

China crops: a perfect storm?

Causality Link 08/29/2022

By analyzing in real-time a large flow of news, the Causality Link system is permanently computing over 2,000 indexes (or indicators) for all countries in the world and 40,000 companies. For large countries, the number of monthly detections for each index is in the hundreds, so they tend to move slowly. For this reason, we were quite surprised to observe last week a very sharp drop of the “crops” index for China (Figure 1). This index is computed as the percentage of uptrends over all trends mentioned for a given index definition. The visualization consists of monthly floating bars representing the 95% confidence interval around the positive trend percentage (PTP).

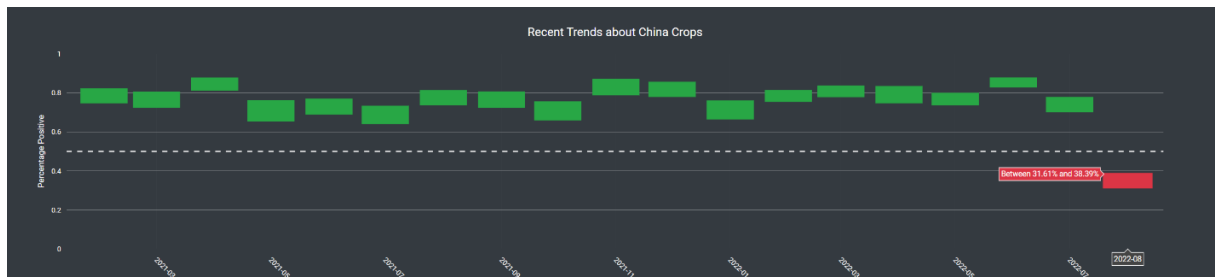


Figure 1: The monthly Positive Trend Percentage (PTP) for the KPI “crops” and geography “China”.

While assessing the certainty associated with an index movement, we usually check the number of detections of the specific indicator just to check that some fluke does not appear in the texts. Figure 2 shows that the number of statements about crops in China has been quite stable, around 1,000 mentions per month in the past 18 months.

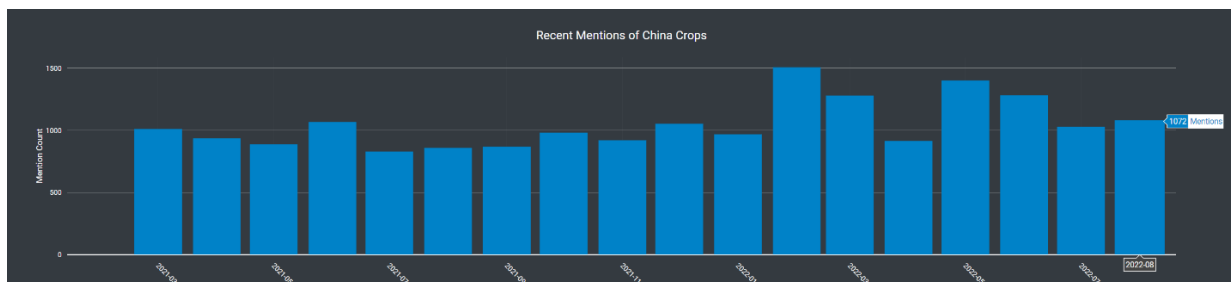


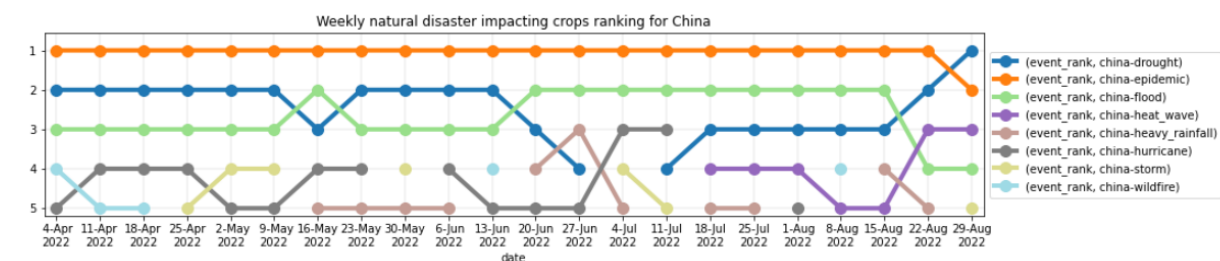
Figure 2: The number of monthly detections for the KPI “crops” in the geographic context of “China”.

Recent Trends about China Crops

Period	Positive Trends	Negative Trends
2019-03	85	-15
2019-06	80	-20
2019-09	95	-5
2019-12	55	-15
2020-03	85	-25
2020-06	75	-25
2020-09	90	-10
2020-12	85	-15
2021-03	125	-25
2021-06	125	-25
2021-09	75	-15
2021-12	115	-25
2022-03	135	-15
2022-06	85	-25
2022-08	55	-120

So far, checking our data indeed indicates that the rapid decline last week of our “China crops” index is essentially due to a rapid transformation of a majority of trend mentions from the positive to the negative.

It is possible to analyze the drivers of the causal statements which conclude on these trends for “China crops”. We have ranked them weekly by frequency in Figure 4.



While “Coronavirus” appears to be the largest cause of disruption of crops in China in the past five months, it just got replaced by “drought” in the last week. We can see that “heat wave” has been present and climbing in the past six weeks, while “flood” is a very important factor that got passed by “drought” and “heat wave” only in the past two weeks.

Are these issues specific to China or widespread around the world?

We then compared this Chinese issue with the same crops KPI evolution in the rest of the world, as shown in Figure 5. This figure shows both the current situation, as well as the evolution between the current situation (using statements that are in the past tense) and the future (as of August 29, 2022). The current situation is in green when past statements are mostly positive for crops. In the second chart, when the future is expected to be better than the past, the color tends towards green, red otherwise. In both cases, the size of the box is proportional to the number of statements we collected from our corpus.



Figure 5: The “crops” index across the world, past statements, and future evolution.

Overall, these two graphs show a disastrous situation in Pakistan that could improve slightly, even though the very recent floods could limit this upside, and a worldwide degradation of the Causality Link crops index, in the US, China, Russia, the Middle East and Africa and in some European countries, including the UK. This tends to indicate that the world overall will have a poor crop yield in 2022.

Turning our attention to the causal relationships between crops and extreme weather events, we produced Figure 6. There, we aggregated all countries and showed only the 2022 causal relationships with more than 100 mentions which originate or conclude around two anchor indexes: **crops** and **food production**, and three events: **drought**, **heat wave** and **flood**.

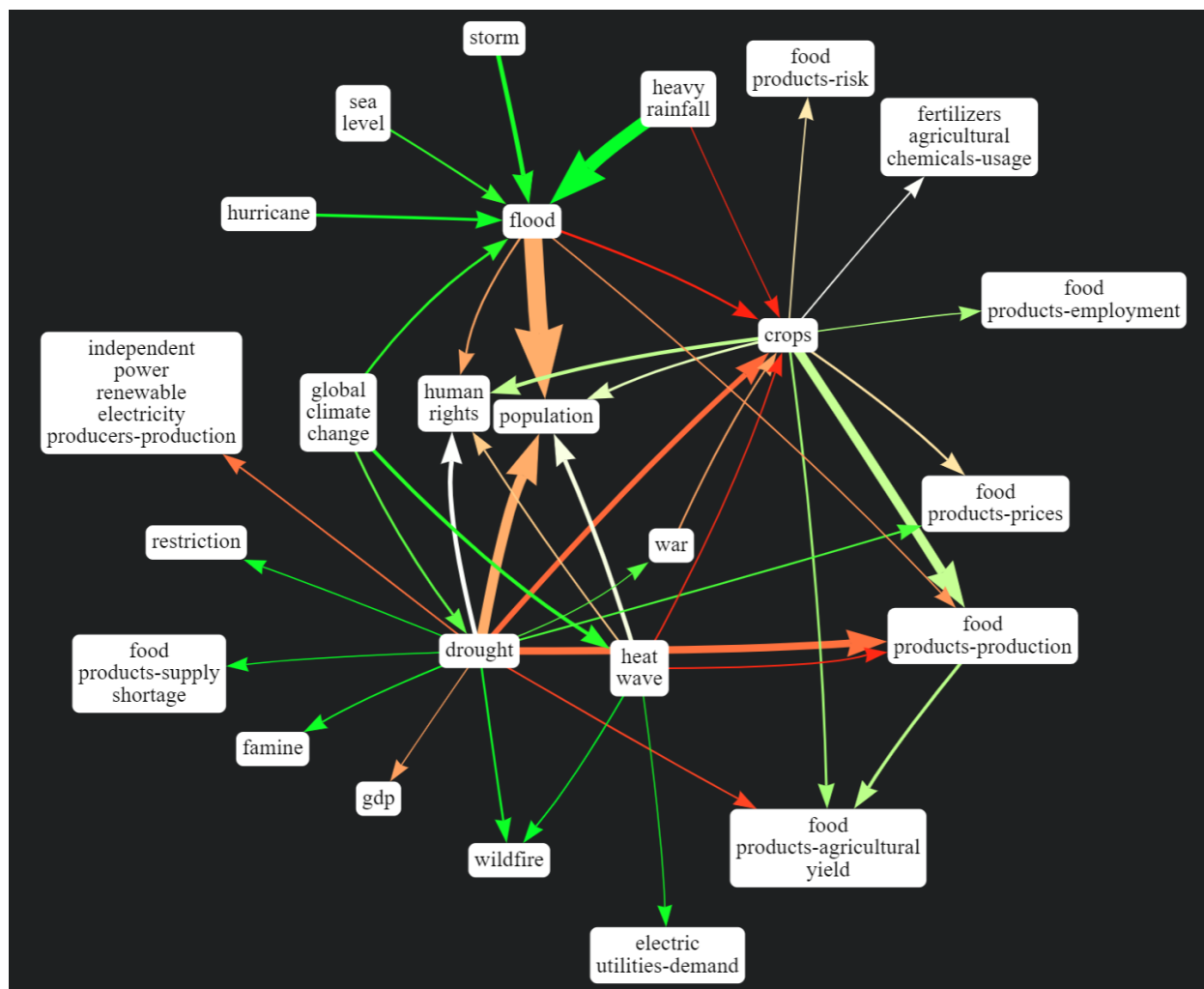


Figure 6: Causal graphs around crops with links of more than 100 detections in 2022.

We can observe the negative impact (red arrows) of drought, floods and heat waves on crops, food production and agricultural yield and the fact that global climate change is blamed for all these three extreme weather events. We capture the joint impact of heat waves and drought on **wildfires** (green arrows: increase of the cause results in an increase of the consequence).

On the energy side, we capture a nasty causal loop where heat waves increase demand for electricity while droughts decrease renewable electricity production (mostly hydro-electric). On the macro-economic side, we observe that droughts increase the probability of famine, restrictions, and wars which in turn reduce crops.

The consequences of a decline in crops will be felt in food prices, declining employment and profits in the food industry as well as reduced food availability.

The full graph is of course much more complex than what we displayed and is mostly useful for computers and quants rather than fundamental analysts.

We can also use the causal graph to generate tables about the more general consequences (excluding the impact on food-related indexes) of these extreme events by country, as displayed in Figure 7, or by crop.

Top consequences in China excluding food products production			
Consequences rank	China drought	China flood	China heat wave
1	China human rights (34)	China population (184)	Electric utilities demand (23)
2	China population (25)	Oil gas consumable fuels prices (68)	China population (23)
3	Renewable electricity producers production (23)	China human rights (28)	China development (9)
4	China sustainability (10)	China assets (18)	China risk (7)
5	China production (10)	China development (18)	Electric utilities production (7)

Top industry and company consequences outside China			
Consequences rank	China drought	China flood	China heat wave
1	Boeing production (3)	Energy sector prices (6)	Electric utilities demand (1)
2	Oil gas consumable fuels demand (2)	Copper prices (4)	Apple production (1)
3	Renewable electricity producers operations (1)	Oil gas consumable fuels risk (3)	Oil gas consumable fuels demand (1)
4	Paper forest products production (1)	Metals and mining import activity (2)	Glencore prices (1)
5	Aerospace defense opportunity (1)	Automobiles demand (2)	Industrials sector usage (1)

Ranking of most mentioned agricultural products impacted by drought and heat waves						
Crop rank	China	Europe	France	Germany	Spain	USA
1	wheat (49)	wheat (73)	wheat (24)	wheat (13)	corn (10)	livestock (620)
2	grains (41)	corn (13)	grains (23)	grains (12)	olive (7)	corn (372)
3	sugar (40)	milk (12)	live cattle (10)	canola (1)	olive oil (6)	wheat (351)
4	corn (37)	grains (12)	livestock (4)	grapes (1)	wheat (5)	live cattle (301)
5	rice (32)	barley (10)	grapes (4)	milk (1)	breakfast cereal (2)	beef (159)

Figure 7: Causal links filtering by cause and consequence, excluding food, inside or outside of China, and by crop

In China, electricity production and demand are severely impacted by these extreme events, as well as the Chinese population. Outside of China, Boeing, Apple and Glencore are the most mentioned foreign companies impacted, as well as a variety of industries.

In general, the most impacted crops are wheat, corn and grains, as well as the meat industry and wine in France!

Conclusion

China has attracted a lot of attention recently, with the worldwide supply chain consequences of its energy and COVID policies, as well as its technical progress, real-estate issues and position versus Taiwan.

The consequences of the war in Ukraine on energy and wheat prices and availability have also been well analyzed.

It seems however that the future impact on food prices and availability of recent extreme weather events worldwide has not received the attention it should, and that China is only one of the many countries which will experience significant crop yield declines in 2022.

We hope that this short paper provides you with a good overview of the global picture that the Causality Link system can provide on such issues thanks to our automatic analysis of 50,000 news per day in 27 languages. For more information, feel free to contact info@causalitylink.com