Chapter 5. Focus and perspectives

Building on the CropWatch analyses presented in chapters 1 through 4, this chapter presents initial CropWatch food production estimates for 2017 (section 5.1), as well as sections on recent disaster events (section 5.2), and an update on El Niño (5.3).

5.1 CropWatch food production estimates

Methodological introduction

Table 5.1 presents the first estimate by the CropWatch team of global maize, rice, wheat, and soybeans production in 2017. It is issued at a time when many winter crops in the northern hemisphere are still growing and summer crops are in very early stages, or even to be planted; in the southern hemisphere the harvest of the summer season/monsoon season was completed. The estimate is based on a combination of remote-sensing models (used for major commodities at the national level and presented in red in table 5.1) and statistical trend-based projections, which are used for minor producers and for those countries which will harvest their crops later during 2017 and for which no directly monitored crop condition information is currently available. The percentage of modeled production varies by crop: 24% for maize, 65% for rice, 98% of wheat (most of it being winter wheat) and 52% for soybeans.

For China and the 30 countries described in chapters 3 and 4 and listed by name (the "major producers"), the quantitative estimates in this chapter are calibrated against national agricultural statistics (as opposed to FAOSTAT). This means that (i) sub-national statistics are used at least for the largest countries and (ii) 2016 information in included in the calibration. It is also stressed that the calibration is crop-specific, which means it is based on different crop masks for each crop and that, for each crop, both yield variation and cultivated area variation are taken into account when deriving the production estimates. The major producers represent at least 80% of production and 80% of exports. "Others"[3] and the countries shown in black in the production table were extrapolated to 2017 based on the linear trend from 2010 to 2016, with FAOSTAT data up to 2014 (the last year available) and CropWatch final estimates for 2015 and 2016.

CropWatch production estimates differ from other global estimates by the use of geophysical data in addition to statistical and other reference information such as detailed crop distribution maps.

Production estimates

CropWatch estimates the global 2017 production of the major commodities at 730 million tons of wheat (a 1% drop below 2016), 761 million tons of rice (up 3%), 305 million tons of soybeans (down 3%), and 1056 million tons of maize, up 5% over 2016. The major producers contribute 622 million tons of wheat (-1%), 685 million tons of rice (+3%), 282 million tons of soybeans (-4%), and 936 million tons of maize (+6%). The share of the "minor producers" (shown as "others" in the table) to the global production is 8% (soybean) to 15% (maize) of the global production, and about 10% for rice and wheat. With the exception of wheat and soybeans, the group of the major producers outperforms the bulk of the remaining nations, with the largest increases over 2016.

[3] "Minor producers" include the 151 countries from Afghanistan and Angola to Zambia and Zimbabwe.

Table 5.1. CropWatch estimated maize, rice, wheat and soybean production for 2017 (thousands tons)

	Maize		Rice		Wheat		Soybean	
	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016	Production (ktons)	% change from 2016
Argentina	**29946**	16	**1769**	4	**11338**	-3	**51116**	0
Australia	759	61	1864	24	**32066**	1	92	-7
Bangladesh	2751	16	**50365**	6	1471	12	64	
Brazil	**79243**	13	**11177**	1	**7771**	3	**96726**	5
Cambodia	811	4	**8880**	3			147	-11
Canada	12198	4			**32589**	-2	5829	8
China	212114	6	204744	2	**120611**	2	12842	-3
Egypt	**5628**	-1	**6109**	-3	**9947**	-3	33	18
Ethiopia	**6806**	-5	173	29	5066	7	72	-28
France	**14518**	-1	380	387	**37460**	-1	129	-38
Germany	**4351**	-5			**27566**	-2	8	
India	19522	5	**167735**	7	**100777**	17	13873	14
Indonesia	**17627**	-4	**70000**	1			900	2
Iran	2535	-6	2690	-3	**11884**	-26	173	0
Kazakhstan	722	5	392	-5	**15607**	-14	207	-24
Mexico	**22779**	-4	158	-11	3542	0	278	-30
Myanmar	1841	5	**27752**	9	190	1	178	40
Nigeria	**10392**	-4	5248	14	84	-27	517	-22
Pakistan	**4216**	-7	9302	2	**24239**	-2	0	
Philippines	**8519**	13	**19103**	-5			1	
Poland	4703	28			**10017**	-6	1	
Romania	**10105**	-12	39	-18	**6184**	-19	141	-32
Russian Federation	15199	23	996	-2	**47379**	-18	2025	-4
South Africa	**12370**	37	3	0	1776	4	912	-17
Thailand	5037	-1	**41732**	5	1	18	144	-38
Turkey	6632	12	949	1	**16916**	-11	180	-17
Ukraine	35535	15	98	-8	**25254**	5	3183	-16
U. Kingdom					**12691**	-11		
United States	383410	4	10030	-5	**54375**	-4	92351	-16
Uzbekistan	490	15	496	13	**6037**	-6		
Vietnam	5434	4	**42643**	0			172	
Sub-total	**936194**	**6**	**684828**	**3**	**622838**	**-1**	**282296**	**-4**
Others	119762	2	75997	2	106946	4	23027	5
Global	**1055956**	**5**	**760825**	**3**	**729784**	**-1**	**305322**	**-3**

Note: Numbers in red are based on remote-sensing models, while other numbers are statistical trend-based projections.

Maize

In the southern hemisphere, a large increase in maize production is listed for South Africa (+37%), as the country recovers from the 2016 El Niño drought. Both Brazil and Argentina did well with 79 million tons (+13%) and 30 million tons (+16%), respectively; the tables in Annex B show additional detail. In both countries, "others" are catching up with the main producing areas, illustrating the fact that production areas are diversifying, which can only be beneficial in the long term for the stability of output, especially in Argentina which has recently suffered from large production variability. The provinces of Cordoba and Buenos Aires still account for 25% of production each, but "others" is now reaching the same percentage. Moreover, while the two leading provinces experience a drop in the production of maize (-3% and -2%), "others" increased 7%. In Brazil, the states of Mato Grosso, Parana, and Goias still lead: they make up 24%, 19%, and 10% of the national production, respectively. The first, however, grew over 2016 at a rate

of 5% to 6%, while Goias progressed 27%, and "others" 47%, describing the same picture of spatial diversification as in Argentina.

In the northern hemisphere, Poland (+28%), Russia (+23%), and Ukraine (+15%) showed increases that result from the trend of the previous seasons. Among the major producers in the northern hemisphere, CropWatch puts China at 212 million tons (+6%) and the United States at 383 million ton (+4%).

Rice

Among the major Asian producers, most are assessed to be doing well in 2017, including Bangladesh (50 million tons and a +6% increase over 2016), India (167 million tons, +7%) in spite of very mixed weather conditions in late 2016, Indonesia (70 million tons, +1%), and Myanmar (28 million tons, +9%). Among the major exporters, Thailand (41 million tons, +5%) did well, but less favorable outputs are projected for Vietnam (43 million tons, 0%). The Philippines are the only major Asian producer that is projected to undergo a decrease (-5%). All negative impacts are more or less directly the result of El Niño, and the current situation of the phenomenon (see section 5.4) raises the fear that it may repeat itself in 2017. The main producers in Latin America, while their rice outputs are sizeable, are dwarfed in comparison with Asia. CropWatch covers Brazil with some detail (see also annex B2), and the country is projected to increase this year's rice production. Argentina, which is listed in table 5.1 with 2 million tons of rice output (+4%) actually comes after Peru and Colombia in terms of production. Among the largest non-trend based production estimates, the largest decrease in rice production is listed for Egypt (-3%), along with decreases for all its cereals (maize, -1% and wheat, -3%). CropWatch puts rice production for China at 205 million tons (+2%) and for Pakistan at 9 million tons (+2%).

Wheat

Table 5.1 lists few countries with an improved production over 2016, resulting in the above-mentioned global production decrease of 1%. Positive values for winter wheat in the northern hemisphere, which makes up the bulk of wheat production, are estimated at 12% for Bangladesh, where the crop is gaining popularity, 2% for China, 17% for India (the Rabi crop), and 5% for Ukraine, which contradicts the generally mixed qualitative assessment in Chapter 3 and thus requires special attention in the next monitoring period. Large negative values are given for Iran (-26%) and Kazakhstan (-14%), Romania (-19%), the Russian Federation (-18%), and Turkey (-11%). Many of the areas suffered from an unusually large shortage of sunshine, but this occurred at late dormancy and early spring growth. Better estimates will become available at the time of harvest. The CropWatch estimate for the United States stands at -4%, which will probably need to be revised upward according to the qualitative assessment (see also the detailed estimates by state in annex B). All the major wheat producing states with a drop in production compared with 2016 also recorded very low sunshine and very abundant rainfall that may have affected crop development through water logging. These include Kansas (-8% wheat production, -7% RADPAR), North Dakota (-20%, -4%), South Dakota (-19%, -5%), Colorado (-5%, -4%), Idaho (-18%, -9%), and Nebraska (-15%, -8%).

Soybean

Only two estimates based on remote sensing are currently available after the South American summer crop harvest, for which details are given in annex B. Argentina remained at the same level as in 2016, and Brazil is up 5% for soybean production. In Argentina, the production drop recorded by the two main provinces (-3% in Buenos Aires and -2% in Córdoba) that together provide about half the national output, is compensated by increases in Entre Rios (+6%) and by "others" (+7%). In Brazil, all states did well, including the two major producers (Mato Grosso +5% and Parana +6%), but with the exception of Minas Gerais (-3%).

Major importers and Exporters

Table 5.2 provides some information about the likely impact on trade of the production variations outlined above. Both maize importers and exporters increased their production by approximately the same percentage between 5% and 7%. For rice, however, the output of the two major importers was low: Philippines (-5%, modelled) and Iran (-3%, trend-based). Nigeria, the top importer in Africa, which produces about 5 million ton of rice, will do well (+14%) if the recent trend continues into 2017.

Table 5.2. 2017 production (million tons) and difference from 2016 of major importing and exporting countries

	Maize		Rice		Wheat		Soybean	
	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016	Prod. (million tons)	% change from 2016
Top 5 importers	241	5	28	-1	30	1	13	-4
Top 10 importers	252	5	306	2	38	1	14	-11
Top 5 exporters	543	7	271	5	204	-6	246	-9
Top 10 exporters	809	6	315	5	290	-6	432	3

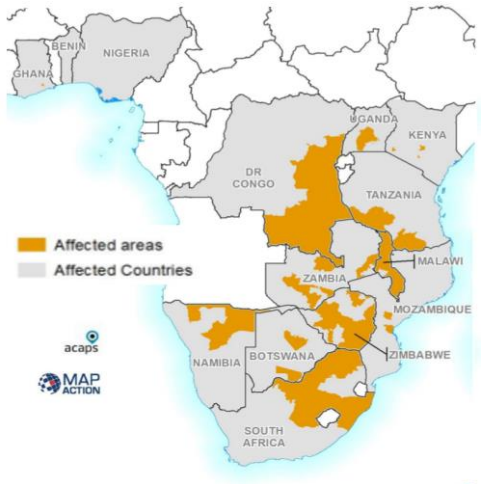
Wheat importers did relatively well (+1%), but exporters are assessed as generally poor, with negative changes among 4 of the top 5 exporters (United States -4%, France -1%, Canada -2%, and Russia -18%) and 8 of the top 10 (including also Germany -2%, Argentina -3%, Kazakhstan -14%, and Romania -19%).

For soybean, top importers produce typically only a fraction of their consumption, so that the negative 2017 trend compared with 2016 is of little significance; it is, however, an illustration of ever increasing demand. Among the top 5 exporters of the crop actual data are available for Latin America, where the total output remained stable in Argentina but increased in Brazil.

5.2 Disaster events

This section focuses on disasters that occurred between February and the end of April 2017, a relatively quiet period in comparison with previous ones in terms of the number of events to be reported on. The period is characterized mainly by the aftermath of El Niño, i.e., floods in north-western South America in March (excess rain started last year in December); the difficult recovery from the impact of El Niño in the Horn of Africa where drought drags on in large areas; and the recovery from hurricane Matthew, which befell the Caribbean and adjacent areas in September 2016, causing damage now estimated to be in excess of US$ 15 billion. Haiti was badly affected because of the prevailing poverty and resulting lack of resilience against disasters, and 400,000 people are still in need of food aid.

Figure 5.1. Fall Armyworm situation as of 26 April 2017



Source: ACAPS thematic report, http://reliefweb.int/sites/reliefweb.int/files/resources/20170425_acaps_thematic_report_southern_africa_armyworms_update.pdf

Fall Armyworm

At the end of April, Reliefweb released an updated report about a new pest called the Fall Armyworm (*Spodoptera frugiperda*), which continues spreading in southern, east and west Africa (Figure 5.1). The insect is native to Central

and South America, and it is not known how it reached Africa where another armyworm (*S. exempta*) is a native species. According to a recent note in the journal Nature, even if the Fall Armyworm is currently causing limited damage in Africa, it is very likely that it will eventually spread to Europe and Asia as well.

Temperature excesses

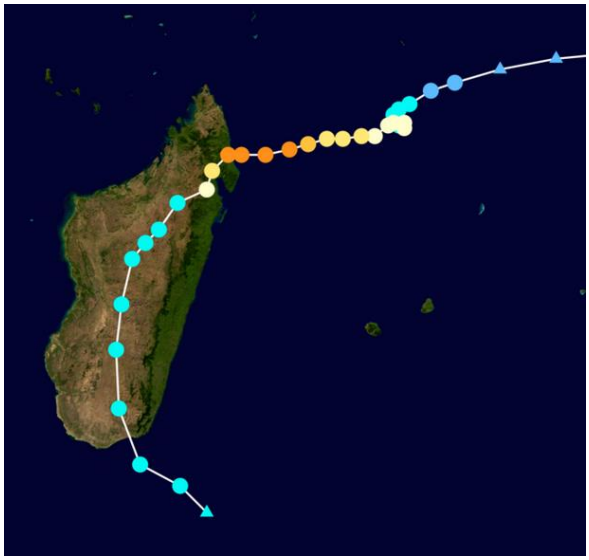
With few exceptions (such as a heat wave in Australia), no excessive temperature situations (cold or warm waves) were flagged by the entities monitoring disasters (Reliefweb, ACAPS, and Recent Natural Disasters, among others.)

Cyclones

Several cyclones with limited impact on agriculture were recorded in Oceania and the Indian Ocean. These include for example Debbie (in late March in east and northeast Australia) and, in April, Cook (New Zealand) and Maarutha (Myanmar). None of these, however, created significant damage in the agricultural sector, unlike two African storms.

In mid-February, tropical storm Dineo killed at least seven people in Mozambique and destroyed thousands of homes and buildings. Strong winds of up to 160 km/h affected 550,000 people as well as crops mainly in Inhambane province. Impacted crops included cereals and fruits, which are important local cash crops (cashew, coconut).

Figure 5.2. Track of cyclone Enawo



Source: https://en.wikipedia.org/wiki/Cyclone_Enawo#/media/File:Enawo_2017_track.png

One month later, on March 7, tropical cyclone Enawo (Figure 5.2) hit land in the northeastern district of Antalaha in Madagascar, the strongest cyclone in about 15 years. Heavy rain and strong wind that reached 230 km/h were recorded. After landfall, the cyclone turned left and crossed the island from north to south in two days, affecting the whole country, though mostly eastern and central areas. At least 80 people were killed and 183 wounded, mainly in Analanjirofo and Sava regions. Moreover, all crops and rice fields in Antalaha and Sambava were submerged and have been destroyed. Village food reserves were also destroyed by the floods, and food prices in local markets are increasing. More importantly, the impact on cash crops such as vanilla will be felt well after the situation returns to normal. According to World Bank estimates, losses in the agricultural sector reach about US$ 200 million.

Droughts

Drought situations are mainly reported from the Horn of Africa and Pakistan.

For the Horn of Africa, El Niño related droughts have been described in previous CropWatch bulletins. While the situation seems to have improved significantly in southern Africa, where floods were recorded (see below), the drought continued in areas of Somalia, Kenya, and Ethiopia. In the whole region, if the situation continues to deteriorate, cattle will die or herders will not be able to sell them. In contrast, maize prices went up, for example by 30% in Ethiopia, where prices currently are 43% above those for the same period last year. The price of milk and eggs has increased by 50% over the middle of last year.

Somalia experienced a bad dry Jilaal season (January-March). The river Shabelle, the main river, dried up, triggering movements into cities and Ethiopia. Half the population of the country currently needs food assistance (involving more than 6 million people, of which 50% in IPC phases 3 and 4). In just the last three weeks of April, the number of people displaced by drought increased 16%, bringing the total number of people in the country driven from their home areas by unrest and lack of water to more than 600,000, mostly in Baidoa (+34,700) and Mogadishu (+18,000). No new refugee movements were reported. Half the population of the country currently needs food assistance (involving more than 6 million people, of which 50% in IPC phases 3 and 4). At the beginning of the reporting period (January and February), the number of malnourished children had increased 24% over August last year. Somalia needs more international social attention to avoid that the unrests of Syria reappear.

In Ethiopia, about 120,000 people in the Somali region alone have been displaced since the beginning of the year, due to a combination of drought and unrest in neighboring Somalia. Food insecurity is largest mostly in the east, affecting Afar, the Sitti zone of Somali region, and parts of Amhara, Oromia, and SNNPR. In the east and south, about 6 million need humanitarian assistance.

In Kenya, just short of 40,000 displaced persons were reported in Isiolo and Baringo. Even if some relief was brought by March and April rainfall in some drought affected areas, the IGAD[4] Climate Prediction and Applications Centre (ICPAC) predicts a second consecutive poor rainy season in the semi-arid, pastoral areas, which will also affect Belg crops in Ethiopia that are normally harvested before August. The main rainy season in Kenya ("long rains", between March and May) was late in many areas already tried by last year's drought.

Altogether, the current situation in the Horn of Africa raises the risks that displaced persons may not be able to go back to their home areas (in spite of the fact that a few thousands were already supported by international aid organizations to return) and that the currently tense situation is bound to continue for months.

In Pakistan, a drought was reported for Sindh province in April by the EC Humanitarian Aid and Civil Protection (ECHO). About a quarter of the population is assessed as being moderately to acutely food insecure, mostly due to limited access to safe drinking water for people and animals. Waterborne diseases and malnutrition are increasing.

Floods and landslides

Heavy rainfall, often resulting in landslides, is reported from Indonesia (Java Island) and Bangladesh at the beginning of April, and in Afghanistan in March. Other continents were affected as well, especially the south of Africa and northwest Latin America.

In Bangladesh, rain started at the end of March, and low-lying areas, including croplands, have been inundated in the northeast (districts of Sylhet, Moulavibazar, Sunamganj, Habiganj, Netrokona, and Kishoreganj) as a result of rising waters and breached embankments (figure 5.3). The floods have caused 150,000 hectares of Boro rice to be destroyed just

Figure 5.3. Broken embankment in Tahirpur district, Northeast Bangladesh

Source: https://elispiritweaver.wordpress.com/category/storms/page/2/

[4] The Intergovernmental Authority on Development is a regional development community covering eight countries in the Horn of Africa.

before harvest, a production loss close to 800,000 tons according to the Ministry of Agriculture. Heavy March rains in Afghanistan led to floods in the provinces of Nimroz (especially Chakhansur district) and Khashrod; In total, 20,000 hectares of arable land were submerged in 23 villages, with the population made extremely vulnerable and in need of assistance.

South African floods, while providing a welcome relief after the 2015-16 drought, affected Mozambique (in relation with the above-mentioned cyclone Dineo), Zimbabwe (in early March), and northern Angola (late March). In Angola, 11 people died and thousands were made homeless. The most serious situation is reported from Zimbabwe, where about 250 people died, and the sudden afflux of water led to about 70 dams bursting.

The South American floods were severe both by their duration (they started in December 2016) and the number of people affected: 1.1 million in Peru and 180,000 in Ecuador and Colombia combined. Problems were first reported from Peru, but later moved into adjacent areas in the other two countries. The floods were brought about by an unusual phenomenon described as a "Coastal El Niño" (see section 5.4), and the whole array of phenomena linked with excess water occurred—landslides, floods, flash floods, and mud flows (figure 5.4). Throughout the region, relief operations were extremely difficult because of destroyed bridges and roads (6000 km in Peru alone); local food stocks were affected as well.

Figure 5.4. Devastation after a mudslide in Trujillo, northern Peru

Source: https://globalrumblings.blogspot.com/2017/04/floodsmudslides-disasters-death-toll.html

In Peru specifically, out of its 25 regions, 24 were affected by the floods and landslides and 12 declared a state of emergency, including the most affected regions of Piura and Lambayeque in the northwest, and Ica and Arequipa in the southwest. Infrastructure damage was most serious in Piura, Lambayeque, Lima, Ica, and Arequipa, with damages to dams and sewage and drainage systems. Food and water shortages are even reported in supermarkets in Lima. Food prices are rising in markets, even as only about 200 hectares of agricultural lands were destroyed as of March 20.[5]

The international media widely reported about the massive mudslide near Mocoa in Colombia (in the Department of Putumayo), which killed 254 people and injured 203 on March 31. The death toll is even expected to increase by at least 200 people. A state of emergency was declared in Putumayo, which borders Ecuador and Peru. In Ecuador, 47,000 people were affected, 21 people have died, and 1,410 were displaced throughout the country due to floods.

In the agricultural sector, the damage of the recent Peruvian floods is estimated to have reached US$ 645 million. The total cost of reconstruction (US$ 2-3 billion) could cancel out the planned GDP growth for the country for 2017.

5.3 Update on El Niño

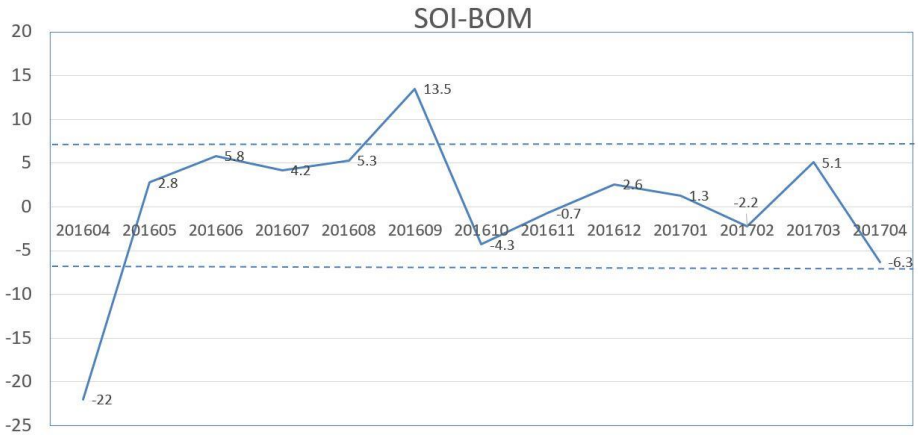
EI Niño conditions have strengthened across the Pacific Ocean during the first quarter of 2017 with an increasing probability (around 50% chance) that the phenomenon may develop again in the coming

[5] INDECI 20/03/2017.

months. The sea surface temperatures in the tropical Pacific Ocean have warmed since the start of 2017, especially in the west coastal regions of Peru with a 6°C above normal temperature, according to the Peruvian Government Multisectoral Committee on the El Niño Phenomenon (ENFEN). In the current season, the Southern Oscillation Index (SOI) has decreased from +1.3 in January to -2.2 in February, after which it rose to 5.1 in March and then again decreased to -6.3 in April (figure 5.5). The Australian BOM reports an El Niño watch, and CropWatch will continue paying attention to the risk of a renewed El Niño in 2017.

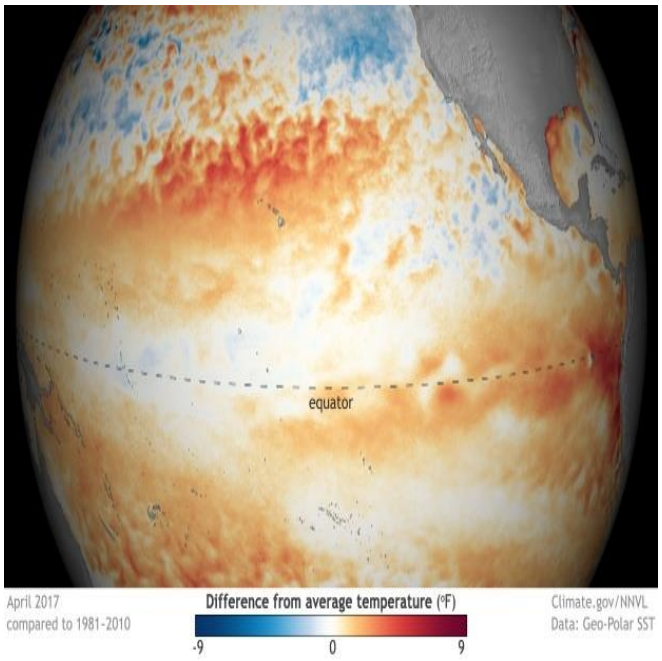
The average sea surface temperature anomalies are depicted in the NOAA image in figure 5.6, showing a different phenomenon referred to as a "Coastal El Niño," as only the sea waters in the coastal areas of Peru and Ecuador warmed up significantly. As a result, severe rains have been ongoing since December 2016 in Peru and neighboring countries (see also section 5.2), which have intensified in the past few weeks, causing landslides, floods, flash floods, and mud flows.

Figure 5.5. Behavior of the standard Southern Oscillation Index (SOI) of the Australian Bureau of Meteorology (BOM), April 2016 to April 2017



Source: http://www.bom.gov.au/climate/current/soi2.shtml.

Figure 5.6. Average sea surface temperature (SST) anomalies (°C), April 2017



Note: Anomalies are computed with respect to the monthly means for the 1981 to 2010 period.
Source: NOAA, https://www.climate.gov/maps-data/data-snapshots/data-source-sst-anomaly-enso-monitoring-region