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BRIEFING

The information in this briefing will be launched at the IWA World Water Congress & Exhibition 2018 in Tokyo on 17 September 2018 at 10:30 JST by IWA member Dr.Ercin, Director R2Water.
Members of the media are invited to attend the briefing and to interview Dr. Ercin.

Traditional Japanese cuisine is under threat from global water problems: soybean, rice and growing meat sector are most at risk

Less rainfall, rivers running dry and a changing climate. This is not a national or regional issue, but a problem for all of us because our economies are globalised and interdependent. This means that the food on our table, feed for our cattle, cocoa for our favourite chocolate bar and the beans that make our morning coffee could all be under threat from water scarcity and drought happening miles away, far from our borders.

In Japan, many traditional culinary ingredients such as rice, edamame, miso and tofu (soybean products) - as well as increasingly popular meat and dairy products - are produced using crops grown in countries that are highly vulnerable to water scarcity and drought. This could affect the country's supply of key commodities which, in turn, could disrupt its economic stability and food security.

R2Water[1], in partnership with *FutureWater*[2], have mapped the global water demand of the Japanese economy and assessed how water scarcity and drought could disrupt supplies of key food crops that it imports[3]. This reveals potential vulnerabilities of Japan's food security and economic stability and identifies which food products may become more expensive in the country in the near and longer-term future.

Japanese economy is highly dependent on water resources outside its borders

The importance of water resources in the USA, Australia, Brazil, China and India for the Japanese economy

Japan uses approximately 63 km^3 of water for all of the goods it produces, consumes and exports annually[4]. Around 73% of this water comes from outside its borders, which means

[1] R2Water Research and Consultancy is a research and communications consultancy that provides insights for governments, civil society and the private sector into a wide range of critical water issues. www.r2water.nl

[2] FutureWater is a research and consulting organisation that works throughout the world to combine scientific research with practical solutions for water management. www.futurewater.eu

[3] This research is part of the IMPREX project, a Horizon2020 research project funded by the European Commission.

[4] Green and blue water footprints of the Japanese economy. The green water footprint is the amount of rainfall used to water crops. It is used to assess vulnerabilities due to drought. The blue water footprint is the water from lakes, rivers and aquifers used to irrigate crops. It is used to assess vulnerabilities due to water scarcity.

that that the Japanese economy is highly dependent on the availability of water in other parts of the world.

Most of the foreign water that Japan depends upon comes from seven countries: The United States of America (USA) (30%); Australia (8%); Brazil (7%); China (7%); India (7%); Indonesia (5%) and Malaysia (4%). This means that Japan is particularly vulnerable to lack of water availability affecting supplies of agricultural commodities from these seven countries.

Around 74% of dependence is on rainfall precipitation in other countries, particularly in the USA, India, China and Brazil for soybean and maize production. Coffee and oil palm imported to Japan is vulnerable to changes to rainfall, mainly in Malaysia and Indonesia.

Japan's vulnerability to global water scarcity

In the near future, supplies of certain crops to Japan could be disrupted due to water scarcity in other parts of the world; a large portion of the water used to produce maize, rice, sugar cane, soybeans and cotton for import to Japan comes from areas with significant or severe levels of water scarcity. This means that surface and groundwater resources are already seriously depleted and that there is too much competition for the remaining available water in those areas.

More than 90% of sugar cane and cotton imports are categorised as "highly vulnerable", mainly related to water scarcity problems in Australia and Thailand. Of other key products, 80% of soybean imports, 74% of grape imports, 72% of rice and 65% of maize imports are all considered "highly vulnerable". Almost all the crop products imported to Japan from Australia and India are sourced from locations with high levels of water scarcity.

Water scarcity problems in the USA may result in short and mid-term price fluctuations (e.g. sharp and sudden price increases) for rice and maize imports.

Japan's reliance on soybean and maize imports could affect meat and dairy prices

Cheaper prices for meat, as a result of increased meat imports, has accelerated meat consumption in Japan. To meet this growing appetite, Japan sources meat products mainly from the USA and the EU. It also imports almost all of the soybean and maize it uses to feed animals for consumption that are reared within Japan. This puts the Japanese meat and dairy sector under jeopardy from water scarcity and drought, both now and under climate change. The potential damage caused by the disturbance of soybean and maize imports might be significant in Japan: a sharp drop in the meat and dairy production in Japan, followed by recovery based on more expensive animal feed and more expensive meat imports. This may result in severe fluctuations in the price of meat and dairy products in Japan.

Soybean supplies are under threat from global water scarcity

Soybeans are a versatile food and are a central ingredient in Japanese cuisine. They form the basis of many distinct Japanese flavours and are processed into countless culinary products. Food oil is the largest end use for soybean on the Japanese market, followed by food beans and then animal feed. Food beans are the raw material that is processed into soy-based foods such as tofu, natto, miso, soymilk and soy sauce[5].

Japan relies almost entirely on imports of soybean to meet demand for oil, soy-based food products and for meat production: it imports around 3.15 million metric tons per year[5] and produces only 240,000 tons/year domestically. The deficit in soybean production in Japan poses a significant risk to its economy.

Around 80% of global soybean supply is highly vulnerable to water scarcity in producing regions. Given its reliance on imports of soybean from China and the USA for animal feed and soya- based food products, Japan's agri-food sector is particularly at risk from weather extremes and climate change disruption in those countries. Prolonged droughts and water scarcity there could disrupt supplies or cause an increase in the price of soy products.

Japan's economy is vulnerable to changes in global rainfall

Whilst in the near term, the Japanese economy is vulnerable to global water scarcity disrupting supplies of maize, rice, sugar cane and soybean, in the longer term, changes in rainfall patterns could disrupt supplies of other products such as oil palm, coffee and cocoa.

If climate change alters rainfall patterns, it would increase the risk of drought or other water-related problems in these crops' countries of origin. Lack of rainfall can lead to drought. Prolonged drought can increase demand for additional water for irrigation. This, in turn, exacerbates water scarcity and reduces the amount of water available, which leads to increased competition for the resources that remain.

Whilst risk of water scarcity is currently "severe", there is a "low" to "moderate" drought risk in locations from which the majority of agricultural commodities imported to Japan originate. Drought risk is "low" to "moderate" in countries where soybean, cocoa, coffee, oil palm, sunflower, maize and olives are produced for import to Japan. However, should rainfall patterns be disrupted in these locations, it would have an even more significant impact on the Japanese economy.

[5] For the year 2015/16, http://www.agrochart.com/en/news/2280/japans-soybean-imports-to-reach-3-15-mmt-in-2015-16-and-stay-stable-in-2016-17.html.

Japan inherits external water risks of the European economy: the new free trade deal

As diets in Japan shift towards an increase in meat and dairy products, particularly in urban areas, the country's reliance on a stable global soybean and maize market grows.

The European Union's (EU) food sector is the one of biggest agri-food suppliers to Japan, especially for high-quality, regional specialities such as wine, cheese, chocolate, meat and pasta. Meat products were the largest single EU food export to Japan in 2017. Given that the EU relies on imports of soybean for animal feed from other countries, any disruption to global soybean supplies would not only affect Japanese imports directly, but also indirectly via its trading partnership with the EU.

Conclusions

Water scarcity and extreme weather events - both now and under climate change - outside Japan's borders are expected to pose an increasing risk to Japan's agri-food importers and to the wider consumer market. Greater effort is needed to build adaptive capacity and resilience in the countries that grow key crops. There is a role for the private sector, government and for Japanese society to support relevant producers, particularly those in developing countries, in order to ensure that these risks are effectively mitigated.

To assist producers and importers - and to increase awareness of the risks that climate change poses to the agri-food business - Japanese policies and business strategies could consider that the Japanese economy is highly dependent on goods produced in regions that are vulnerable to water-related impacts. They could further promote actions towards mitigating the negative consequences that the Japanese economy may face by:

- Addressing these dependencies on a sectoral basis, such as in climate adaptation-related policies and agricultural trade policies, as well as in international development strategies;
- Taking the associated risks into account when developing bi-lateral relations with trade partners in the future;
- Considering the strategic importance of certain regions and countries such as the USA, China, Brazil, Australia, India, the EU and Malaysia, which is likely to increase for Japan with respect to both to potential climate-induced impacts on water resources and to the need of a continuous supply of commodities imported from these regions;
- Channelling investments into measures that will, for example, increase drought resilience and strengthen water governance in order to ensure sustainable, efficient and equitable water use in key producing regions;
- Encouraging all Japanese businesses that are reliant on international commodity supplies to map their dependencies and better understand the water-related vulnerabilities in order to sustain their businesses;

- Providing better access to information on climate change impacts and the associated financial risks for key sensitive sectors such as meat and dairy, soybean, cocoa, coffee, rice and cotton;
- Building improved networks and partnerships: promoting knowledge-sharing and creating new opportunities to attract funding and government support for managing the risks associated with climate change outside Japan's borders.

Notes:

The data used in this briefing paper is extracted from '*Dependencies of Europe's economy on other parts of the world in terms of water resources*' Authors: Dr. Ertug Ercin, Daniel Chico Zamanillo and Dr. Ashok Chapagain. It was produced for Improving Predictions and Management of Hydrological Extremes (IMPREX) project, part of the EU's Horizon 2020 grant programme. The programme aims to improve society's ability to anticipate and respond to the impacts of climate change.

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Dr. Ercin will be in Japan from 14 – 21 September 2018

Press briefing:

17 September at 10.30 JST - IWA Pavilion (booth No.115 and No.74), IWA World Water Congress & Exhibition 2018, The Tokyo International Exhibition Centre (Tokyo Big Sight).

For further details about the press briefing contact Marta Jimenez: Communications Officer, IWA: +31 631 934 081