Chapter 5. Focus and perspectives

Building on the CropWatch analyses presented in chapters 1 through 4, this chapter includes an updated production outlook for 2016 focused on wheat (section 5.1), as well as sections on recent disaster events (section 5.2), a focus on agriculture in the East and Southeast Asia (5.3) and an update on El Niño (5.4).

5.1 CropWatch production outlook

The production outlook for the current bulletin includes only the major producers in the southern hemisphere, as assessments for the northern hemisphere would be too hypothetical at this early stage in the season.

For Argentina, CropWatch puts its winter wheat production of 2016 at 11.245 million tons, an increase of 5.0% over the previous year resulting from increases in the major production area. This year, however, provinces that generally contribute relatively little to the global output outperformed the traditional “big” wheat producers from Córdoba to Buenos Aires. The same occurred in Australia where the wheat production increased more in minor producing areas (+45.1% over last year) than nationwide (+24.3%). The total output in Australia exceeds that of Argentina by a factor 3 and reaches 32.066 million tons. Finally, at 7.747 million tons, the output of Brazil stays behind that of its southern neighbor, increasing however 10.0% over the previous season. Contrary to the situation in Australia and Argentina, minor wheat producing areas in Brazil did poorly (-29%). Wheat production results for Argentina, Australia and Brazil are listed in Annex B.

5.2 Disaster events

Introduction

According to a recent World Bank study (Hallegatte et al, 2017), economic losses from natural disasters totaled US$92 billion in 2015, mostly in the building, infrastructure and agricultural production sectors.

For many people, a disaster is the beginning of the poverty spiral, as assets—such as farm tools and animals, often acquired over many years, are abruptly lost in one disaster event. For instance, there are indications that the losses to the livestock sector during the Sahelian droughts of the 1960s to mid-1980s are still not completely recovered from in terms of per capita meat and milk production.

The World Bank study found that the effect of disasters on well-being, measured in terms of lost consumption, is larger than asset losses. This results in long-term effects on health, education, ability to work productively and to restore pre-disaster conditions. It also precipitates many people into debt when assets had to be sold to survive. Therefore, the report estimates that impact on well-being in affected countries is equivalent to consumption losses that far exceed direct impact losses and reach about US$520 billion a year, far larger than any earlier estimates.

Overview

This section of the CropWatch bulletin provides an overview of disasters that occurred during the reporting period. It is sometimes based on early reports, as well as early impact assessments, as the full measure of impacts becomes available long after the impacting factor itself has subsided. The report also focuses on disasters that have the potential to directly affect agriculture. Volcanic eruptions in non-

agricultural areas, earthquakes and man-made disasters are thus mostly not mentioned, even if they have the potential to lead to long-term effects that are very comparable to those listed in the just mentioned World Bank report. Importantly, all disasters can be made worse by mismanagement as it often affects rescue operations.

The recent El Niño, which has led to misery in large regions worldwide, was the first occurrence of a large-scale geophysically caused disaster in many years, probably going back to the mid-1980s and the well-known Ethiopian droughts.

The most significant disasters of the reporting period include floods in southeastern Africa (especially Mozambique) and Hurricane Matthew, which affected Haiti at the beginning of October.

Cyclones and storms

Hurricane Matthew (September 28-October 10, 2016) was one of the strongest and long-lived Atlantic cyclones in ten years, starting its trajectory off the Venezuelan coast and dissipating east of Canada. It crossed the Caribbean between Cuba and Haiti, which were the most severely affected developing countries (damages estimated at US$2.6 billion and US$1.9 billion, respectively). Total economic loss, including between US$5 and 8 billion in the United States) is currently put as about US$13 billion. In the Caribbean, the period coincides with the maize and rice harvests and the planting of the second maize crops. According to FAO, the most affected areas in Haiti have lost up to 100% of crops, and pastures to feed livestock have also been affected. The organization puts the total value of crop losses at US$360 million and damages to irrigation and fishing equipment at US$178 million. The final estimate by government and FAO puts annual crops losses due to Matthew at 116,000 tons of food, while also about 16,500 tons of food in stock was lost. Fruit losses until recovery are estimated at over 100 million tons. About 2 million birds, 500,000 goats, 163,000 pigs, 102,000 heads of cattle, 74,000 sheep and 23,000 horses were killed, which will affect protein availability for several years. In total, 1.4 million people, or 13% of Haiti's population, were in need of food assistance at the beginning of October. In Cuba (Guantanamo, Holguin, and Las Tunas provinces) the impact was more limited; the production loss is estimated to reach 10,000 tons of maize, as the affected provinces represent a small fraction of total national maize and rice output. Horticultural crops, however, are deemed to have been more severely impacted, as were plantain and bananas. Plantain and bananas suffered as well from wind damage in several Caribbean islands.

Figure 5.1. Damage to bananas in Hainan as a result of typhoon Sarika

Source: Wikipedia

Typhoon Sarika (October 13-19, 2016) affected the Philippines (crop loss: 250,000 tons), South China, and Vietnam (provinces of Nghe An, Ha Tinh, Quang Tri, Thua Thien Hue, and Quang Binh), for a total estimated loss of US$760 million (of which US$680 in Hainan) and 34 fatalities (figure 5.1). The typhoon formed east of the Philippines where it made landfall in Quezon and moved west-northwest in the general direction of China's Hainan province. A twin typhoon (Haima) developed between 14 and 26 October in the same general area, making landfall over northern Luzon in the Philippines and then progressing to China and eventually reaching Japan. The total damage is estimated at 18 casualties and US$1.93 billion damage, including US$70 million in the Philippines and more than US$1 billion in China. Precise impact estimates for the agricultural sector are still missing. In Guangdong, agricultural and economical losses were in excess of US$500 million. Just under 200,000 ha of crops were destroyed in

Hainan (worth just over US$600 million), with more limited impacts in Fujian (200 hectares and an economic loss of US$5 million).

Hurricane Otto affected Costa Rica, Nicaragua, and Panama between November 20 and 26 in 2016. Total damage is estimated at US$50 million. No specific agricultural impact assessments are available from FAO, but the damage to the sector was limited and certainly much less severe than the destruction brought about by Matthew.

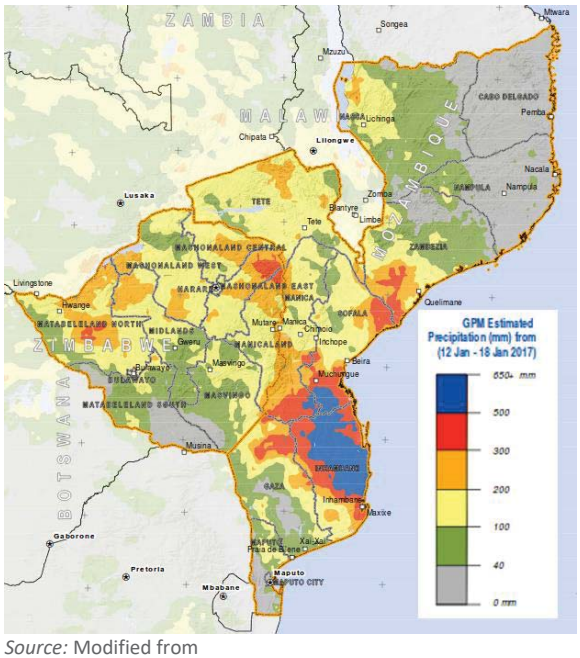
Typhoon Nock Ten was the third cyclone that affected the Philippines this season. It lived from the 20th to the 28th of December and affected, next to the Philippines, Vietnam as well, with wind speeds reaching just short of 300 km/h in the early stages. Nearly 3 million people have been affected in Bicol region, Mimaropa, Calabarzon and Eastern Visayas, but casualties remained low and damage relatively contained (US$ 100 million), mostly comprising of about 200,000 tons of rice, maize, and some high value crops totaling US$90 million.

At the end of January, about 20 people died in Georgia and Mississippi in the United States after multiple tornadoes rattled the region. In total, at least 62 tornadoes touched down across the states of Texas, Louisiana, Mississippi, Alabama, Georgia, Florida, and South Carolina from January 21 to 23.

Excess rainfall and landslides

Abundant precipitation leading to floods have occurred on all continents, forcing people to evacuate and destroying homes and crops. Example of this are in Egypt (late October, killing 30), Indonesia (mid-November in Karawang, West Java), the Dominican Republic (mid-November, affecting several provinces with frequent landslides), and in central Vietnam (early December, with losses valued at more than US$309 million). In Argentina, a storm surge on December 26 caused flooding and heavy damage in the provinces of Buenos Aires and Rosario, with 10 towns still flooded in January. On January 9, floods affecting 13 provinces killed 19 people in the lower-central region and mostly the south of Thailand. Some days later (January 20 to 26), the Philippines were hit by floods and landslides that resulted in 9 deaths, mainly in Davao and northern Mindanao regions, affecting 1.5 million people; early estimates indicated that the cost of damage to agriculture is about US$1 million.

Figure 5.2. Map of estimated precipitation between 12 and 18 January 2017 in Mozambique and Zimbabwe



Source: Modified from http://www.unitar.org/unosat/node/44/2535.

The most severe and widespread floods are those that befell southern Africa, after a drought year brought about by El Niño and reported on in previous CropWatch bulletins. Countries affected include mostly Mozambique and Zimbabwe, and—to a lesser degree—Angola where 10,000 people were made homeless. The region is at the peak of its agricultural season, with cassava and maize being the main crops. Torrential rains started early in the month, and more than 600,000 people were affected by as much as 600 mm in one week (12 to 18 January) in Mozambique, while 44 people were killed, mostly in the provinces of Maputo, Gaza, Inhambane, and Nampula (figure 5.2). According to ACAPS, the Zambezi river burst its banks on January 24 in the central province of Sofala. Two million people are expected to

be affected in Mozambique (IPC phase 3 level)[3]. The floods occurred when about 1 million people were still receiving food assistance as a result of last year's drought and at a time the price of maize was already 20% to 100% (according to the market) above normal seasonal values. Many of the affected areas are semi-arid (especially in the south) and are not well prepared nor equipped for excess precipitation. Although thousands of hectares of crops have been lost, it is likely that the precipitation will benefit crop production at the national level.

Drought, heatwaves, and fire

On November 8, wild fires started in the central provinces of Chile. By mid-December, 49 fires had been reported; by mid-January, 32 fires (out of a total of 100) were still active. In total, about 250,000 hectares of vegetation were lost in seven regions: Valparaiso, Metropolitan, O'Higgins, Maule, Bío-Bío, Aracuanía, and Los Lagos, and 11 people have died. According to Chile's fire brigade chiefs, poor preparation for climate change and large monoculture plantations were to blame for the disaster (see figure 5.3).

An extreme heat wave has hit parts of New South Wales and Queensland in Australia at mid-January, with temperatures reaching close to 50°C.

Figure 5.3. Dramatic night view of wild fires in Chile

Source: https://www.theguardian.com/world/2017/jan/29/chiles-forest-fires-poor-planning-fire-chiefs-monoculture-fire-breaks.

Cold wave

At mid-December, a dzud (an extreme cold wave) affected 13 provinces in northern Mongolia.

A cold wave affected a large area spanning the Mediterranean and parts of central Europe; the conditions started in early January and the cold wave was accompanied by snowstorms, strong winds, and very cold freezing temperatures by local standards (reaching -35°C). Disaster monitoring systems single out Macedonia and Belarus. In North Africa, Morocco reports a less intense but nevertheless severe cold wave from mid-January, affecting particularly regions in the east, north, and south. Neighboring Algeria was affected in its eastern, central and the high plateau regions. In Libya, cold weather was reported from late December. It is unknown whether agricultural impacts are to be expected.

5.3 East and Southeast Asia

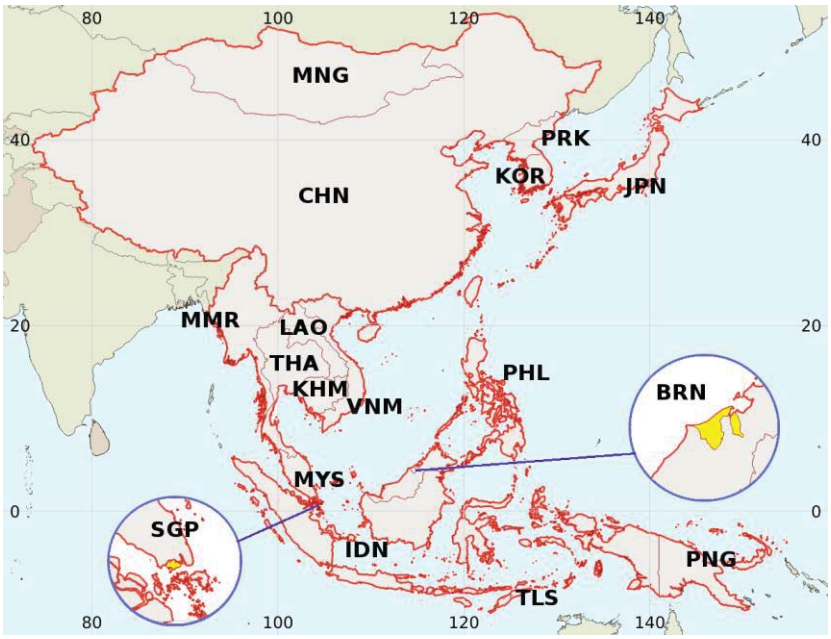
General geographic setting

East and South-East Asia[4] (hereafter referred to as "the region"[5]) are home to about 31% of the world population distributed among 17 countries, including some of the most populated ones such as China (ranking first), Indonesia (fourth), and Japan (tenth). Figure 5.4 shows the location of the countries in this region, identifying them by their three-letter ISO codes. The countries together span a huge climate and

[3] IPC stands for Integrated Phase Classification, a standardized code to report food insecurity. See also, http://www.ipcinfo.org/ipcinfo-detail-forms/ipcinfo-resource-detail0/en/c/162270/.
[4] Unless otherwise specified, the data used for section 5.2 is taken from FAO (FAOSTAT, http://www.fao.org/faostat/en/#data) and the World Bank (http://data.worldbank.org/indicator).
[5] Eastern Asia and South-East Asia are referred to as "sub-regions". "Recent rate of change" refers to the percent change between 2001-2005 and 2011-15.

ecological gradient as their latitudes vary from about -19°S to 50°N, and close to 85° in longitude from Xinjiang in China to the islands of New Ireland in Papua New-Guinea.

Figure 5.4. Location of countries in East and Southeast Asia



Note: BRN: Brunei Darussalaam; CHN: China; IDN: Indonesia; JPN: Japan; KHM: Cambodia; KOR: Republic of Korea; LAO: Lao People's Democratic Republic; MMR: Myanmar; MNG: Mongolia; MYS: Malaysia; PNG: Papua New-Guinea; PHL: Philippines; PRK: Democratic People's Republic of Korea; SGP: Singapore; THL: Thailand; TLS: Timor Leste; and VNM: Vietnam. Mostly for ethnic reasons, PNG is often considered part of Oceania, although it shares the island of Papua with Indonesia. The line between CHN and MMR, LAO and VNM marks the separation between East Asia and South-East Asia. Boundaries modified from GAUL_0 (FAO, 2017).

The largest share of the population (1,594 million or 72% of the region's total population) occurs in Eastern Asia, including China, Myanmar, the Democratic Republic of Korea, Republic of Korea, and Japan (table 5.1). In both sub-regions of Eastern Asia and Southeast Asia, the rate of urbanization is close to 50%, with rates of 58% and 45% respectively,[6]resulting from a recent rate of change of about 30%. Overall, however, the population in Eastern Asia grew only 5% since 2001, which is less than the growth in world population of 12%. Needless to say, since China's population represents 87% of the East Asian population, all trends affecting the sub-region are *de facto* Chinese trends. This applies, in particular, to the sharp rate of decrease in the rural population since 2001-2005 (-17%) due to a combination of factors, including foremost the recently relaxed one-child policy.

Table 5.1. Comparison of selected agricultural indicators in Eastern Asia, Southeast Asia and the world

Region		Eastern Asia		South-East Asia		World	
Variable		**Average**	**C%**	**Average**	**C%**	**Average**	**C%**
Population (million)	Total	1594	5	615	12	7140	12
	Urban	925	32	284	30	3764	23
	Rural	691	−17	331	1	3357	2
Land (million ha)	Total	1156	0	640	0	13009	0
	Forest	253	7	94	4	4009	−1
	Agricultural	638	−2	316	−5	4885	−1
	Arable	116	−6	221	−2	1404	0
	Irrigated	73	13	109	10	327	8
Production (million tons)	Cereals	558	31	248	32	2639	22

[6] Urbanization keeps increasing in most areas (with rates as high as 94% in Japan and 100% in Singapore, where crop agriculture disappeared in the 1990s), while the share of agriculture GNP drops. For example, in Vietnam this share today is 17%, down from 40% in the late 1980s; in Cambodia it is still 90%.

Region		Eastern Asia		South-East Asia		World	
Variable		Average	C%	Average	C%	Average	C%
	Fiber crops	7	5	0	0	31	14
	Fruits	154	71	54	24	654	29
	Oil crops	17	10	58	75	187	49
	Pulses	5	−21	6	83	74	25
	Roots and tubers	177	−8	79	54	805	13
	Sugar	14	19	15	28	172	20
	Vegetables	597	34	41	37	1110	29
	Maize	204	62	39	63	933	41
	Rice, paddy	223	14	208	28	727	21
	Wheat	122	31	0	45	690	16
	Potatoes	96	28	2	21	367	14
	Soybeans	14	−17	2	11	271	39
Local Food Availability (LFA) ratio	Cereals	0.91		0.96			
	Oil	0.18		0.85			
	Sugar	0.67		1.09			

Note: "Average" stands for the average of whichever years are available in FAOSTAT between 2011 and 2015. "Irrigated" stands for "equipped for irrigation," which may differ from "actually irrigated". C% is the percentage of change between the average of 2001-2005 and 2011-15; it is thus not the annual rate of change. The local food availability ratio (LFA ratio) was computed as local production divided by availability, which in turn is obtained as local production plus imports minus exports.

The climatic environment and agriculture

Due to the wide geographic extension, combined with a very varied topography (figure 5.5), the region covers about 15 climate classes (figure 5.6) conditioned by altitude and continentality in east Asia, while topography has a limited influence on the prevailing tropical (continental Southeast Asia) and equatorial conditions (maritime Southeast Asia). The climate range results in a similarly complex agricultural environment ranging from cold desert conditions in the north (too cold for winter crops, but favorable for irrigated summer crops or livestock husbandry; D and B climates) to temperate conditions that can accommodate both winter and summer crops. (Additional detail will be provided below in the comments about the crop distribution map (figure 5.9) after examining the constraints linked to water shortage, which are dominant in the northern sub-region.)

Figure 5.5. Topography

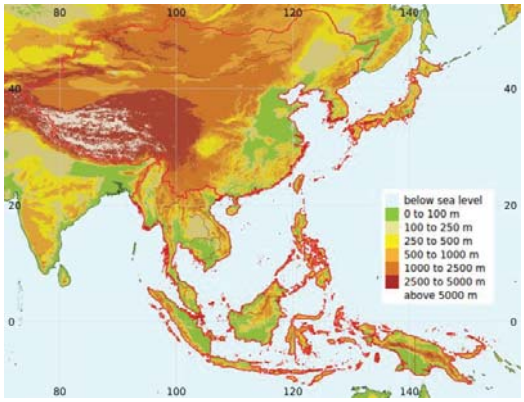
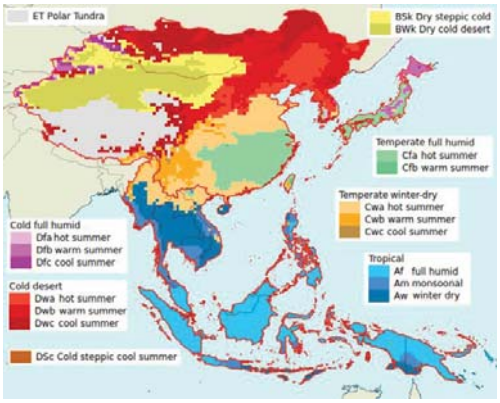


Figure 5.6. Köppen 1971-2000 Climate map



Note: Köppen 1971-2000 climate map based on Kottek et al., 2006.

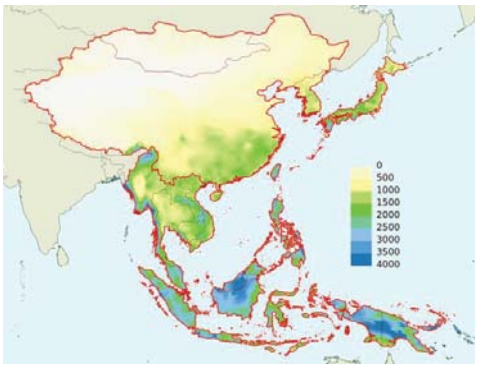
Figures 5.7 and 5.8 illustrate the water availability in the region. Significant amounts of rainfall in excess of 1000 mm annually occur in areas roughly south of the Yangtze in China, the Korean peninsula and Japan. They are the same areas where a weak positive water balance (rainfall-evapotranspiration, see figure 5.8) appears along a north-south gradient, reaching large excesses in Indonesia (Borneo, Papua province and, to some extent, western Java), parts of the Philippines, and in Papua New-Guinea. A climates are typical tropical forest areas, which are also conducive to plantation crops such as rubber and

oil palm. This directly influences the ratio between arable land and permanently cropped land, which reaches high values in some countries in the region, for instance 1/1 in Papua New-Guinea or 1/5 in Malaysia.

A large share of the population actually lives in the basin of the rivers that flow from the Himalayas, creating some complex situations that typically characterize international rivers (see the Mekong in Figure 5.9) in that climate in one location, for example in Tibet and Yunnan, can affect crops at far distances, such as in the Mekong Delta, more than 3000 km away.

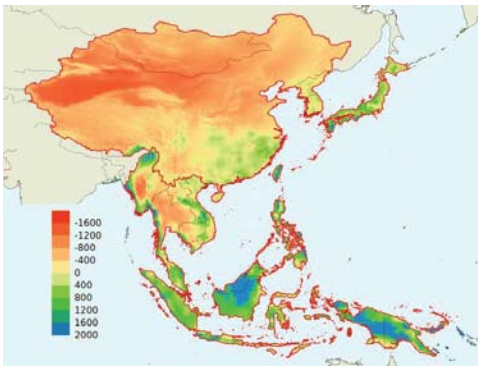
Overall, the distribution of rainfall during the year—either in winter (parts of Mindanao, Sumatra, and most of the Cf climates in China), summer (most of Cw climate in China), or throughout the year (much of the equatorial belt), the length of the growing season and rainless periods (just two or three winter months in Hainan), cold weather, and the availability of non-rain sources of water, together result in a large diversity of crop growing seasons.

Figure 5.7. Annual precipitation (mm)



Note: Based on data in Kritikos et al., 2012.

Figure 5.8. Annual water balance as rainfall-Potential Evapotranspiration (PET) (mm)



Note: Prepared with data from Kritikos et al., 2012, and Zomer et al (2006, 2008) for PET.

Crop distribution and irrigation

As mentioned, climate and irrigation water availability largely condition the distribution of the crops cultivated in the region (figure 5.9). While the highest latitudes can cultivate only summer crops due to cold winter (such as in Northeast China), more temperate areas grow mostly winter wheat and summer crops (especially rice and maize, and frequently soybean, sunflower and potatoes as well) until tropical climates are reached along a latitudinal gradient in continental Southeast Asia. Here, in A climates, the main crop is usually harvested at the end of the year around the time that a secondary crop is planted, to be harvested in May or June. In the Cf climates of eastern Asia, multiple crops are practiced under irrigated conditions, often involving a winter crop and one or two summer crops.

Rice, the preferred cereal in eastern and southeastern Asia, dominates the agricultural landscape from the south of Japan, the southern Korean Peninsula, and the remaining region approximately south of the Yangtze. Wheat still remains confined to higher latitudes but, as also discussed below, the continental Southeast Asian countries are making efforts to develop the crop. The recent trends also show that maize is likely to continue expanding, essentially at the expense of rice, in most of the region where the crop is climatically suitable, with or without irrigation, a concept that covers several levels of water control.

In the driest areas, where natural moisture is always in short supply, water can be obtained only from rivers, where available, or from aquifers, at least during part of the year if temperature conditions permit. It is typical, in tropical areas (Am or Aw in figure 5.6), that irrigation is applied during the season when rainfall is insufficient, but temperature is conducive to plant growth. It is common, in all A climates, to

have the dominant rice crop cultivated behind bunds that retain rainfall. Strictly speaking, the rice cultivated under those conditions (lowland rice) is rainfed and may occasionally suffer drought, just as upland rice, which is also cultivated using only rainfall.[7]

As shown in figure 5.10, Irrigation percentages up to 25% are common along the Pacific coast of the region in Northeast China, the Loess region, Southeastern China, and most of the region south of the Yangtze, including continental Southeast Asia from Vietnam to Myanmar. Higher irrigation percentages (>25% to 50%) occur along the Yangtze and in patches in western Gansu-Xinjiang, southern Sagaing and southern Ayeyawaddy delta in Myanmar, and the Red River area in Vietnam. Next, even higher irrigation densities (>50% of land irrigated) are most relevant in China (Huanghuaihai and the Yangtze delta) and Vietnam (Mekong delta). Highest irrigation percentages (75% and above, sometimes reaching more than 90%) occur in central Liaoning province (Northeast China) and in northern-central Thailand where double and triple rice cropping is practiced in Suphanburi, NakhonPathom, Nonthaburi, PathumThani, PhraNakhon, and Si Ayudhya and adjacent areas. The listed areas in Thailand and China are somehow comparable to central California and the Nile delta, but very far from reaching the level of irrigation occurring in the area from Punjab (Pakistan and India) and Haryana and Uttar Pradesh, where virtually all land is irrigated.

In maritime Southeast Asia, irrigation is less widespread due to equatorial conditions with regular water supply throughout the year. It is, however, practiced in the northern Philippines (central Luzon and the Cagayan valley), as well as in limited areas in Indonesia (Tengah and Timur at Java), which happen to be areas where the full humid tropical climate (Af) gives way to winter dry climate as the distance to the equator increases.

Figure 5.9. Distribution of main cereals (rice, wheat, maize)

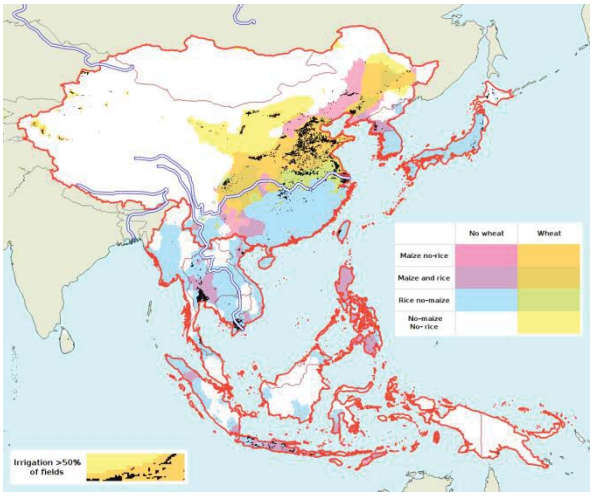
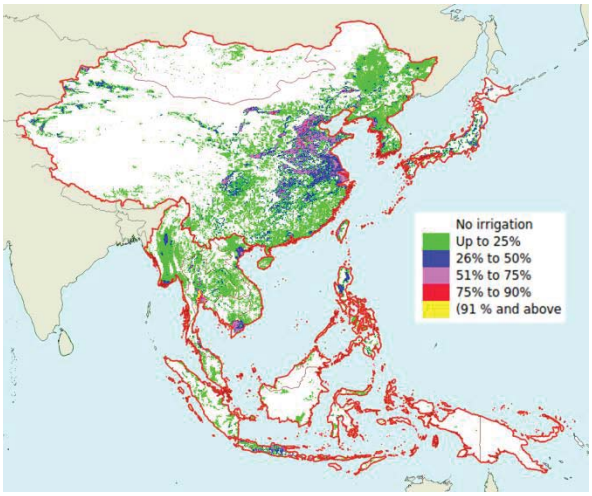


Figure 5.10. Percentage of irrigated crop area according to GMIA (2017)



Note: Based on crop distribution data from JRC (Vancutsem et al., 2013). The large rivers relevant for the region are the west-east flowing Yangtze (entirely in China) and the north-south flowing Brahmaputra and Mekong.

[7] Upland Rice is often cultivated at high elevations, where precipitation is abundant. The defining factor, however, is not elevation but the fact that the crop is rainfed and not cultivated in flooded fields. Upland rice can thus be cultivated at sea level if precipitation permits.

Crop production

China not only "dominates" all population statistics in Eastern Asia (87% or the people in the sub-region are Chinese), but the same is true for agriculture. China produces an even larger share (96%) of both cereals and tubers, indicating that, in spite of fast industrial and economic growth, agriculture retains a larger importance than in some other countries in the sub-region, especially Japan and the Republic of Korea. When considering the larger region, the share of China decreases to 67% and 65% (cereal and roots and tuber production), with Indonesia and Thailand coming next with 11% and 5% shares for cereals and 11% for roots and tubers in both countries. Vietnam comes third with shares of 6% and 4%, respectively. When compared to the Southeast Asian sub-region alone, the percentages for Thailand, Indonesia, and Vietnam increase about threefold.

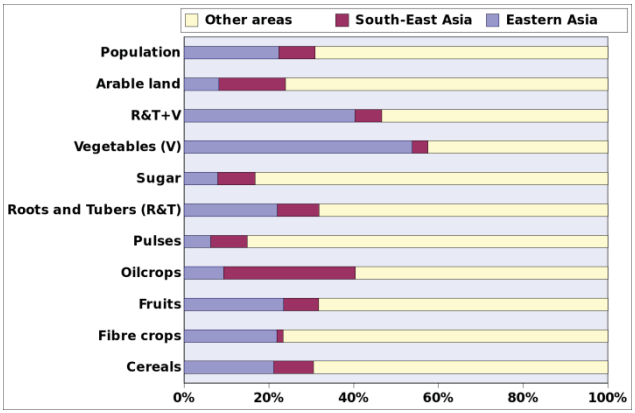


Figure 5.11. Relative contribution of East and Southeast Asia to the global production of major crops

*Note: "*Other areas" was obtained by subtracting eastern and southeastern Asia data from worldwide data.
Source: Data source is FAOSTAT.

Figure 5.11 shows the relative contribution of the region and the two sub-regions to the global production of main crop groups, while table 5.1 adds detail about recent change dynamics. Due to the specific features of diets in the region, where meat plays a subordinate role compared with plants, vegetables is the only category where the region produces more than half of the world output (58%) while vegetables in the broad sense (that is, including roots and tubers) reach 47%. As far as dynamics are concerned, the increase in production of cereals (+31% in eastern Asia and +32% in the southeast of the region), fruits (+71% in eastern Asia), and potatoes (+28% and +21%) all exceed the worldwide recent growth rates of +22%, +29%, and +14% respectively).

The figure given for cereals hides the fact that wheat (31% and 45% for the two regions respectively vs. 16% globally) and especially maize (+62% and +63% vs. 41%) are growing fast, while rice is lagging behind in eastern Asia (+14%). Together with the southeastern Asian countries, the regional increase of rice production reaches 20%, a value close to the worldwide value of 21%. The most significant decreases are those of pulses and especially soybeans. For pulses, the 14% increase over the last 15 years (to be compared with +25% for worldwide production) was brought about by a decrease in eastern Asia that reached 21%. Similarly, the stagnation of soybean (0% change since 2001-2005) is due to a large decrease in all eastern Asian countries and a modest increase of 11% in the southeast. This compares with the spectacular worldwide increase (+39%) of a crop which, together with maize, is one of the favorite crops of the moment, largely owing to the large demand precisely in eastern Asia. In 2016, however, due to changes in policy, soybean production increased for the first time in China after a more than decade-long decrease that was compensated by massive imports.

Owing mainly to climate conditions, oil crops (in particular oil palm, a typical plantation crop in A climates) are the only category where southeast Asia out-produces the eastern sub-region (58 vs 17 million tons of output) and where the rate of change since 2001-2005 is one of the highest (+75% or 53% above the global rate of change). This comes, however, at a large environmental cost as deforestation rather than agricultural land reallocation is the source for the new land.

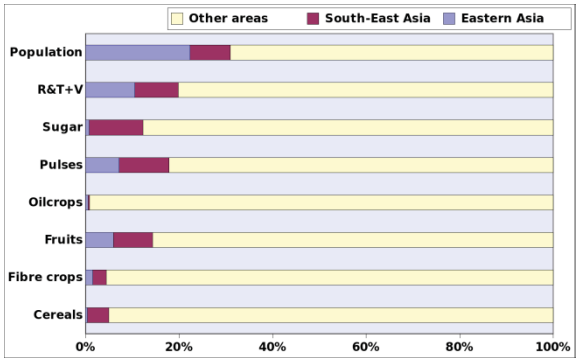
Statistics do confirm the liking of the region for maize with a number of countries increasing their production by more than 50% (China, 68%; Indonesia, 74%; Lao, 534%; Myanmar, 125%; Philippines, 53%; Papua New-Guinea, 66%, and Vietnam, 68%). The list includes Vietnam, a significant exporter of maize, next to Thailand (+14% "only"). Actually, Thailand and neighboring Myanmar both put a lot of emphasis on cassava (+50% and +1286% increases in production, respectively, with +92% in Vietnam) and, interestingly, in wheat (+44% both), of which the production is currently insignificant in Southeast Asia,[8] among others because the crop cannot compete with other commodities in the Af climates of maritime Southeast Asia. For roots and tubers, in addition to cassava, farmers in the region have also increased the production of potatoes (Thailand, +50%) and sweat potatoes (Malaysia, +94%), as well as other traditional crops such as yams in Laos (+587%) and Cambodia (+2120%), as well as Myanmar (+109%), confirming the come-back of a country that used to be a major exporter of rice thirty years ago.

Finally, rice production doubled in Cambodia, an isolated observation regarding a crop that is so well established in the region (59% of world production) that it dominates the landscape, the diet, and the culture… while at the same time losing ground to other summer crops, especially in the eastern Asian sub-region.

Trade

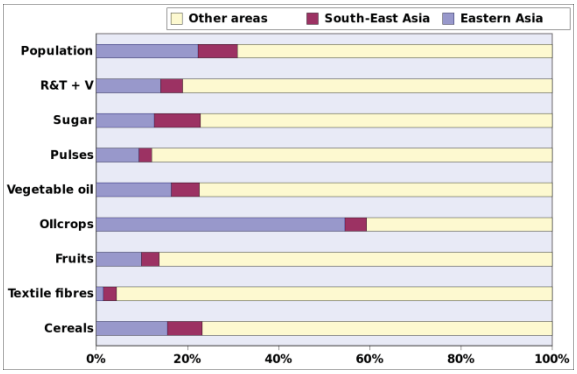
Figures 5.12 and 5.13, based on FAOSTAT data, represent sums of exports/imports of the individual countries inside the two sub-regions. However, as such they do not take into consideration that exports to or imports from countries inside the group do not actually leave the group and should not be counted.

Figure 5.12. Exports of major crop categories by Eastern and Southeastern countries compared with the rest of the world



Source of data: FAOSTAT.

Figure 5.13. Imports of major crop categories by Eastern and Southeastern countries compared with the rest of the world



Source of data: FAOSTAT.

Nevertheless, the figures show that *exports* from Southeast Asia, for instance for sugar (sugarcane), exceed those of Eastern Asia, while food *imports* in all categories tend to be largest in Eastern Asia, again reflecting the weight of China in terms of production and trade as well. Eastern Asia imports about 60 million tons of soybeans, which is almost entirely absorbed by China (90%) with the rest going to Japan. Of the 56 million tons of cereals that go to Eastern Asia, 26 go to Japan, while the Republic of Korea absorbs 13 million tons and China (including the province of Taiwan) 17 million tons. In all Eastern Asian countries, the cereal imports are made up by approximately one-third of wheat and two-thirds of maize, while China usually also imports some other coarse grains next to maize (such as barley and sorghum as animal feeds) and about 2 million tons of rice as well. The most remarkable—and often quoted—success

[8] In tropical countries, wheat and other temperate cereals (such as barley) are typically grown as an irrigated crop in Aw climates where the cold and dry seasons coincide.

stories in the region include the export of refined sugar from Thailand (up 29% from the early 2000s) as well as rice exports from Vietnam, which rose 77% in about 15 years. During the same period, Japan reduced soybean imports by 45% to 3 million tons, and maize imports by 10% to 15 million ton.

Southeast Asia imports 28 million tons of cereals distributed as follows: Indonesia, 11 million tons; Malaysia, 5 million; Vietnam, 4 million; the Philippines, 4 million; and Thailand, 2 million. The volume is made up (approximately half) by wheat, with the difference shared equally between maize and rice. Southeastern Asia imports 6 million ton of soybean, which go mostly to Indonesia and Thailand in about equal shares (2 million tons) and to Vietnam and Malaysia. The sharpest changes in food imports over the recent decade include a 129% increase in maize imports to reach 3 million tons in Indonesia, a doubling of wheat imports to Vietnam (which now exceed 2 million ton annually), as well as the already mentioned soybean bought by China. Wheat imports where quintupled in a decade in China, while maize climbed from 50 thousand tons in 2008 to 5 million tons in 2012, equivalent to a more than hundredfold increase in just five years, mostly to take advantage of favorable international prices and to pave the way for some internal reforms.

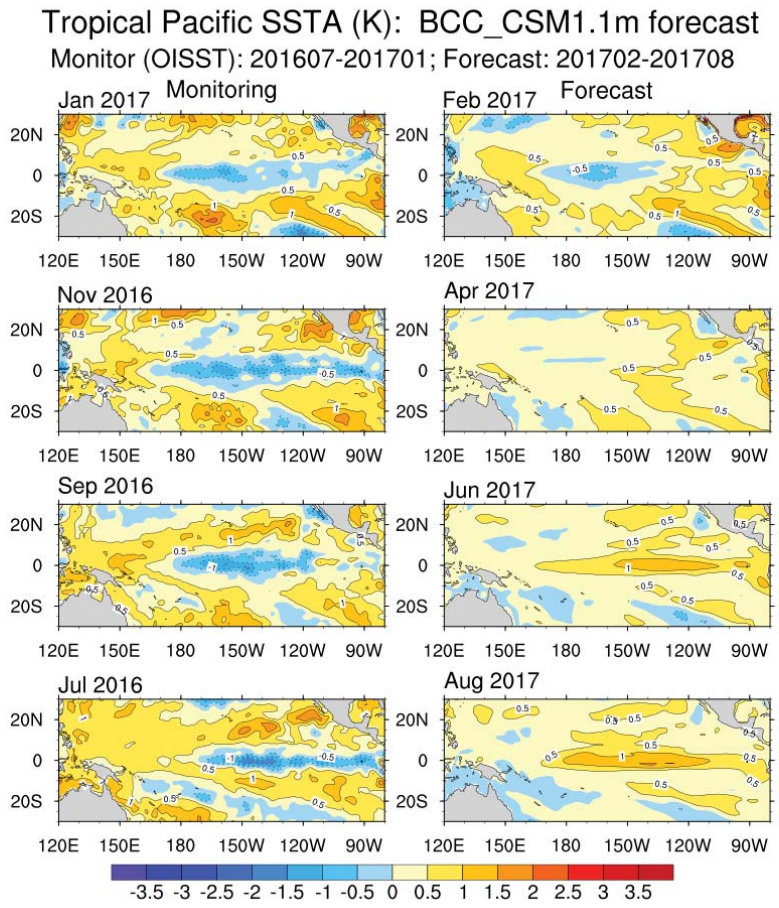
5.4 Update on El Niño

EI Niño has continued to be neutral during the fourth quarter of 2016 and the start of 2017. The eastern tropical Pacific sea surface temperatures have kept cooling between July and January according to the Optimum Interpolation Sea Surface Temperature (OISST). Temperatures are predicted to rise moderately while staying altogether average until the third quarter of 2017 according to the Beijing Climate Center (figure 5.14).

Figure 5.15 illustrates the behavior of the standard Southern Oscillation Index (SOI) of the Australian Bureau of Meteorology (BOM) from January 2016 to January 2017. During the current season, SOI has increased rapidly from -4.3 in October to +2.6 in December, followed by a minor decreased +1.3 in January, 2017, indicating neutral conditions of EI Niño.

NOAA confirms the cooler-than-average sea temperature in the central-eastern tropical Pacific Ocean and that La Niña is no longer present (figure 5.16). BOM and NOAA agree on a neutral EI Niño for 2017. CropWatch will nevertheless keep monitoring EI Niño trends.

Figure 5.14. Tropical Pacific SSTA (Forecasted and monitored datasets)

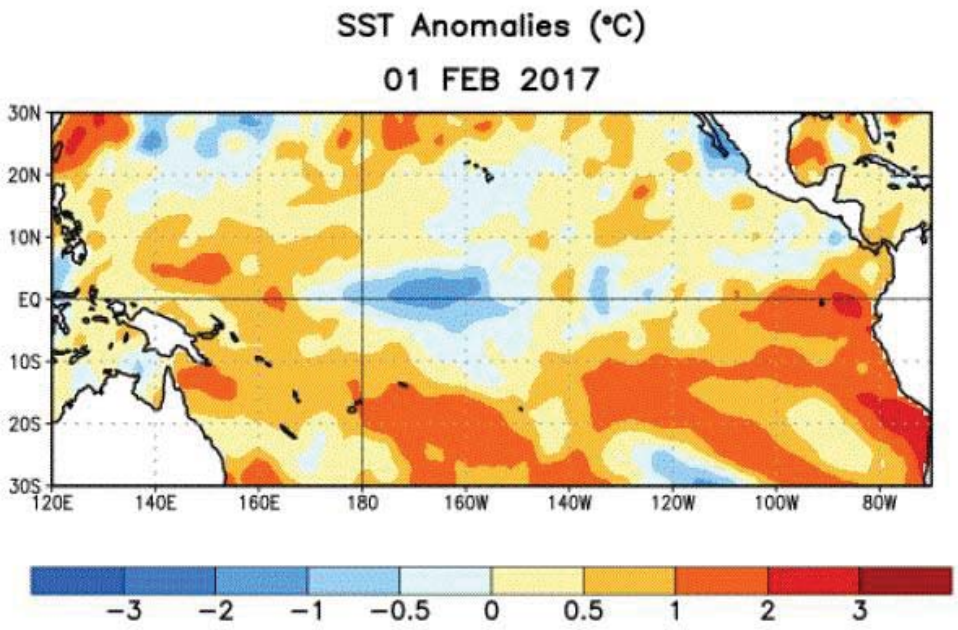


Source: http://cmdp.ncc-cma.net/download/ENSO/Variables_evolution/ENSO_SSTA_Patterns_O7P7_20170201.png

Figure 5.15. MonthlySOI-BOM time series for January 2016 to January 2017

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

Figure 5.16. Average sea surface temperature (SST) anomalies (°C) for the week of February 1, 2017



Note: Anomalies are computed with respect to the 1981-2010 base period weekly means.