase forecast at *1.6%* and *0.6%* for maize and rice, respectively), while soybean will continue its decade-long falling trend (*-1.3%*) according to the forecast.[6]

The largest projected increase for maize production is the estimate for Mexico (+8.2%). For wheat, both Argentina and Brazil show significant gains (+14.8% and +8.7%), as well as Iran (+5.3%) and neighboring Turkey (+5.2%). Rice did particularly well in two major exporters: Thailand (+7.2%) and Vietnam (+6.6%).

Most of the notable projected decreases in production are associated with well-identified causes, mostly weather and the resulting reduction in cultivated areas in extreme cases. For maize, this applies to South Africa (-12.4% in maize production) and Ukraine (-15.0%); for wheat to Australia (-9.0%) and some eastern European countries and Russia (around -8%). In Ethiopia, a critical shortage of rainfall for belg[7] crops is also likely to affect crops harvested later in the year, leading to estimated decreases in production of -10.0% for maize and -7.0% for wheat.

In India, CropWatch forecasts are very close to early estimates issued by several government agencies. For maize, rice, and wheat the decrease compared to last year's harvest amounts to -4.6%, -1.9%, and -4.5%, respectively.

[6]Numbers in italics refer to the forecasts based on average conditions, rather than on assessments of the currently completed or ongoing harvest; see also table 5.2.

[7]"Belg" refers to crops harvested before August; all crops harvested from August to December belong to the "Meher" season.

Table 5.2. 2015 production estimates and forecasts for maize, rice, wheat, and soybean (thousand tons) in selected countries, compared to 2014 CropWatch estimates

	Maize			Rice			Wheat		Soybean	
	2015	Δ%		2015	Δ%		2015	Δ%	2015	Δ%
Argentina (+)	**25332**	**1.0**		*1805*	*4.5*		**12053**	**14.8**	**52230**	**-0.4**
Australia (-)	*557*	*7.4*		*1779*	*19.6*		**24581**	**-9.0**	*89*	*5.9*
Bangladesh (+)	*2229*	*0.5*		52669	3.5		*1311*	*1.5*	*64*	*0.1*
			Boro	**29495**	**4.2**					
			Aus&Aman	23175	2.7					
Brazil (=)	**78921**	**0.3**		**11983**	**1.2**		**6710**	**8.7**	**89487**	**0.5**
Cambodia (-)	*1048*	*1.4*		9248	-2.3				*103*	*-6.1*
			Main	**7149**	**0.3**					
			Dry	2099	-10.2					
Canada (+)	12114	1.7					**34564**	**3.8**	5569	2.7
China (+)	195118	1.6		202323	0.6		121009	1.1	12914	-1.3
			Early	35645	0.7	Winter	**113502**	**1.1**		
			Single	131586	1.1	Sprint	7507	0.0		
			Late	35092	-1.5					
Egypt (=+)	5875	-1.3		6603	4.3		**9870**	**3.7**	*22*	*-6.7*
Ethiopia (-)	**6068**	**-10.0**		*180*	*-1.2*		**4084**	**-7.0**	*72*	*0.0*
France (+)	14590	-3.1		*58*	*-29*		**38976**	**-2.0**	*105*	*-2.5*
Germany (+)	5202	2.3					**26452**	**-4.4**	*3*	*12*
India (=)	**19251**	**-4.6**		153936	-1.9		**91396**	**-4.5**	11146	-4.1
			Rabi	**133924**	**-1.4**					
			Kharif	20012	-5.6					
Indonesia (=)	**18554**	**1.0**		70398	1.6				*743*	*-4.1*
			Main	**66526**	**1.8**					
			Second	3872	-1.3					
Iran (=-)	*2591*	*3.3*		*2935*	*2.4*		**14061**	**5.3**		
Kazakhstan (+)	*603*	*4.4*		*365*	*1.5*		**13263**	**-4.2**	*252*	*12.2*
Mexico (+)	**25925**	**8.2**		*184*	*2.0*		**3736**	**2.2**	*323*	*10.9*
Myanmar (-)	*1747*	*1.8*		28196	-0.9		*188*	*0.7*	*177*	*-6.9*
			Main	22557	-1.6					
			Second	**5639**	**1.7**					
Nigeria (=)	**10319**	**-3.4**		**5221**	**2.2**		*98*	*-18.1*	*760*	*9.1*
Pakistan (=-)	4717	0.1		9482	-0.1		**24554**	**0.7**		
Philippines (=-)	7463	-0.6		19284	-0.4				*1*	*-4.1*
			Main	10812	-0.3					
			Second	**8472**	**-0.5**					
Poland (+)	4479	6.7					**9121**	**-6.4**		
Romania (=)	10316	-3.8		*42*	*-9.8*		**6806**	**-7.3**	*161*	*5.6*
Russia (=-)	11875	1.0		*910*	*-6.2*		**48510**	**-8.9**	1449	-4
South Africa (-)	**10974**	**-12.4**					**1743**	**-6.6**	*705*	*4.7*
Thailand (=-)	5090	0.2		41965	4.5				*225*	*10.3*
			Main	34476	7.4					
			Second	**7489**	**-6.7**					
Turkey (+)	5827	0.6		*949*	*2.0*		**21808**	**5.2**	*229*	*15.7*
Ukraine (=-)	25475	-15.0		*160*	*1.0*		**20873**	**-9.6**	3673	-4.7
U.K. (+)							**14206**	**-2.8**		
United States (=+)	320419	-3.9		8388	-7.3	Winter	**58210**	**2.6**	85696	-4.7
Uzbekistan (=+)	*423*	*9.2*		*401*	*11.4*		**6189**	**-1.3**		
Vietnam (=)	5389	3.6		46914	6.6				*138*	*-13.6*
			Winter /Spring	**21111**	**7.7**					

	Maize			Rice		Wheat		Soybean	
	2015	Δ%		2015	Δ%	2015	Δ%	2015	Δ%
			Summer /Autumn	25803	5.8				
Sub total	838491	-1.8		676378	1.0	614372	-1.6	266336	-1.7
Other countries	109123	2.4		73838	1.5	97920	1.7	19543	7.9
Total	947614	-1.3		750216	1.0	712292	-1.1	285879	-1.1

Note: Figures in orange are estimates or a revision of the estimates in CropWatch 2015 February bulletin. Figures in blue are estimates based on actual NDVI up to late April (some crops already harvested) or a combination of actual and average NDVI data from May to December for crops currently in the field and to be harvested up to the end of the growing period. Figures in red color are forecast value purely based on average NDVI data from planting to harvest. Figures in italics are forecast based on FAOSTAT data using a linear trend. For China, a more complex approach combining agrometeorology and remote sensing is used. Other figures are either estimates based on a combination of actual and average NDVI data from May to December, or on the average of trend value and remote sensing estimates. The sign after the country name (+, =, -, or a combination) is a subjective estimation (SE) of the quality of the growing season based on the country analyses in Chapter 3. "Other countries" is the sum of 2015 projected 2009-2013 trends from 134 countries from FAOSTAT, with negative projected values set to 0. Whenever the remote sensing-based estimate for the 30 countries above markedly contradicted the SE, the average of the FAOSTAT-based trend and the NDVI remote sensing estimate was adopted.

5.2 Disaster events

Introduction—A decade of disasters

According to a recent report by the UN Food and Agriculture Organization (FAO), natural disasters over the decade ending in 2013 affected close to two billion people and caused around 500 billion U.S. dollars in damage. Because an exact breakdown of impacts between different economic sectors is usually very imprecise (if available at all), it is hard to estimate agricultural losses specifically. These losses would include direct losses of production, as well as long-term effects on infrastructure, perennial crops, and land and animal stocks, which all can only be recovered and rebuilt over several years, if not more. In general, however, agricultural losses are the largest in places where agriculture contributes the most to the GDP, and the FAO report estimates that, in developing countries and for medium and large scale disasters, about 22 percent of the losses occur in agriculture. Among all disasters, floods are among the most frequently occurring (about 60 percent of disasters), followed by storms and droughts. Losses due to either excess water or from water shortage are about comparable in economic terms.

Overview of the current reporting period

The current reporting period is typical in that water-related disasters, such as floods and landslides, dominate the list of reports from various sources, in particular for disasters in Latin America, the Caribbean (for example Peru and Haiti), Central Asia (Kazakhstan), and southern Africa (also reported in the recent February 2015 CropWatch bulletin).

The recent period was further characterized by an unusually high frequency of volcanic eruptions and earthquakes, in Latin America and Asia, although geophysicists insist the events are not connected. Of particular relevance was the 7.8 magnitude earthquake that struck the Gorkha area northwest of Kathmandu (Nepal) on April 25, causing extensive suffering and damage involving an estimated 8,000 deaths, 16,000 injured, and around 600,000 houses damaged, of which about half completely destroyed.

Hailstorms, heavy rains, and floods

Although disasters in different parts of the worlds are difficult to compare, sources seem to indicate that the most serious floods affected Peru, Argentina, and Bolivia, Kazakhstan, Haiti, and southern Africa. Several floods were also reported for Asia.

Peru, Argentina, and Bolivia. In Peru, persistent rain started in September 2014 and by February this year had affected more than 30,000 people in several districts (Arequipa, Loreto, Cusco, Amazonas, and San Martin); 2,000 people were homeless as a result of the rains. By the end of March, as much as 115,000 people had been affected, with damages reported for 27,000 homes. The rains also caused 27 deaths and displaced many people in the Pando province of Bolivia (bordering Brazil) where the river waters rose to 14 meters above their normal level (figure 5.1). In

Figure 5.1. Flood situation in South America on February 20, 2015

Source: ReliefWeb (http:/reliefweb.int/sites/reliefweb.int/files/resources/ECDM_20150220_SouthAmerica_Floods.pdf); Based on a map prepared by EC/JRC for OCHA.

Argentina, floods affected the province of Cordoba in February and again at the beginning of March when close to 4,500 people had to be relocated from Cordoba, Santa Fe, San Luis, Catamarca, and Santiago del Estero. Other floods from South America include one on April 4 in northern Paraguay. At the end of March, Chile recorded the heaviest rain in 80 years in the usually very dry Atacama desert region.

Kazakhstan. According to ReliefWeb, floods repeatedly occurred in Kazakhstan in the Karaganda Oblast between March 23 and April 16, affecting about 15,000 people in 35 villages. The floods were caused by high temperatures and rapid snow-melt. A state of emergency had to be declared for eastern and northern regions of Akmola, Karaganda, and Pavlodar. The floods destroyed homes, roads, and bridges, and disrupted electricity and water supplies.

Haiti. In Haiti, abundant precipitation on April 4-5 2015 affected almost 9,000 families, mostly in the West department. Six people died in the capital, and close to 9,000 houses were flooded. Unregulated construction in high risk areas and insufficient infrastructure maintenance are considered to be the main causes of the disaster.

Southern Africa. In southern Africa, floods killed 64 people, including many children, in the middle of March near Lobito in Angola, as well as 50 people in the central Tanzanian region of Shinyanga at the beginning of the month. Floods in Shinyanga also destroyed infrastructure and thereby hindering relief operations. At the end of February, floods near Antananarivo and the surrounding area (Madagascar) killed 14 people and displaced more than 21,000. These floods followed heavy seasonal rainfall that had started in December 2014 and extended into January in the general area of the Zambezi basin, causing floods that affected close to 500,000 people in Malawi, Mozambique, Madagascar, and Zimbabwe. In Malawi, about 50 percent of the districts suffered significant losses to crops, livestock, and infrastructure, especially in the southern lowlands. As already mentioned, the floods also worsened a cholera outbreak. In Mozambique alone 65,000 hectares of crops were destroyed, putting the food security of half a million people at risk in the coming months. Altogether, the early 2015 south-African floods have, directly and indirectly, affected close to one million people.

Asia. In April, floods were also reported from Vietnam (Lam Dong province in the central highlands), Bihar in India (killing 35 people), Mymensingh and Kishoreganj districts of Bangladesh on April 19 (killing 8 people and leaving hundreds of houses damaged), and China's Sichuan province (claiming 7 lives). Earlier, February witnessed floods in Indian-administered Kashmir (killing at least 17 people) and northern Pakistan.

Disease outbreaks

Floods in various places have also increased the risk of diseases, such as for example floods in January 2015 that created stress situations conducive to the development of cholera in Malawi and Mozambique in February. Cholera also affected Kenya in February, while a plague outbreak occurred in Madagascar and a measles epidemic in the Sudan in March. Recent reports mention no new cases of Ebola virus disease in West Africa, although more time will be needed before the region can be declared Ebola free.

Cyclones

Over the reporting period, no cyclones were reported that created massive damages, although cyclones still affected select areas. In Madagascar, the above-mentioned floods that occurred in February were partly due to the abundant soil moisture resulting from the passage of tropical storm Chedza, which

crossed the island mid-January.[8] In Australia, on February 20, cyclone Marcia—a category 5 severe tropical cyclone—hit central Queensland, causing about 600 million U.S. dollars in damages.

At the end of March and in early April, the early season typhoon Maysak (or Chedeng as the typhoon is called in the Philippines) was the most powerful pre-April typhoon on record in the Northwestern Pacific Ocean. Maysak reached the north of Luzon in the Philippines after affecting Micronesia where it claimed 12 lives, damaging crops and infrastructure.

Droughts

Significant drought is mostly reported from Pakistan and the western United States, in particular California and Washington State (including the Olympic Peninsula, the east side of the central Cascade Mountains including Yakima and Wenatchee, and the Walla Walla region). California has introduced measures to save water and ration it for some uses. The water shortage is due to a combination of factors, such as reduced rainfall and snowfall this winter in areas including the Sierra Nevada mountains, as well as a tradition of unrestrained ground water use.

In Pakistan, in the Tharparkar district in Sindh region, drought has claimed the lives of at least 40 people in February alone, with more than 500 lives claimed over the last three years. Although Tharparkar is a semi-arid region, multi-annual droughts are unusual for the area.

Cold and snow

Extreme winter weather was reported from the Middle East in January, especially from Lebanon and Syria where it has compounded the problem associated with the civil unrest and the resulting humanitarian crisis. In February, news reports included those about cold weather emergency situations in both the United States (in Tennessee) and Afghanistan, where avalanches in Badakhshan province killed 12 and destroyed houses.

The recent reporting period also brought a—still to be confirmed—new world record of snowfall. In the town of Capracotta in central Italy, one day brought 2560 mm of snow. The previous record for a 24-hour show fall was from Silver Lake, Colorado in the United States, where 75.8 inches (or 1925 mm) had fallen in 1921.

5.3 Crop production and trends in South America

Introduction

Two of the major world food crops originate in South America: cassava, which has now become pan-tropical, and potatoes, today cultivated worldwide in temperate areas as a summer crop.[9] Globally, Brazil ranks fourth in terms of cassava production (after Nigeria, Thailand, and Indonesia) with a per capita production of about 40 kg per year, which compares with similar values for cassava production in Colombia, averages of 32 kg per capita for the sub-continent,[10] and average of 14 kg per capita for all cassava producing countries.

[8] Tropical storm Chedza was also reported on in the previous, February 2015, CropWatch bulletin.
[9] Several crops originate in South America; American crops include sisal, cassava, yams, maize, opuntia (prickly pear), papaya, ground-nuts, several beans, pineapple, potato, tomato, sweet potato, sunflower, cocoa, vanilla, plus a number of local crops (such as quinoa), some of which some are gaining worldwide popularity.
[10] The sub-continent includes the 15 countries south of Colombia and Venezuela, plus territories of disputed status or administered by countries not part of the region.

While cassava remains an important crop in tropical South America, the continent has lost the supremacy of potato production as only Peru appears in the top twenty of world producers, ranking 17th. Within the region, however, Peru, Bolivia, and Chile, three Andean countries, lead in terms of per capita potato production with respectively 80, 63, and 59 kg per capita per year, while regional and global averages are only 30 kg per capita per year.

In terms of value, meat (especially beef), soybean, and sugarcane dominate South American agricultural production, with values in the range of 40 billion U.S. dollars for beef, and 32 and 27 billion U.S. dollars respectively for soybeans and sugarcane. Rice and maize crops rank as numbers 7 and 8 (after milk, pork, and poultry) in terms of value, with both crops providing values in the range of 6 billion U.S. dollars.

Agricultural statistics

Brazil is the giant of South America by most standards, including area, population, nominal GDP,[11] and agricultural production. Table 5.3 summarizes some statistics for the most populated countries in the region. As shown in the table, urbanization rates are high among the seven listed countries, while the prevalence of under-nutrition also remains considerable in some of the countries. Arable land has been mostly stable over the recent years, with a marked decline only in Colombia (-5%). The fraction of surface water used in agriculture varies significantly between equatorial countries that are well endowed with water, such as Brazil and Colombia, and the more temperate and mountainous areas such as Peru and Chile. The daily availability of food reflects the relative importance of the crops. Not shown in the table are meat products (including poultry), which do play an important part in the region's economy.

Table 5.3. Population and agricultural statistics for selected large South American countries

Country	Pop. (millions)	Under-nutrition (%)	Urbanization rate (%)	Δarable land (%)	Surface water used for agri. (%)	2011 Daily per capita availability (kcal)					
						Wheat	Sugar	Rice	Soybean oil	Potato	Maize
Brazil	205	15↓	85	+1	55	385	386	347	328	n.a.	208
Colombia	48	13=	76	-5	39	250	246	285	135	n.a.	245
Argentina	43	5=	93	+2	66	872	404	80	66	66	82
Peru	31	11↓	78	+1	85	342	206	522	74	223	186
Chile	18	5=	90	+1	70	873	440	n.a.	115	133	203
Ecuador	16	18↓	69	-1	92	303	174	419	126	n.a.	n.a.
Bolivia	11	24↓	68	+2	57	392	258	281	67	n.a.	286

Note: Countries included in the table have a population above 10 million, according to July 2015 projections from Wikipedia. Under-nutrition data is for 2010-2012, arrows (↓, ↑) indicate the change since 1999-2001, while "=" indicates a change smaller than1 percent. Percentage increases in arable land data are for the period 2007-2012, while surface water data is from 2002. Daily per capita availability of crops is based on 2011 data; n.a. indicates the crop is not among the ten most available crops in that country.
Source: All data based on FAOSTAT.

Agricultural export products and crop production trends

Over the recent decades, the region has undergone some spectacular agricultural developments, with some countries developing into major global producers of maize and soybeans, but also sugarcane, coffee, cocoa, and several other commodities such as fruits (bananas, grapes, and nuts), palm oil, and vegetables, with production taking advantage of the large diversity of climates—from temperate to equatorial—occurring in the region. For coffee, globally Brazil is the number one producer, with Colombia and Peru ranked 4 and 6; for cocoa Brazil is number 6, Ecuador 7, Peru 10, and Colombia 11. In addition

[11] In 2013 Brazil's nominal GDP was between that of the United Kingdom and Italy; nominal GDP is computed at official exchange rates and does not take into account the cost of living.

to the many food products, hides and wool are also among the main export products of the region. (See table 5.4).

Table 5.4. Agricultural export products of selected large South American countries

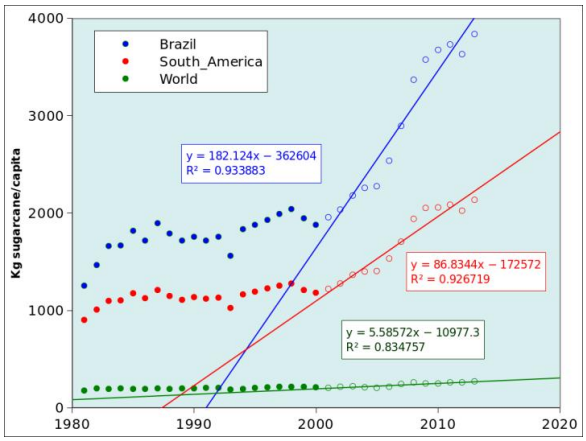
Country	Destination	Top three of agricultural exports by value
Brazil	China, the Netherlands, and Russia	Soy, sugar, and coffee
Colombia	United States, Belgium, and Japan	Coffee, banana, and sugar
Argentina	China, Brazil, and the Netherlands	Soybean, maize, and wheat
Peru	United States, Germany, and the Netherlands	Coffee, vegetables, and grapes
Chile	United States, China, and United Kingdom	Grapes, fruit, and potatoes
Ecuador	United States, Russia, and Germany	Bananas, cocoa, and palm oil
Bolivia	Venezuela, Colombia, and Peru	Soy, nuts, and oil

Source: FAOSTAT.

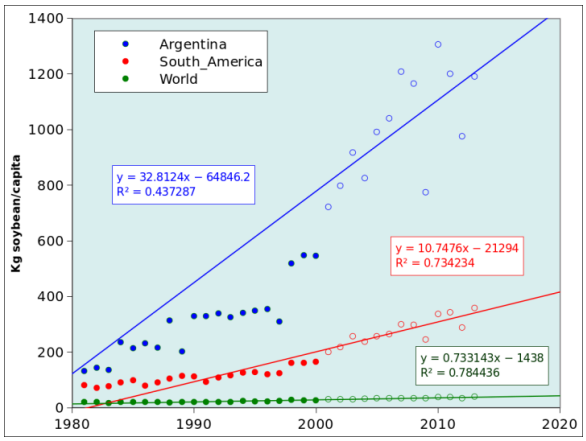
Figure 5.2 illustrates some typical trends of per capita crop production in South American countries, including Brazil, Argentina, Guyana, and Paraguay. In Brazil (figure 5.2(a)), the trend for sugarcane production drastically changed after 2001; today, the annual rate of production increase per person in Brazil (182 kg/person) is more than double the regional average (87 kg/person) and more than 30 times global averages. Inter-annual variability is relatively limited, as most of the crop is irrigated.

Only a fraction of sugarcane production in Brazil is used for food, as the country, starting in the 1930s, has developed a unique program of running cars on a mix of ethanol (made from sugarcane) and gasoline, currently accounting for 25 percent of the world ethanol fuel consumption. Mixing ratios of 1/1 have been practiced in the past, but the current proportion is 1 ethanol to 3 gasoline.

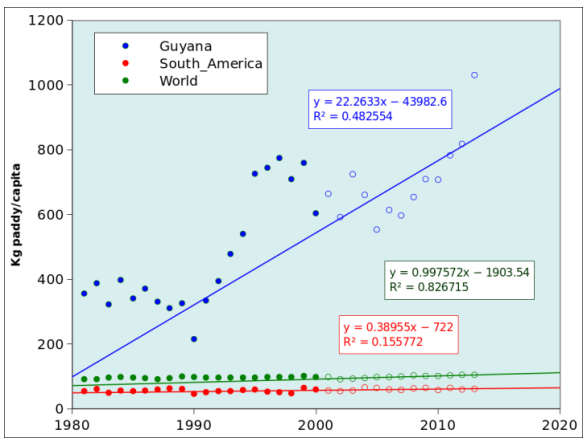
Figure 5.2. Trends in per capita crop production in four South American countries since 1981

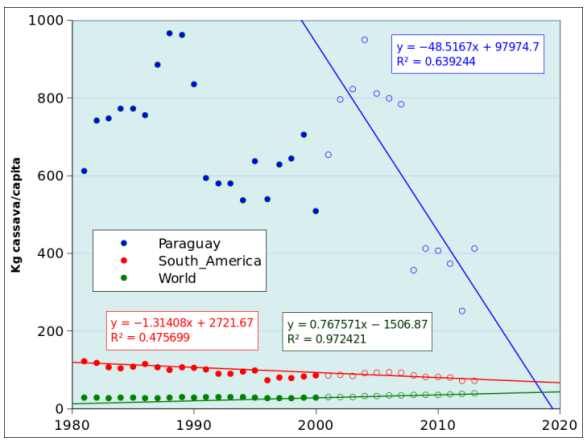


a. Per capita sugarcane production in Brazil



b. Per capita soybean production in Argentina





c. Per capita rice production in Guyana

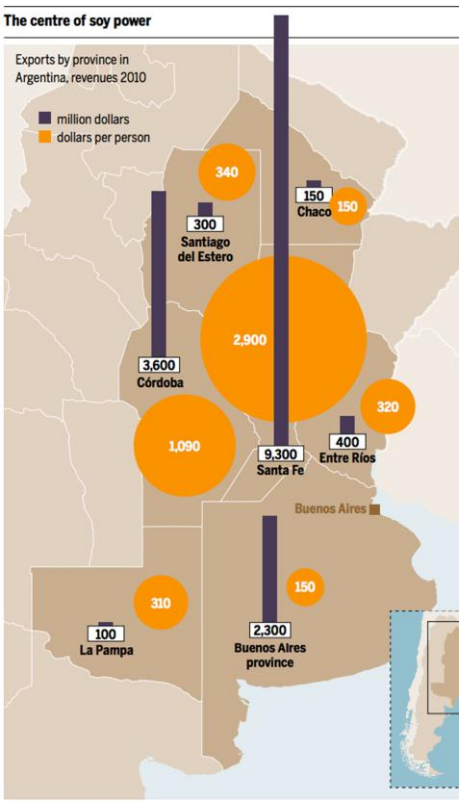
d. Per capita cassava production in Paraguay

Note: Trend lines refer to the period from 2001 to 2013.

Soybean in Argentina (figure 5.2(b)) is the prototype of the South-American agricultural success story with yields, areas, and production steadily increasing over the last thirty years, although with more variability than sugarcane in Brazil. In fact, Argentina has experienced several years of drought, which also affected maize and especially wheat crops. The drought has occurred despite a trend of increasing rainfall for the region between 1951 and 2012 (Marengo et al., 2014).

Over the years, a new production model for producing soybeans has become in use in the country. Starting in the 1990s, but particularly from the early 2000s after the severe economic crisis that affected the country, a system called the "pool de siembra" (or "sowing pool") has been used. Under this model, a pool is funded by several investors who adopt an industrial approach to farming by using large rented areas and shared equipment, eventually dividing benefits. The sowing pool system currently covers about 25 percent of the soybean production in Argentina and typically cultivates 15,000 to 30,000 hectares (and up to 100,000 hectares) per pool. The system relies heavily on advanced mechanization, low or no tillage, and pesticides (glyphosate), and it has been criticized as unfairly competing with more traditional small crop and livestock producers; adversely affecting the soil, the environment, and human health; and contributing to increased social tensions. The model has started expanding into neighboring countries, where it competes with other crops, for instance cassava in Paraguay, resulting in spectacular drops in production (figure 5.2(d)). Figure 5.3 presents an overview of sowing pools in Buenos Aires province in Argentina.

Figure 5.3. Sowing pools in Buenos Aires province, Argentina



Source: HBF 2014

Figure 5.2(c) illustrates that South America also has seen some interesting development of crops not immediately associated with the continent, such as rice in Guyana. Other examples are sorghum in Brazil, potatoes in Colombia, paddy in Paraguay, and barley in Argentina; in Argentina, per capita barley production increased about tenfold over the last two decades.

Current developments in perspective

Over the recent decades South American agriculture has undergone spectacular changes, especially an explosion in the production and exports of maize and soy beans. The changes have been driven mostly by increasing demand for animal feeds and the development of Asian economies, which have become major importers of the two commodities. As mentioned in the previous CropWatch bulletin, agriculturally less developed regions in the world, including Africa, are currently trying to build on the South-American and Thai experience and have started implementing plans that aim to repeat the success of the Brazilian Cerrado and northeast Thailand. Due to worldwide urbanization and the fast development of emerging economies, there is no sign of abating demand, which means a lot of potential for further agricultural development in South America and Africa remains. However, more attention should be paid to the

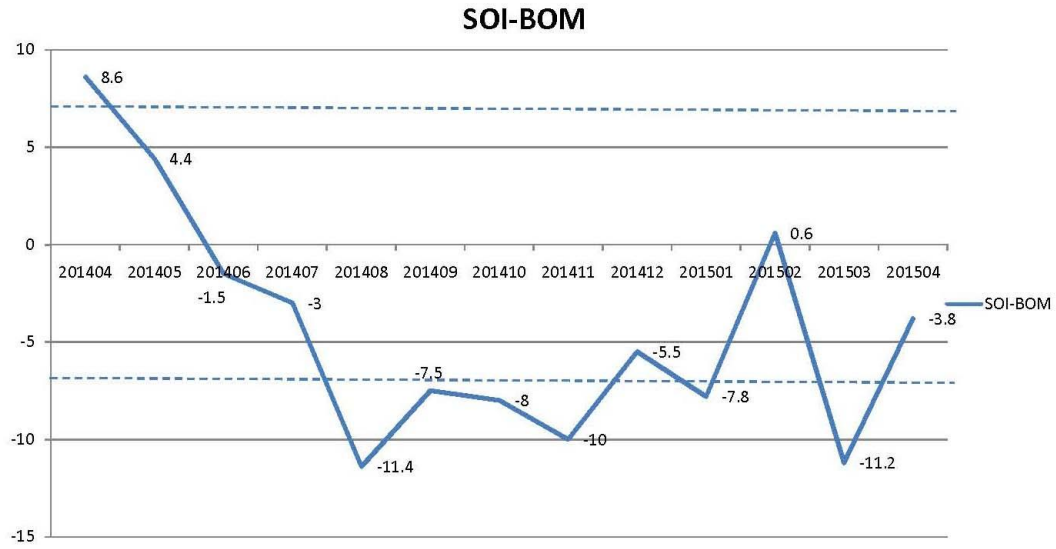
sustainability of new developments, as there are growing signs that the eventual costs of these developments in terms of adverse impacts on the environment and human health may be very high.

5.4 El Niño

El Niño reports have turned into an "alert status" during this monitoring period. Figure 5.4 illustrates the behavior of the Southern Oscillation Index (SOI) of the Australian Bureau of Meteorology (BOM) from April 2014 to April 2015. Sustained negative values of SOI below -7 indicate a likely EI Niño event, while sustained positive values above +7 are typical of La Niña. Values within the range (-7 to +7) indicate neutral conditions. As shown in the figure, the SOI dropped rapidly from +8.6 to -11.4 between April 2014 and August 2014, after which it maintained a low value of around -7.0 with only a positive value of 0.6 in February 2015. In April 2015, the index was -3.8. Considering the consistently low value of the SOI, high sea surface temperature over EI Niño thresholds, and weaker trade winds than average, the status of the ENSO Tracker at the BOM is raised to "Alert" as of April 2015, and it is foreseen that a full-fledged and real El Niño is developing.

Several extreme weather events that happened in the world recently are consistent with EI Niño. Paraguay and Argentina suffered severe floods caused by sustained heavy rainfall in June 2014, while Brazil in 2014 has experienced its most severe drought since 1930. In addition, the middle and eastern parts of the United States have suffered 6 large snow storms over the recent winter, and Southern China is now encountering sustained heavy rainfall. CropWatch will keep a close look at EI Niño in the coming months.

Figure 5.4. Monthly SOI time series from January 2014 to January 2015



Source: Australian Bureau of Meteorology (http://www.bom.gov.au/climate/glossary/soi.shtml).