CENTRE OF EXPERTISE ON RESOURCES

The Hague Centre for Strategic Studies

TNO

SOY SUPPLY SECURITY FOR THE NETHERLANDS

Anticipating Future Global Challenges through Strategic Responses

GEOPOLITICS

COE-RESOURCES ISSUE BRIEF 1

CENTRE OF EXPERTISE ON RESOURCES

The Hague Centre for Strategic Studies

TNO

The Centre Of Expertise on Resources (COE-Resources) supports industry and government to timely and effectively anticipate strategic opportunities and risks related to the sustainable supply of resources.

This report is from the COE-Recources theme **GEOPOLITICS**. Our other themes are FORESIGHT and ENVIRONMENTAL POLICY.

GEOPOLITICS

We specialize in bringing the geopolitical context in to the debate on natural resources. How secure is the country of your main supplier? How vulnerable is the shipping lane you depend on? How vulnerable is your national economy to supply disruptions of certain imports? We have the knowledge and the instruments to analyze these kind of questions for your raw material supply chain.

Partners

The Hague Centre for Strategic Studies (HCSS) helps governments, non-governmental organizations and the private sector to understand the fast-changing environment and seeks to anticipate the challenges of the future with practical policy solutions and advice.

TNO, the Netherlands Organization for Applied Scientific Research TNO, was founded by law in 1932 to enable business and government to apply knowledge. As an organization regulated by public law, we are independent – not part of any government, university or company. We believe in the joint creation of economic and social value. TNO connects people and knowledge to create innovations that boost the competitive strength of industry and the well-being of society in a sustainable way. We focus on transitions or changes in five social themes: Industry; Healthy Living; Defense, Safety & Security; Urbanization and Energy.

Trinomics (www.trinomics.eu) aims to support better policy-making in the cross-cutting fields of energy, environment and climate change and to have an impact on the policy agenda. We strive to be at the forefront of assessing new and current policy options and their implementation, closely linking with the strengths of our strategic partner TNO, a Dutch knowledge and innovation powerhouse.

CENTRE OF EXPERTISE ON RESOURCES

The Hague Centre for Strategic Studies

TNO

SOY SUPPLY SECURITY FOR THE NETHERLANDS

Anticipating Future Global Challenges through Strategic Responses

Author & contributors: Marjolein de Ridder, Pim ten Haaf, Nathalie Olah, Hans Bolscher

We would like to thank MVO for allowing the reproduction of its figures and tables, and F. Köster (MVO) and J. Nicolai (IDH) for their editorial support.

The Centre Of Expertise on Resources (COE-Resources) supports industry and government promptly and effectively anticipate strategic opportunities and risks related to the sustainable supply of resources. This paper has been published following the seminar, "Soy Supply Security: Anticipating Future Global Challenges through Strategic Responses" on May 12th, 2015, organized by the COE-Resources in cooperation with MVO (The Netherlands Oils and Fats Industry) and FNLI (the federation of Dutch Food and Grocery Industry).

CENTRE OF EXPERTISE ON RESOURCES

c/o
The Hague Centre for Strategic Studies
Lange Voorhout 16
2514 EE The Hague
The Netherlands

+31 (0)70 318 48 40

www.coe-resources.nl
info@coe-resources.nl

Graphic Design Studio Maartje de Sonnaville, The Hague

SOY SUPPLY SECURITY FOR THE NETHERLANDS

Anticipating Future Global Challenges through Strategic Responses

COE-RESOURCES ISSUE BRIEF 1

TABLE OF CONTENTS

SUMMARY

Soy is of strategic value to the Netherlands

Security of supply of soy (in the form of beans, oil or meal) is of strategic importance to the Netherlands. Soy is widely used for its high protein and oil content. Major players in the beef cattle, livestock and food processing industry in the Netherlands depend on imports of soy. Their activities account for an estimated 7% of Dutch GDP.[1] Import dependence makes these industries vulnerable to geopolitical developments that affect supply. This is particularly true since the main substitutes of soy have several shortcomings, making soy the preferred source of protein and oil for many industries, and options for alternative sourcing are limited. Despite their potentially profound impact on the security of supply of soy, geopolitical developments often remain underexposed in analyses of global soy trade. A geopolitical perspective on the security of supply of soy has become increasingly important because the international system is changing in ways that have consequences for the Dutch position in the global soy market.

Global trends, risks, and challenges affect the Dutch soy supply security

Soy supply and demand are influenced by several global trends, including population growth, urbanization, climate change and economic development. Population growth combined with economic growth leads to increased consumption of meat, leading to greater demand for soy. Climate change reduces soybean yields and makes water increasingly scarce. Water can become a potentially limiting factor to increase soy production, especially since urbanization in producing countries spurs demand for drinking water in megacities. While there is little evidence that global demand for soy will outweigh supply in the near future, Dutch companies will increasingly have to compete over available supply as a consequence of the rapidly growing demand from emerging economies, especially China. Understanding the impact of global megatrends on supply and demand is crucial for Dutch businesses and policy makers that aim to secure supply and anticipate and mitigate future supply risks.

In addition to risks that stem from global megatrends, soy supply to the Netherlands can be disrupted as a result of various other developments. Financial speculation causes overshoots in soy prices which can cause issues if traders do not hedge sufficiently against these risks. Furthermore, speculation is generally considered to increase price volatility. Government intervention also affects the market, for example by encouraging domestic processing,

exercising control over trade through state-owned enterprises, or through taxes and export restrictions. European regulations also hamper Dutch soy supply security by restricting GM varieties that are allowed on the European market. Finally, producing countries, especially in Latin America, are vulnerable to social and political instability, which may be ignited by factors related to soy production, such as changes in land and water use or environmental degradation.

Conclusion

The main challenge for businesses is to become sufficiently resilient to absorb sudden price shocks or supply disruptions, while policy makers and industry together need to promote sustainable security of supply, as this is crucial for the economic security of the Netherlands. Growing soy demand from countries like China, increasing global production of GM soy outside Europe, and EU GMO policies are among the major challenges. Other factors, such as deliberate export restrictions, conflicts or social unrest, may also create supply risks. These developments are a potential threat to the Dutch position as importer and re-exporter of soybeans, and to the economic value added by industries that transform soy and soy products into high quality animal protein and food. This may in turn negatively affect the Dutch leverage in international programs to make the soy chain more sustainable. Understanding the drivers and potential impact of geopolitical developments is a crucial first step towards robust decision-making and improving the resilience of the Dutch industry.

1 INTRODUCTION

Europe is almost completely dependent on imports to meet its demand for soybeans, soybean oil and soymeal. Within Europe, the Netherlands is the biggest importer of soy. Soy has a high protein and oil content and is therefore a crucial input for the Dutch oils and fat industry, the animal feed and livestock industry, and the food and grocery industry. The strategic value of this commodity in combination with limited options for substitution or alternative sourcing, and high import dependence, makes the Dutch industry particularly vulnerable to geopolitical developments that put current trade flows and long-term supply security under pressure.

This Issue Brief provides a geopolitical analysis of the security of supply of soy to the Netherlands. It focuses on two main questions:

- Why is soy of strategic importance to the Netherlands, and for what industries and policy goals?
- What are some of the major risks to the sustainable security of supply of this resource?

It discusses the strategic relevance of soy by illustrating why soy is important from the perspective of economic security. It also explains how the dynamics of the global resource nexus affect the sustainable security of supply of soy to the Netherlands. With the insights from this Issue Brief, COE-Resources aims to help policy makers and industry to anticipate future global challenges in the global soy market and to mitigate risks to the Dutch supply security through strategic responses.

1.1 Geopolitics and the changing international playing field

This Issue Brief focuses on the geopolitics of soy. Geopolitics can be defined as the influence of geography on international peace and security issues and international relations. The geographical location of a country influences its endowment with natural resources, such as minerals and oil. It also dictates whether a country disposes of arable land and whether, for instance, its climate is suitable for soy production. It also shapes its trade relations with other states, the exposure to security issues that arise from instability within its own boundaries or in neighboring states. A geopolitical analysis of soy supply security also takes into account aspects of social and political geography, such as demography and governance.

Despite their potentially profound impact on the security of supply of soy, geopolitical issues often remain underexposed in analyses of global soy trade. A geopolitical perspective on the security of supply of soy has become increasingly important because the international system is changing in ways that have consequences for the Dutch position in the global soy market. Trends and developments on both the supply and demand side enhance the competition between countries and companies and create both incidental and sustained supply risks. Securing soy supplies has become a priority for companies and policy makers, as it is currently crucial for food security, society, and economic security. Changes in the economic and political world order are affecting the international system in which trade in soy takes place. Understanding these international geopolitical developments can help to improve industry's resilience to price and supply shocks.

1.2 Strategic relevance and economic security

Geopolitical developments do not imminently put the food security of the Netherlands at risk, as the Dutch food sector is well integrated in the world market. Nonetheless, geopolitical developments are a real risk to the economic security of the Netherlands, as they impact the security of supply of strategic imports, such as soy, for strategic sectors, such as the Dutch agri-food sector.

Economic security is primarily about having a strong and resilient economy that generates prosperity for the citizens of a country. Anything that is required for a strong and resilient economy and the proper functioning of the economy could potentially be a dimension of economic security. Conversely, anything that can damage the economy could potentially be considered a threat to economic security.

Security of supply of soy is relevant for economic security for several reasons.

The agri-food sector is a vital contributor to the Dutch economy. The Netherlands is one of the largest producers of fruit and vegetables and the second largest agricultural exporter in the world after the United States. At the same time it also imports and re-exports large quantities of agricultural products. Between January and April 2015, agri-food commodities accounted for 14.17% of total Dutch imports.[2] Among all agricultural commodities imported soy and its derivatives are among the largest import streams to the Netherlands. The Netherlands accounted for 23.5% of all EU imports of soy in 2014. In the same year, the Netherlands imported over 8.03 m tonnes of soy (beans, oil, and meal combined). Some of these imports are directly re-exported, others are processed in the Netherlands before export. In 2014, the Netherlands exported around 4.11 m tonnes (beans, oil, and meal combined).[3]

- **Soy is used in a wide range of products and sectors.** In addition to the economic value associated with the high volume of Dutch imports and re-exports, the strategic importance of soy for the Netherlands is related to their application in a wide range of

agri-food products, making it relevant for various economic sectors, ranging from animal feed, dairy, oils and fats, to food and groceries. These sectors create added value by transforming soy into high quality animal protein and other food products. Cumulatively, these industries contribute 35 billion euros to the Dutch economy, which is almost 7% of total GDP.[4]

- **Options for alternative sourcing are limited.** Soy production is heavily concentrated in North and South America. This is due to the favourable temperature and rainfall,[5] availability of arable land[6] and substantial investments in agriculture.[7] The increased competition that the Netherlands is facing from other countries to secure supply from these regions is worrisome, as the alternative sourcing options outside and within Europe are limited. European soy production is a mere 1.7 m tonnes, which is insufficient to meet the total European demand of 34.2 m tonnes.[8]
- **Options for substitution are limited.** Substitutes for oil and protein from soy are available, including oilseed rape meal, lupine, sunflower, dried pea, field bean, linseed, dried grass and lucerne silage.[9] However, these currently do not match the price-quality ratio offered by South-American soybean.[10] Meat and bone meal is a potential alternative to soy that could have profound impact on the European soybean demand. However, this would require the lifting of a European ban that was implemented as a consequence of food safety issues associated with the use of bone meal in animal feed that arose during the BSE crisis of the 1990s.[11]

To sum up, major players in the Dutch beef cattle, dairy, and food processing industry will, at least for the foreseeable future, depend heavily on the import of soybean and derivative products. This high import dependence makes the Dutch agri-food sector vulnerable to geopolitical developments. Given the importance of this sector for the overall economic security of the Netherlands, this is a strategic challenge for policy makers and industry.

1.3 Sustainable security of supply

In addition to securing a stable and affordable supply of soy for economic security, the Netherlands has an interest in a *sustainable* security of supply. Sustainability has been defined as meeting the needs of current generations without compromising the ability of future generations to meet their own needs.[12] Working towards sustainable security of supply is essential to increase the resilience of the Dutch agri-food industry to geopolitical developments.

The production, trade and use of resources like soy can lead to various problems that can undermine the sustainable security of supply of resources like soy to the Netherlands. These include economic risks, such as the high concentration of production, price volatility, the limited availability of alternative sourcing options, and the lack of economically competitive substitutes. But soy production is also associated with social and environmental problems. In Latin America, changes in land rights and deforestation has led to violent clashes with local communities. Concerns over the impact of soy production on biodiversity,

sources of livelihood for indigenous communities and local farmers, and the pollution of land, air and water have caused social instability.

These problems are a threat to the resilience of the present and future economy, society and environment. This means that the Netherlands has a broader interest than merely securing sufficient resources to safeguard economic performance. In order to achieve sustainable security of supply, resource policies should not only focus on the economic risks to the supply of resources, but also on the social, political, security and environmental challenges. This requires environmental and community stewardship.

Securing a sustainable supply of soy fits well with commitments of the Dutch government's broader policy goals, such as international development, human rights, poverty alleviation, the rule of law, environmental protection, and combatting climate change. Industry also has an interest in sustainable security of supply of soy, as it serves its long term goals detailed in companies' corporate social responsibility programs (CSR).

2 THE GLOBAL SOY MARKET AND THE DUTCH POSITION

The supply side of the global soy market is heavily concentrated, with the US, Brazil and Argentina being the major producers and exporters. Table 1 shows an overview of the major soybean cultivating countries. With almost 300,000 farms producing soybeans, the US is the largest producer in the world.[13] Soy trade has historically been dominated by a few transnational corporations. Just three companies, Archer Daniels Midland, Bunge and Cargill, own over 70% of the global soybean processing capacity.[14]

MAIN SOYBEAN CULTIVATING COUNTRIES	X 1.000.000 TONNES
U.S.A.	108
Brazil	94
Argentina	55
China	12
India	8.7
Paraguay	8.1
Canada	6.0
Ukraine	3.7
Uruguay	3.4
Russia	2.6
EU-28	1.7

TABLE 1. MAIN SOYBEAN CULTIVATING COUNTRIES (X 100.000 TONNES). SOURCE: MVO, 2015.

For the Netherlands, the majority of supply comes from the Americas: in 2014 the top suppliers of soybeans were the U.S. (43,1%), Brazil (41.9%) and Paraguay (8.4%). For soybean meal, Brazil (54.5%) and Argentina (34.2%) were the largest suppliers.[15]

Dutch imports from the **US** have been waning since the beginning of the 2000s, but showed an upward trend again between 2012-2014, reaching a ten-year high of 1.3 m tonnes in 2014. The initial decline of imports can partially be explained by the decreased crushing

capacity in the Netherlands and the US disapproval of the EU's stringent GMO legislation and its opposition to the European GMO traceability rules. What's more, US supply has increasingly been monopolized by China. The growth of soybean trade between the two global powers began after China cut tariffs and eliminated import quotas on soybean products and was facilitated further when China joined the WTO in 2001. Since 2012, China is the top market for US agricultural exports. The US is China's top supplier of soy, accounting for 36% of Chinese soy imports in 2012-2013.[16] Implementation of the Transatlantic Trade and Investment Partnership Agreement (TTIP) could potentially halt the declining EU share of US soy exports through harmonization of policies between the US and EU.[17]

Dutch imports from **Brazil** benefitted from increased soybean production in Brazil in the early part of the 21st century, which reached an all-time high due to the widespread expansion of soy cultivation into the soil-rich Cerrado. [18] Between 2000-2006, the Netherlands accounted for 11% of all soybean exports from Brazil (an increase from 6% for the period 1996-2000).[19] However, in recent years, the volume of soybean product exported from Brazil to the Netherlands has dropped. This can be attributed to various factors, including the imposition of policies to prevent deforestation of the Amazon.[20] The Netherlands is amongst the largest consumers of illegally sourced deforestation commodities, primarily because of its large imports and re-exports of soybeans.[21] In recent years, measures have been taken to curtail complicit involvement in deforestation and to promote sustainable soy cultivation.

Soy production in **Paraguay** is set to increase substantially over the coming years.[22] This may potentially reduce international competition over supplies and positively affect the Dutch security of supply. The country has benefited from foreign direct investment (FDI). Between 2011 and 2014, Dutch imports of soybeans from Paraguay have gradually decreased, whereas the Dutch imports of soymeal from Paraguay have risen sharply (from 0 in 2013 to 297100 tonnes in 2014).[23]

Although **Argentina** is one of the major soy suppliers, Dutch imports from Argentina have steadily declined since the mid-2000s. This can be explained by Argentina's virtually 100% GM soy production, but also because Argentina has a specific economic policy, with high import and export taxes on soy beans, which does not make it a preferred partner; and lower biodiversity values and less sustainable soy development than in Brazil, for example.[24]

Furthermore, over the last decade, Dutch soy imports have consisted decreasingly of raw soybean and increasingly of soybean meal. This shift can mainly be attributed to a stagnant crushing capacity in the Netherlands, as well as a low domestic consumer acceptance of soy in food products. Meanwhile, Latin American countries increased their crushing capacity and supported the export of soybean meal.[25] China hardly imports soybean meal and instead focuses on raw soybeans, due to its massive crushing capacity.[26]

Global soy production has been increasing steadily in recent years and is expected to continue to grow (see figure 1). Production growth has been achieved through a combination of factors, such as the development of soybean varieties that thrived well in the growing conditions in South-America. This, in combination with vast tracts of arable land and large scale mechanization, led to a rapid expansion of soybean production.[27] In Brazil, for example, crop productivity rose by 151% over the past 30 years.[28] In Uruguay, soy production growth has been backed by large-scale FDI from the soybean sector in neighboring Argentina, due to large differences in export taxes. Ukraine has also become a bigger player in the soy market. Its general agricultural output has increased since it has increasingly gained access to modern production technology. In Russia, growth in production is outweighed by consumption on account of the fast-growing and modernizing livestock industry and increased demand for processed food.[29] Overall, however, the growth in global soy production is expected to keep up with the expected growth in demand (see below).[30]

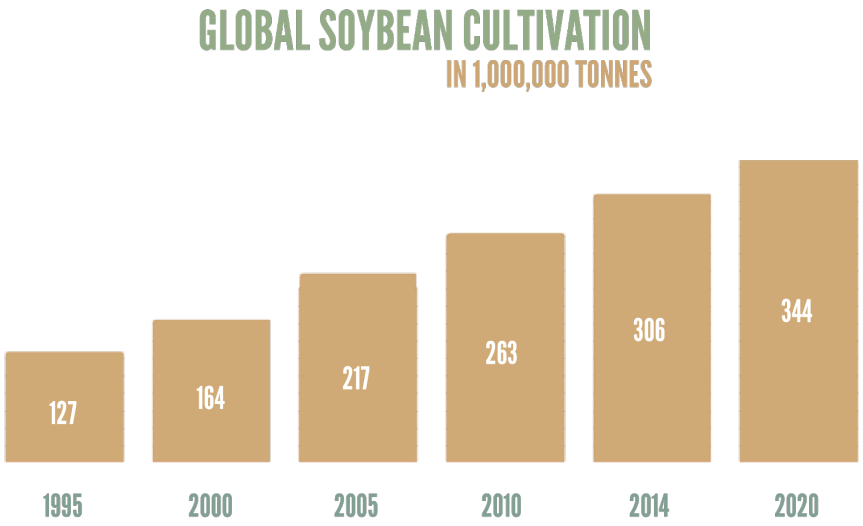

FIGURE 1. GLOBAL SOYBEAN CULTIVATION (IN MILLION TONNES). SOURCE: MVO, 2015.

On the demand side, China is by far the most important soybean importer, accounting for over 60% of supply compared to 12% for the EU.[31] For soybean meal, the EU (30%) and Southeast Asia (23%) are the biggest importers.[32] Figure 2 shows that global demand for soybeans has been growing steadily in recent years and this is expected to continue. It also shows that the majority of growth in demand comes from China, which is expected to account for up to 65.6% of global demand in 2020. By 2024-2025, the total demand of China will almost equal the combined production of the US and Brazil.[33]

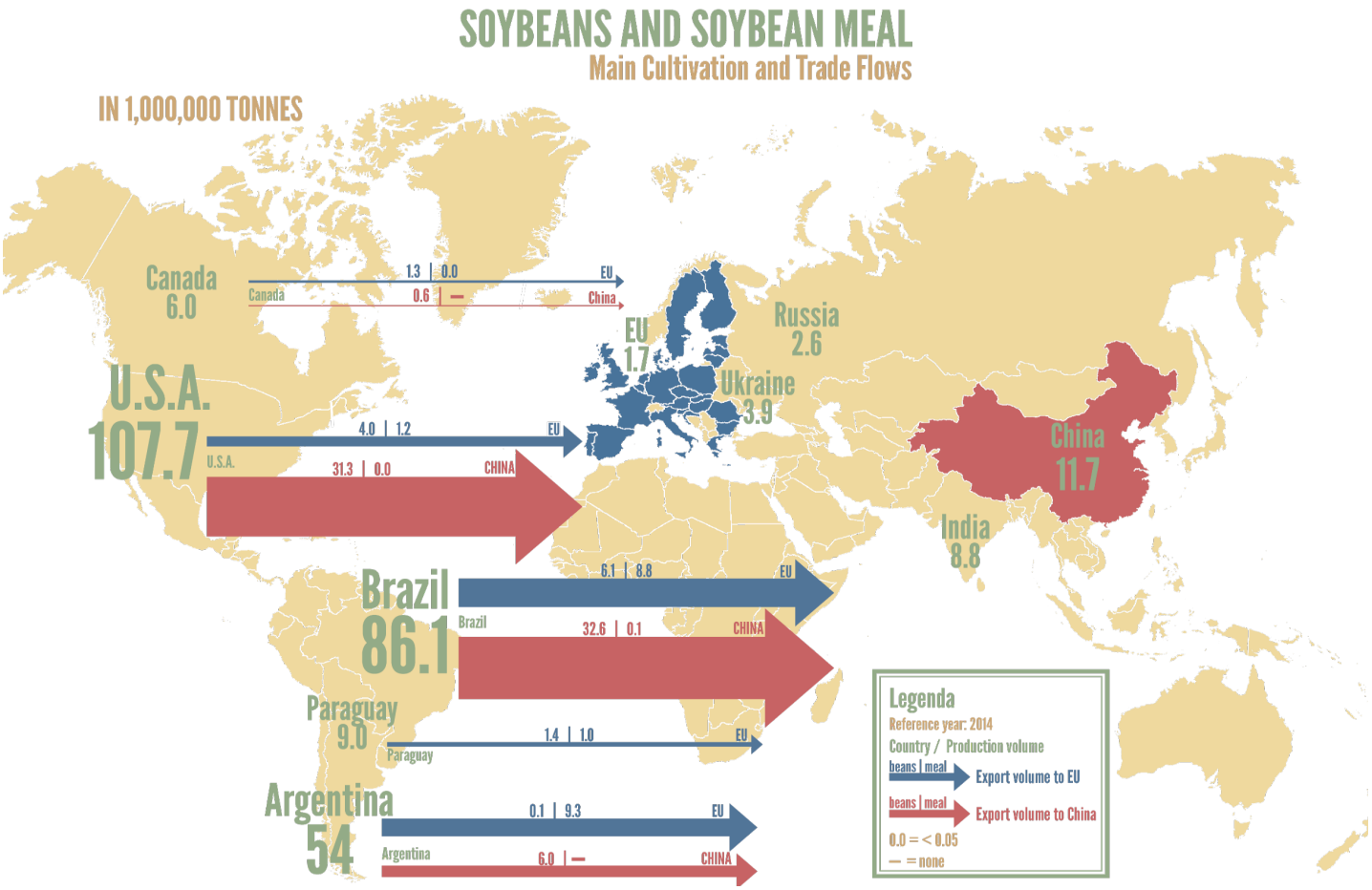

FIGURE 2. GLOBAL IMPORTS OF SOYBEAN (IN MILLION TONNES). SOURCE: MVO, 2015.

The trade flows shown in Figure 3 indicate that the share of exports to the EU as a whole are low compared with exports to China. As China's share of global demand grows, the Netherlands will increasingly have to compete over available supplies. This is particularly true when taken into account that 82% of global soy acreage consists of GMO soy varieties,[34] while the import of GM soy is largely restricted under EU regulations (see more below).

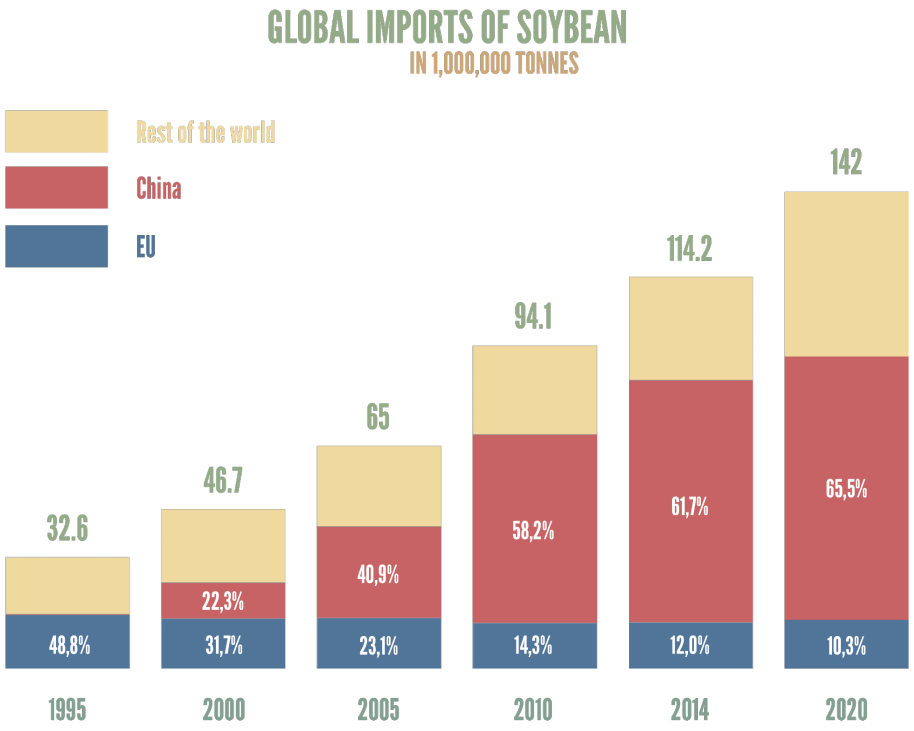

FIGURE 3. SOYBEANS AND SOYBEAN MEAL: MAIN CULTIVATION AND TRADE FLOWS (IN MILLION TONNES). SOURCE: MVO, 2015.

In response to this challenge, the EU has gradually started to increase the European production of soy. The awareness that domestic cultivation of protein crops is considered necessary to achieve sustainable agriculture in Europe, has prompted various cultivation programs to expand EU soy production and to tackle the decline in research and scientific knowledge on cultivation of such crops.[35] The most prominent example is the Danube Soy program, in which civil society, politics, and business enterprises from every step in the soy value chain – from seed producers via agricultural traders, through to food producers and retailers – work together to promote a GM-free, sustainable and regional protein supply.[36] However, as Figures 4 and 5 show, the supply of Danube soy will meet only a relatively small share of total European demand. Furthermore, the largest potential for production of Danube soy is informally outside the EU, namely in Ukraine. As a consequence, the Netherlands will remain highly dependent on sources outside the EU and therefore vulnerable to trends and developments in the global soy market.

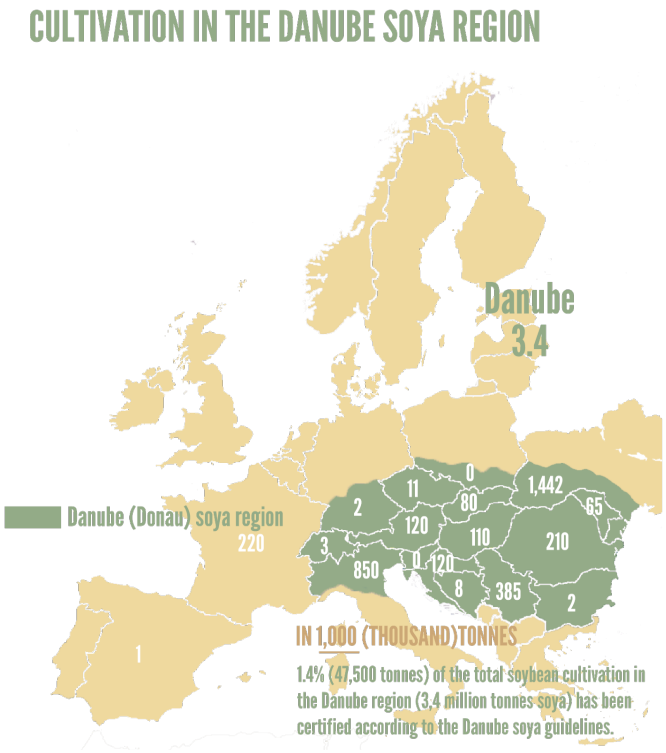

FIGURE 4. CULTIVATION IN THE DANUBE SOYA REGION (IN 1000 TONNES). SOURCE: MVO, 2015.

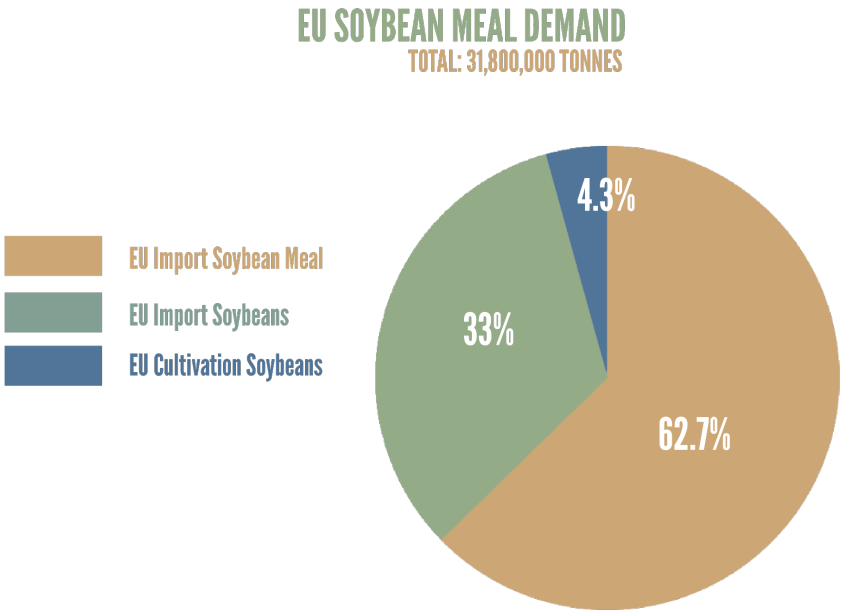

FIGURE 5. EU SOYBEAN MEAL DEMAND. SOURCE: MVO, 2015.

3 TRENDS, RISKS, AND CHALLENGES

The geopolitics of soy are influenced by a wide variety of variables that interact in multiple and intricate ways. This complex system of interaction and feedback loops between variables that affect supply and demand of resources has been conceptualized as the global resource nexus (see Figure 6). This refers to the interaction between the demand and supply of various resources, for example how the demand for soy influences demand for other resources, such as water, land, energy and minerals. The concept of the global resource nexus also helps us to understand the influence of global megatrends that drive supply and demand of resources, such as economic growth, climate change, urbanization, demographic trends, and other factors, such as human resources, technology, governance, social and political factors, and instability. Some of the trends and other nexus dynamics drive up the global demand for soy or hamper supply, or create other challenges and risks for the Dutch security of supply of soy.

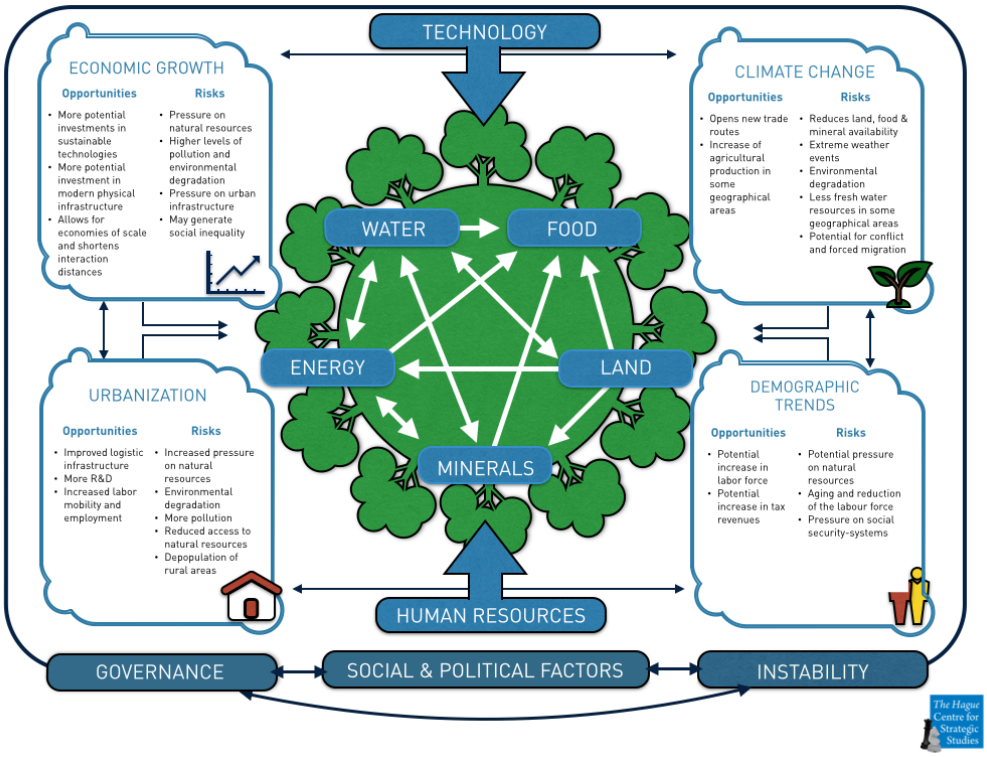

FIGURE 6. THE GLOBAL RESOURCE NEXUS. SOURCE: HCSS, 2014.

3.1 Population growth

UN world population prospects assume a world population between 8.3 and 11.1 billion in 2050. A larger population places more demand on all resources, particularly the availability of food. According to figures published by the OECD and Food and Agriculture Organization, meeting the needs of a growing population will require 60% more animal feed, one billion more tonnes of cereals, and 200 million more tonnes of meat by 2050.

3.2 Economic development and changing consumption patterns

As a consequence of economic growth, the middle class is growing globally. In 2050, it is expected that 80% of the global population will consist of those who have been lifted out of poverty and can make a decent living. Increases in GDP per capita alter consumption patterns, shifting from plant-based diets to diets based on meat, eggs and dairy products. Global average meat consumption is expected to increase from 37 kg per capita in 2000 to 48 kg per capita in 2050. Increased production of these goods will increase demand for soy and its derivatives. In China, for example, meat consumption is now twice as high as in the US.[37] Population growth and economic development in Brazil, where meat consumption per capita is higher than the world average, may create an increased domestic demand for soy for the Brazilian livestock industry. These developments may further reduce the supply that remains available for export to the Netherlands.

3.3 Urbanization

Urbanization will have substantial impact on agriculture in general. However, the symbiotic relationship between soybean cultivation and urbanization is often ignored. Several authors have outlined the role of soybean production in altering landscapes, agricultural systems and societies. As a general trend, the number of farms is reduced and their average size increased. For example, between 1999 and 2001 alone, 5.3 million people left the rural areas of Brazil, which consequently led to the closure of 96% of all smallholder farms (< 100 hectares). Relocation led to a 'multiplier' effect, where farmers were able to buy more land in the Cerrado region for the price of the original land sold. As a result, there were fewer but larger farms, a situation that contributed to the expansion of soy cultivation and mechanized farming across Brazil.[38] Urbanization is also a driver of soy demand because people change diets when moving into urban areas. Their income often increases at the same time, which gives access to a wider range of foodstuffs and leads to higher consumption of meat.[39]

3.4 Climate change

Soybean harvests are expected to be affected by the temperature changes caused by global climate change. When the mean temperature in the growing season exceeds 30 degrees Celsius, yields start to decline. [40] Soybean yields per acre are expected to fall dramatically in the US, for instance, as a result of temperature rise. Additionally, decreasing rainfall reduces the availability of freshwater for agriculture and irrigation purposes.[41] Droughts in major producing countries, such as Brazil, have already led to substantial crop losses and considerable social unrest as a result of water shortages.[42]

3.5 Price volatility and financial speculation

Historically, soy prices have fluctuated heavily. In recent years price fluctuations have been even more severe. This increase in volatility cannot merely be explained by changes in supply and demand. Rather, they can in part be attributed to increased financial speculation in agricultural commodity markets.

The volume of derivatives on agricultural commodities is 20 to 30 times greater than the actual production. As a result, investors hold considerable sway over price development in the soybean market.[43] Speculation on futures markets such as the Chicago Mercantile Exchange causes significant overshoot of short term and even medium term spot prices for soybeans.[44] Spikes in soybean prices mean that commodity traders, under the same capital requirements, can hold smaller reserves of soy. Furthermore, large variations in soybean prices make it attractive for producers to negotiate future supply contracts to protect profitable price levels.[45]

These developments have two implications for the security of supply of the Netherlands. First, in case of shortages, obtaining soy could be difficult because of smaller reserves. Second, even if soy is in stock, it could already be bound for sale to a competing buyer. However, these risks only come into play if commodity traders do not hedge against these risks. A highly capitalized trading market also means that there are many possibilities to mitigate price volatility. This way, the financial risks of volatility are borne mainly by financial markets instead of traders.[46] Hedging can also be a tool by those who depend on soy; futures contracts oblige producers to supply soybeans at an agreed upon price and time.[47]

3.6 Governance issues and national policies

The sustainable supply of resources like soy is also undermined by failing global governance and trends in national resource policies. On the one hand, international institutions that work on global trade issues and issues that are part of the global resource nexus, such as the WTO and UN, have been rendered largely ineffective due to power competition and opposing national interests of their members. The OECD observes that efforts to develop approaches for a better control and more transparent use of export restriction at the multilateral level has stalled.[48] The ineffectiveness of the institutions has an impact on global resource management, but also on other policy areas, such as climate change, peace and security, which ultimately also affect the supply of resources like soy.

At the national level, governments around the world have started to formulate natural resource strategies. Motivated by concerns about growing resource scarcity, climate change, the depletion of fossil fuels, economic competitiveness and innovation, governments are increasingly interfering in the market.

Resource nationalism, which refers to a situation in which the state acquires a more prominent role in the ownership of production and processing assets, in on the rise, including

in the soybean industry. An example is China, where the government is trying to gain control over soybean infrastructure both through domestic and state-owned enterprises.[49] In major sourcing countries-, however, foreign direct investment in soy production is limited due to restrictions in foreign ownership of agricultural land.[50]

Another way in which governments influence trade is through economic policies.[51] On the importers side, these policy interventions are often aimed at securing resources for future generations and ensuring future economic growth, while at the exporters side, they aim to maximize the current political and economic benefits of resource endowments and high commodity prices. Although these are legitimate concerns, they are at times distorting the market and creating supply issues for other countries. For example, taxation regimes, such as import and export restrictions, are used by governments to reduce price volatility and safeguard food security.[52] While these measures stabilize food prices in the countries that implemented them, they exacerbate price volatility on the world market.[53]

Export restrictions have affected the soybean market in the past, such as an export taxation regime in Argentina, which not only restricted exports but also encouraged domestic soybean processing.[54] In addition, high inflation and instability of the peso has incentivized Argentinean farmers to hoard their crops and barter in soybeans. This reduces the availability of soy on the world market, driving up prices, and threatening supply.[55] Russia also imposed 13.33% export duty on soybeans, which is gradually being reduced in accordance with WTO regulations.[56] Both measures restrict the ability for importers to secure soybean supply at a reasonable price.

In the EU, two particular policy areas have implications for the Dutch security of supply of soy, namely the regulations on GMO and the use of bone meal.

3.7 GMO regulation

The vast majority of global soybean supply consists of GM soy. Figure 7 shows the adoption rates of GM soy in Argentina, the US and Brazil between 2000 and 2014. About 82% of the world soybean acreage is GM. [57] In the EU, however, public concerns over potentially negative health and sustainability implications of GM soy have contributed to restricted access for GM soy to the EU market.

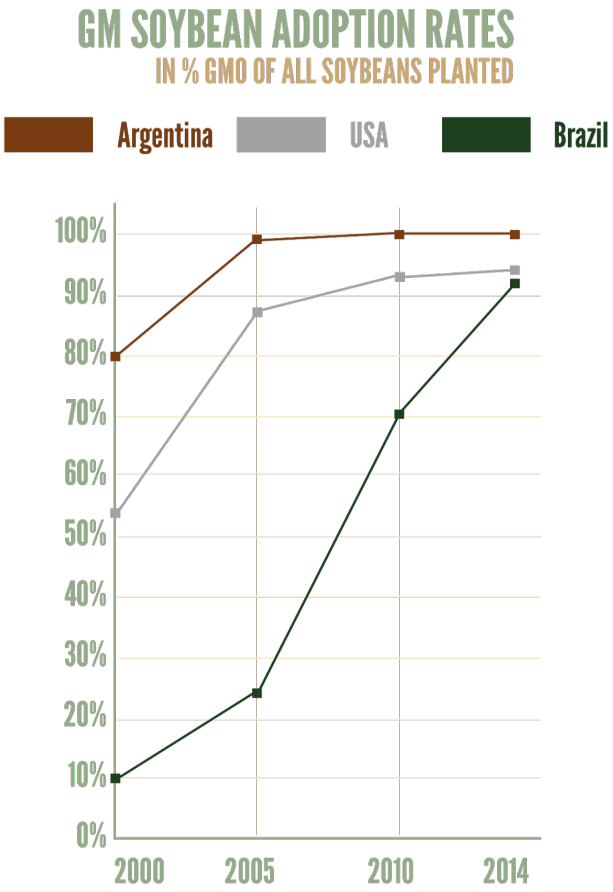

FIGURE 7. GM SOYBEAN ADOPTION RATES (IN % GMO OF ALL SOYBEAN PLANTED). SOURCE: MVO, 2015.

In 2003, the US, Argentina and Canada filed a WTO case against the EU to oppose its stringent GMO-approval protocol. A consultation process with scientists, which was deemed necessary by the WTO panel in order to rule, confirmed the legitimacy of health and environmental issues that the EU regulations and procedures address.[58] Although at a much lower pace than desired by major GM soy producers, the EU is slowly opening up to GMOs and derived food and feed.

As of May 2014, only twelve GM soy varieties have been approved for the EU's internal market.[59] In comparison, the United States has approved twice as many variants.[60] The European Commission's 2015 proposal for a GM 'opt-out' allows individual Member States to prohibit or restrict GM crops completely. Such measures would further reduce the share of global supply from which the Member States could source their imports. As a consequence of the opt-out scheme, the EU market for GMO soy from Argentina, the US and Brazil may contract. In the global competition over soy supplies, this could further undermine the negotiation position of EU-based companies towards the major sourcing countries relative to buyers that do not have such import restrictions.[61]

Another challenge from the perspective of supply security is the slow rate of authorization of GM soybean varieties in the EU market, and the EU's zero-tolerance policy regarding GM cross-contamination of soybeans. Due to EU legislation, suppliers need to make extra efforts to segregate authorized GM soybeans from non-authorized varieties. Originally, segregation was not such a major problem because the major suppliers to the EU only produced approved GM varieties.[62] However, worldwide the share of acreage of non-authorized GM soybeans is increasing.[63] The zero-tolerance policy of the EU entails that if a shipment contains even only accidental traces of non-approved GM, its entry to the European market is refused.[64] This strict zero-tolerance creates risks that many traders are not willing to take, and as a result the imports have declined.[65] This affects the whole of the EU, but the Netherlands in particular as the largest European importer.

3.8 Meat and bone meal

Also relevant for the Dutch sustainable security of supply of soy is the European ban on meat and bone meal (MBM) in animal feed. Properly sterilized animal by-products can be a valuable source of protein in animal nutrition, but if they are improperly heated they can contribute to mad cow disease (Bovine Spongiforme Encefalopathy, or BSE). Therefore, in 2001 the EU banned the use of MBM as an ingredient in animal feed in order to halt the spread of mad cow disease.[66] In the year following the ban, some 16 million tonnes of MBM in animal feed was substituted by 23 million tonnes of soybean meal. Given that the total European demand for soymeal or equivalent is 40 million tonnes, a reversal of the ban could reduce the demand for soy by half. This would have consequences for EU soybean demand and soy prices.[67] However, the recent emergence of BSE in Ireland calls the desirability of lifting the ban into question.[68]

3.9 Social and political instability

From a geopolitical perspective, social and political instability are generally considered a major risk for the security of supply of resources. Instability in general has a negative impact on supply because it hampers all activities in the value chain from production to export. In addition, it stifles overall general economic development and foreign investments in the resource sector.

In the global resource nexus, supply and demand of resources, governance, social and political factors and instability interact with each other in various ways. Bad governance, corruption, or lack of political freedom may spark social unrest, and are often at the root of the state's inability to deliver resource security for its people. Resource scarcity, especially food insecurity, in turn heightens the risk of social unrest or conflict, which may further weaken already dysfunctional institutions.

The risk of social and political instability in the Latin American soy producing countries is relatively high. In 2014, the Economist Intelligence Unit measuring the risk of social unrest, categorized Brazil as 'high' and Argentina as 'very high'. This is due to a combination of

factors, with emphasis on political weakness and economic instability.[69] Soy production has been a cause of instability as well. As mentioned above, changes in land rights, deforestation, and pollution have led to violent clashes with local communities in tropical Brazil, northern Argentina, and eastern Paraguay and Bolivia.[70] The GM soy-based agro-export model as currently configured in Argentina is considered "a socially and ecologically unsustainable model of national development." [71] This makes the country vulnerable to social unrest and political instability, which may threaten the Dutch sustainable security of supply of soy.

Due to regional economic disparities, instability caused by soy production also has an international dimension. For example, in Paraguay and Bolivia there is great animosity towards Brazilian farmers who settle in these respective countries in search of cheaper land. Tensions have escalated into violent conflict between landless squatters and farmers, both in Paraguay and the Bolivian lowlands, disrupting soybean production. For instance, social and political conflicts during the 2009-2010 growing season led to a six-fold reduction of the soybean acreage in Bolivia.[72]

In Ukraine, the largest producer of soy beans in Europe, the ongoing conflict with Russia may contribute to price volatility and supply restrictions. Although so far, sanctions and trade disruptions - such as the Ukrainian ban on soybean export to Russia - have yet to hamper Ukraine's agricultural output: the Ukrainian market of soybeans is breaking records in terms of production, exports and processing volumes.[73] However, a negative impact on the operations of farmers and soy supply cannot be ruled out if the conflict continues, as a large part of Ukraine's agricultural acreage is near the territory disputed by Russian separatists.

CONCLUSION

A sustainable security of supply of soy is of strategic interest of the Netherlands. As soy is currently a widely used source of protein and oil, it is an key import for the Dutch agri-food industry, which is a crucial contributor to Dutch economic security and the prosperity and well-being of Dutch society.

The sustainable supply security of soy to the Netherlands is affected by several global trends, risks and challenges, which do affect the business and competitiveness of the Dutch industry. High import dependence, in combination with limited options for substitution and alternative sourcing, leaves the Dutch industry vulnerable to geopolitical developments and the dynamics of the global resource nexus. Growing soy demand from countries like China, increased global production of GM soy outside Europe, and EU GMO policies are among the major challenges. Other factors, such as deliberate export restrictions, conflicts or social unrest, may also create supply risks. These developments are a potential threat to the Dutch position as importer and re-exporter of soybeans, and to the economic value added by industries that transform soy and soy products into high quality animal protein and food. It may in turn negatively affect the Dutch leverage in international programs to make the soy chain more sustainable.

In order to improve the resilience of the Dutch industry, it is paramount to devise strategies to anticipate and mitigate upcoming challenges. This first requires understanding the position of the Netherlands in the global soy market, and how developments in this market create challenges. The major challenge for businesses is to become sufficiently resilient to absorb sudden price shocks or short term supply disruptions. Part of the long-term strategic response is to continue to invest in sustainable soy production and the development of other high quality and affordable sources of protein and oil. The Netherlands is already one of the world's frontrunners in this area.

However, the persisting social and environmental problems surrounding the production of soy in Latin America require attention. Expanding domestic production of soy within the EU is a robust policy option in response to increased global competition over available supplies, but by no means sufficient to meet total European demand. More significant could be changes in EU legislation regarding GMOs and the use of MBM. As the EU's largest importer and re-exporter of soybean meal, the Netherlands stands to gain from a more unified and strategic EU policy stance towards the developments in the global soy market. Anticipating challenges related to the sustainable security of supply of soy through strategic responses is crucial for Dutch economic security.

REFERENCES

1 Marjolein de Ridder, Sijbren de Jong, Joren Selleslaghs, Thom Achterbosch, Roel Jongeneel, Petra Berkhout, Martijn van der Heide, *The Emerging Geopolitics of Food*, p29.

2 CBS, International trade; import- and export according SITC-classification.

3 Oil World, "Oil World Annual 2015."

4 Marjolein de Ridder, Sijbren de Jong, Joren Selleslaghs, Thom Achterbosch, Roel Jongeneel, Petra Berkhout, Martijn van der Heide, *The Emerging Geopolitics of Food*, p29.

5 FAO Water, "Crop Water Information: Soybean."

6 Pacheco, P., "Soybean and Oil Palm Expansion in South America - A Review of Main Trends and Implications."

7 Goldsmith, P & Hirsch, R., "The Brazilian Soybean Complex".

8 Oil World, "Oil World Annual 2015."

9 Ibid.

10 Van Krimpen, M. M., Bikker, P., Van der Meer, I. M., van der Peet-Schwering, C. M. C., & Vereijken, J. M., "Cultivation, processing and nutritional aspects".

11 Marjolein de Ridder, Joshua Polchar, en Maarten Gehem, "From Farm to Fork and Further. Research Tackling the Grand Challenge of Food Safety in Europe.", 24.

12 WCED (UN World Commission on Environment and Development), "Our Common Future".

13 United States Environmental Protection Agency; http://www.epa.gov/agriculture/ag101/cropmajor.html.

14 Murphy, S., Burch, D., Clapp, J., "Cereal Secrets - The World's Largest Grain Traders and Global Agriculture."

15 Oil World, "Oil World Annual 2015."

16 United States Department of Agriculture Economic Research Service, 'U.S. Agricultural Trading Relationship With China Grows', 2015; http://www.ers.usda.gov/amber-waves/2015-may/us-agricultural-trading-relationship-with-china-grows.aspx#.VUzWS_mqpHw.

17 FEDIOL, "FEDIOL Position on Transatlantic Trade and Investment Partnership Agreement (TTIP)".

18 Ibid.

19 Greenpeace Netherlands, 'The Dutch economic contribution to worldwide deforestation and forest degradation', 2007; http://www.greenpeace.nl/Global/nederland/report/2010/5/the-dutch-economic-contributio.pdf.

20 FERN, 'Stolen Goods: the EU's Complicity in Illegal Tropical Deforestation', 2015; http://www.fern.org/sites/fern.org/files/Stolen%20Goods_EN.pdf.

21 Ibid.

22 Chatham House, 'Resources Futures' 2012; http://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Energy,%20Environment%20and%20Development/1212r_resourcesfutures.pdf.
23 Oil World, "Oil World Annual 2015".
24 Inspectie Ontwikkelingssamenwerking en Beleidsevaluatie (IOB), 'Evaluation of the Dutch foreign policy with respect to Latin America', 2013, p 51; http://www.iob-evaluatie.nl/sites/iob-evaluatie.nl/files/Deelstudie%20Duurzame%20ontwikkeling%20-%20Soy%20case%20study.pdf.
25 Van Gelder, J.W., Kuepper, B., Vrins, M., "Soy Barometer 2014 - A research report for the Dutch soy coalition", p28.
26 Gustavo de L. T. Oliveira and Mindi Schneider, "The Politics of Flexing Soybeans in China and Brazil", p5.
27 Goldsmith, P & Hirsch, R., "The Brazilian Soybean Complex".
28 HCSS, 'The Global Resource Nexus', 2015; http://www.hcss.nl/reports/future-contours-of-agriculture-and-food/163/.
29 Ibid.
30 USDA, "USDA Agricultural Projections to 2024", p57.
31 USDA, "USDA Agricultural Projections to 2024, p30."
32 Ibid, p32.
33 Ibid., p33.
34 ISAAA, "Global Status of Commercialized Biotech/GM Crops in 2014."
35 Bues e.a., "The environmental role of protein crops in the new common agricultural policy".
36 Verein Donau Soja, "Danube Soya."
37 The United States Department of Agriculture Economy Research, 'China in the Next Decade: Rising Meat Demand and Growing Imports of Feed', 2014; http://www.ers.usda.gov/amber-waves/2014-april/china-in-the-next-decade-rising-meat-demand-and-growing-imports-of-feed.aspx#.VUnE1vmqpHw.
38 Greenpeace Netherlands, 'The Dutch economic contribution to worldwide deforestation and forest degradation', 2007; http://www.greenpeace.nl/Global/nederland/report/2010/5/the-dutch-economic-contributio.pdf.
39 Stage, Stage, en McGranahan, "Is urbanization contributing to higher food prices?", 14.
40 Schlenker, W., & Roberts, M. J., "Nonlinear Temperature Effects Indicate Severe Damages to US Crop Yields under Climate Change."
41 Boulanger, J., Buckeridge, M., Castellanos, E., Poveda, G., Scarano, F., Vicuna, S., "Central and South America".
42 Glickhouse, R., "Brazil Update: Historic Drought Takes Toll on Agriculture".
43 UNCTAD, "Don't blame the physical markets - Financialization is the root cause of oil and commodity price volatility".
44 Rahmani, O., "The Fundamentals and Financial Investment in the World Soybeans Market".
45 Irwin, S. H., & Good, D. L., "Market instability in a new era of corn, soybean, and wheat prices.", p9-10.
46 CME Group, "Self-Study Guide to Hedging with Grain and Oilseed Futures and Options".
47 Ibid.
48 http://www.oecd.org/trade/benefitlib/export-restrictions-raw-materials-2014.pdf , p 14.
49 Gustavo de L. T. Oliveira and Mindi Schneider, "The Politics of Flexing Soybeans in China and Brazil."
50 Piñeiro, M., & Villarreal, F., "Foreign Investment in Agriculture in MERCOSUR Member Countries."
51 Ibid., p20.

52 Anania, G., *Agricultural Export Restrictions and the WTO: What Options Do Policy-Makers Have for Promoting Food Security?. ICTSD Programme on Agricultural Trade and Sustainable Development.*
53 Food and Agriculture Organization, *Soaring Food Prices: Facts, Perspectives, Impacts and Actions Required (Vol. 1)*, p45.
54 Shama, R., *Food Export Restrictions: Review of the 2007-2010 Experience and Considerations for Disciplining Restrictive Measures*, p10.
55 Hugh Bronstein, "Record Argentine soy crop to pump exports despite hoarding".
56 USDA, "Russian Federation - Oilseeds and Products Annual 2015."
57 ISAAA, *Global Status of Commercialized Biotech/GM Crops in 2014*.
58 European Commission, 'Europe's rules on GMOs and the WTO' ; http://europa.eu/rapid/press-release_MEMO-06-61_en.htm?locale=en [accessed 20-5-2015].
59 European Commission, "EU Register of Authorized GMOs."
60 ISAAA, "GM Approval Database."
61 European Commission, "Review of the Decision-Making Process on GMOs in the EU: Questions and Answers."
62 LEI – Wageningen UR, "Study on the Implications of Asynchronous GMO Approvals for EU Imports of Animal Feed Products", p5.
63 Ibid.
64 European Commission, 'Study on the Implications of Asynchronous GMO Approvals.
for EU Imports of Animal Feed Products'; http://ec.europa.eu/agriculture/analysis/external/asynchronous-gmo-approvals/summary_en.pdf [accessed 20-5-2015].
65 LEI – Wageningen UR, "Study on the Implications of Asynchronous GMO Approvals for EU Imports of Animal Feed Products".
66 EU Joint Research Centre, "Animal by-products".
67 Elerink, E. V., "Meat, Milk and Eggs: Analysis of Animal Food Environment Relations - Proefschrift Ter Verkrijging van Het Doctoraat in de Wiskunde En Natuurwetenschappen Aan de Rijksuniversiteit Groningen", p43.
68 BBC, "BSE: Suspected 'Mad Cow' Disease Case Found on Republic of Ireland Farm."
69 The Economist, "Mexico, Argentina, Brazil At 'High Risk' For Social Unrest In 2014".
70 Gudynas, "The New Bonfire of Vanities".
71 Leguizamon, A., "Modifying Argentina: GM soy and socio-environmental change."
72 Soybean and Corn Advisor, "Paraguay and Bolivia Crop Acreage."
73 APK Inform, "Ukrainian soybean market - new season & new records".

CENTRE OF EXPERTISE ON RESOURCES

c/o
The Hague Centre for Strategic Studies
Lange Voorhout 16
2514 EE The Hague
The Netherlands

+31 (0)70 318 48 40

www.coe-resources.nl
info@coe-resources.nl