

WHAT THE OFFICIAL WEBSITES SAY ON SOY AND PALM OIL

Systematic Information Collection Methods to Benchmark Official
Discourses about National Policies on the Lifecycle of Some Key
Agricultural Commodities





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.

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The Hague Centre for Strategic Studies (HCSS)

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In collaboration with The Agricultural Councils at the Dutch embassies of Brazil, China, India, Indonesia and Malaysia.

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FOREWORD

FOREWORD

If policy practitioners, analysts or scholars want to develop more systematic and fine-tuned sensors to pick up patterns and trends in countries of interest shifting stated policy priorities, there is currently not a single source that is more suitable to this than governmental websites. They are publicly available in electronic format. Governmental websites remain the main vehicle through which they communicate with the outside world. Most of the texts that appear on the websites were drafted by civil servants. Those that were not were at least approved by them – typically through formal procedures that determine what ultimately ends up (or does not end up) on their websites. This may – in fact is even likely to – change over time, but at this moment in time, social media cannot (yet) really compete with the official websites.

Most analyses of contemporary policy are based on relatively ‘thin’ and often selective evidence base. To buttress their arguments, policy analysts of course do generally try to piece together evidence from a number of different sources. These sources include high-level policy documents; international agreements; policy and/or press statements by authoritative politicians, civil servants or spokesmen; the frequency and level visits to certain countries; budgetary priorities, the relative scope and/or character of the diplomatic representation in certain countries, etc. Analysts then typically make a fairly limited (and often untraceable) selection out of all of these potentially available sources – a selection, the representativeness of which cannot readily be verified. But it has now become possible to tap into a number of new data sources with a set of innovative analytical tools, both semi-automated and automated, that offer unprecedented promise to improve the quality of our analyses. HCSS submits this report as a modest attempt to demonstrate that some of these empirical deficiencies can be remedied and some ways in which this could be achieved.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Palm oil and soy can be considered as two of the most important agricultural commodities in the global food system. The global annual production is ever increasing, to serve a growing world population that is now eating more meat and processed food. This has and will likely continue to have significant impacts on the environment, our ecosystems, our health, societies and human rights as a whole.

Against this background, some of the large global business players have agreed to work towards 100% sustainable sourcing. Considerable steps have been made in raising the standards for the production and trade of palm oil and soy. The Dutch government has set the objective to further expand the influence of sustainability schemes for the production of palm oil and soy. For a stronger effect of raised standards for responsible production, the main producing and importing countries would also need to make sustainability a priority. How can we reach out to them?

This analysis was requested by the Ministry of Economic Affairs of the Netherlands for developing policy strategies to further expand the influence of sustainability schemes – and here in particular, for the production of palm oil and soy. Insight into the discourse by the government of these countries and their interest in the Dutch efforts towards sustainable production can be useful to determine which strategies would be effective. As such, this study aims to identify which are the issues and priorities governmental publications focus on in their discourse on the production, trade and consumption of soy and palm oil. We studied all webpages of governmental websites for Brazil and China¹ regarding soy, the former as exporter and the latter as importer. Indonesia, Malaysia and India were addressed regarding palm oil, the former two as exporters and the latter as importer. In order to find any change in the discourse over time, potentially as a response to the raised standards by the Dutch players, we studied all relevant webpages from 2007 till 2014.

The Ministry of Economic Affairs asked HCSS to conduct a study of the tradeoffs implied by current and future sustainable palm oil and soybean policies directed at the most relevant countries, particularly Brazil, China, India, Indonesia and Malaysia. Its objective is to provide an estimate of whether we are standing at the beginning of a system change at the global level in this domain, and how current Dutch policy ambitions fit within this developing context.

The project had an important methodological component, but also had to deliver useful substantive results on the basis of these new tools and methods. It was agreed that the mode of research would be as automated and multilingual as circumstances would permit. Where the technology exists and is available for the different languages, the research mode would be mostly automated. This means that this study is also an attempt to explore the usefulness of these new data sources and data analysis tools. HCSS set out to construct a new database consisting of all retrievable text-based webpages from the Ministries of five countries that play a key role in relevance to the research topic. We then applied a number of textmining tools to this new dataset, in order to automatically identify the main topics to have emerged from these websites as well as a number of associations with some topics of interest.

Textmining tools essentially attempt to convert 'text' into meaningful 'data'. They employ a variety of computational linguistic tools to break down texts in meaningful units, to boil those units down to their very essence (e.g., by reducing various grammatical variants of a word to its basic meaning) and to then employ a variety of statistical tools to tease out significant patterns from those data. The first textmining approach or research strand that we used for this study was based on R, a statistical programming software, and the second, on textmining with topic modelling. Both approaches implied overcoming a number of limitations – which we share in this report. The latter was an experiment to compare results with the ones obtained with R. The first model had yielded surprising results, indeed. But as the use of topic modelling required more time than expected, leading to insufficient samples for analysis, this report includes the results with the purpose of showing its potential and what can be done with it.

We attempted to summarize the main findings in a way that would render more accessible and readable the complexity of the output generated by our textmining tools. The collaboration with the Agricultural Councils at the Dutch embassies of the countries we addressed, proved extremely helpful in further analyzing and making sense of these results.

Perhaps one of the most surprising results of this study was that what was expected to stand out, turned out to be missing. The environmental dimension, the concerns for society, human rights, health – human security as a whole, were not the main elements characterizing the official discourses of Brazil, China, India, Indonesia, Malaysia. These indeed appeared to be mostly concerned with economic sustainability, rather than environmental balance and human security as a whole.

For Brazil, this can be explained by its position as a major soybean exporter, primarily driven by the objective to protect its producers and increase its productivity and the quality of production through technology and innovation in order to face the growing global demand. China's discourse includes the role of central policies, and reflects the concerns of a soy importer over the challenges of a growing domestic demand and the economic implications of trade.

With respect to the other commodity, India's position as importer of palm oil also typically reflects concerns for economic aspects such as trade and pricing, rather than the protection of the environment and human rights. The country does not directly deal with the consequences of expanding plantations. Yet as exporters that heavily depend on external demand, Indonesia and Malaysia do not emphasize environmental and social dimensions as much as they discuss investments, resources, the role of companies, the position of small shareholders, production capacity, or the expansion of plantations either.

Official commitments made by members of a country's Ministry of Agriculture at global, major conferences may resonate strongly and may influence significantly in our perception of these priorities – more so than statements formulated, written and published all year long on the official website of that same Ministry.

Our study brings some evidence of a gap between 'the walk and the talk', and of the possible bias in interpreting a country's position and priorities. We also provide a number of recommendations to help in addressing this broad range of concerns when communicating and working with these countries. This may complement and improve the way communication is built between the Netherlands and these countries, in order to foster a better understanding, allow for a more efficient collaboration, and lead to fruitful benefits.

This report is structured as follows. The first chapter following the Introduction describes the methods and tools that were developed and used for this analysis. The

second chapter presents the findings of this analysis. It includes three parts: the background information provided by our contacts from the Dutch embassies' Agricultural Councils and supporting our findings, the results that emerged from the first research strand (textmining with R), and the results of the second research strand (textmining with topic modelling). Each part is accompanied by a description of the main topics to have emerged from textmining the websites. The third chapter includes a summary of the main findings, and a list of recommendations as to how the Netherlands could address each 'national discourse' and each country's preference or potential angle of collaboration based on our results. The report ends with our general conclusions.

We refer readers to the Technical Appendix, which includes a more detailed version of our entire research process, methodologies and findings, as well as two Annexes. The first provides data on global trade to inform the introduction of the report on soy and palm oil. The second assesses the extent to which each country includes the Netherlands' Sustainable Trade Initiative (IDH) in the official discourse.

INTRODUCTION

INTRODUCTION

Palm oil and soy can be considered as two of the most important agricultural commodities in the global food system. The global annual production is ever increasing, to serve a growing world population that is now eating more meat and processed food.² With soy as a major livestock feed component and palm oil an indispensable fat in the food processing industry, the demand for these commodities is expected to grow as the world population will reach nine billion or more. Such a rapid expansion leads to many risks. Environmentally, the degradation of ecosystems and CO₂ emissions are major issues. On a societal level, the rights of indigenous people, smallholders, and workers, including their health and safety, are issues that have raised global awareness.

Against this background, some of the large global business players have agreed to work towards 100% sustainable sourcing. The entire Dutch industry has set the target of supplying 100% responsible soy³ for the Dutch market by 2015. Similarly, the Task Force Sustainable Palm oil has made the commitment of sustainable sourcing in 2015 by these Dutch corporations. These are considerable steps in raising the standards for the production and trade of palm oil and soy.

Dutch players are global leaders in this process. However, while the Dutch are the second largest exporter of agricultural products, their influence on the global trade of commodities is declining. The South–South and South–North (e.g., Brazil–China) trades are expanding with the growth of emerging markets, both as producing countries and as importing countries. That means, for a global effect of raised standards for responsible production, the main producing and importing countries also need to prioritize sustainability.

This study aims to find out which are the issues and priorities that governmental publications focus on in their discourse on the production, trade and consumption of

soy and palm oil. We studied all webpages of governmental websites for Brazil and China⁴ regarding soy, the former as exporter and the latter as importer. Indonesia, Malaysia and India were addressed regarding palm oil, the former two as exporters and the latter as importer. In order to find any change in the discourse over time, potentially as a response to the standards raised by the Dutch players, we studied all relevant webpages from 2007 till 2014.

This analysis was requested by the Ministry of Economic Affairs of the Netherlands for developing policy strategies to further expand the influence of sustainability schemes for the production of palm oil and soy. Insight into the discourse by the government of these countries and their interest in the Dutch efforts towards sustainable production can be useful to determine which strategies would be effective. As such, this analysis hopes to reveal the topics and issues that these governments express in their publications on palm oil and soy.

Providing analysis of what is happening in other countries remains an important task for our governments. Much of this analysis currently depends on the information that is available to the Agricultural Councils. While their knowledge remains indispensable, it is clear that the sources that can be used for analysis are changing extremely rapidly. The same holds for the tools that can be used to analyze those sources in addition to the traditional methods for data analysis. It has now become possible to tap into a number of new data sources with a set of innovative analytical tools, both semi-automated and automated, that offer unprecedented promise to improve the quality of our analyses.

This project represents an attempt to explore the usefulness of these new data sources and data analysis tools. HCSS set out to construct a new database consisting of all retrievable text-based webpages from the Ministries of five countries that play a key role in relevance to the research topic. We then applied different textmining tools to this new dataset, in order to automatically identify the main topics to have emerged from these websites as well as a number of associations with some topics of interest. The first approach we used was based on textmining with R, a statistical programming software, and the second, on textmining with topic modelling. The latter was an experiment to compare results with the ones obtained with R. The first model yielded surprising results, indeed. But as the use of topic modelling required more time than expected, leading to insufficient samples for analysis, this report includes the results with the purpose of showing its potential and what can be done with it.

This report is structured as follows. The first chapter following the Introduction describes the methods and tools that were developed and used for this analysis. The second chapter presents the findings of this analysis. It includes three parts: the background information provided by our contacts from the Dutch embassies' Agricultural Councils and supporting our findings, the results that emerged from the first research strand (textmining with R), and the results of the second research strand (textmining with topic modelling). Each part is accompanied by a description of the main topics to have emerged from textmining the websites. The third chapter includes a summary of the main findings, and a list of recommendations as to how the Netherlands could address each 'national discourse' and each country's preference or potential angle of collaboration based on our results. The report ends with our general conclusions.

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1 METHODOLOGY, CHOICES AND PROCESS

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1 METHODOLOGY, CHOICES AND PROCESS

1.1 The task

Commissioned by the DG Agro of the Dutch Ministry of Economic Affairs, this study aims to get insight into how the governments from emerging countries have considered from 2007 onwards the life-cycle (or sourcing, i.e., production and trade) of two agricultural commodities: soy and palm oil. An investigation of the 'official discourse' or high-level discussions on soy and palm oil is thus required. The boundaries of the research were set for a limited set of countries with essential relevance to the topic at stake – agriculture, and its relevant issues.

Research questions

How do the governments of Brazil, China, India, Indonesia and Malaysia discuss and communicate about the life cycle of soy and palm oil to the rest of the world in their public statements? What are the key differences between these discourses, across each country's official websites?

An additional question we examined involved looking at the extent to which the five countries mention the Dutch Sustainable Trade Initiative (IDH) across their governmental webpages.

Country selection

The countries and languages that were selected to be analyzed included: Brazil (Portuguese), China (Mandarin), India (English), Indonesia and Malaysia (Bahasa).

Due to a concern over research consistency and for comparability purposes, HCSS first set out to include all countries for each key search term. For example, Brazil would then be researched in relevance to 'soy' and 'palm oil'.

Given a variety of practical issues involved in the crawling and parsing of various websites, both parties originally agreed to limit this effort to the original requirements: a search for Brazil and soy, China and soy, India and palm oil / oil palm, Indonesia and palm oil / oil palm, Malaysia and palm oil / oil palm.

Brazil is part of the selection, as one of the world's top soybean producer, and China as one of the main consumers. Indonesia and Malaysia are the main producers and exporters of palm oil – 85% of all palm oil is globally produced by and exported from these two countries. India is the world's biggest importer of palm oil. This makes them key players of (respectively) the soy and the palm oil industry, thus indispensable to include them in this study.

The topics: soy, palm oil... and oil palm

HCSS started by looking at 'palm oil' as the commodity, the product from oil palm fruit – and not 'oil palm', which reflects the major underlying agricultural activity behind the production of palm oil. We decided to research both key terms for India, Indonesia and Malaysia.

There is a bit of a semantic subtlety for Bahasa. '*Minyak kelapa sawit*' means 'palm oil', while '*kelapa sawit*' alone means 'oil palm'. Adding '*minyak*' to '*kelapa sawit*' changes it from 'oil palm' to 'palm oil' when translated into English. '*Kelapa*' alone means 'coconut', which does not directly relate to palm oil and tends to create some confusion in the results. This means that the research done for originally 'palm oil' yielded results for both 'palm oil' and 'oil palm'. A search on 'oil palm' as plantations is here not deemed relevant for India, as this country is not a producer.

Purpose

The purpose is twofold:

- Understanding the gist of the discourse with respect to relevant sustainability priorities around the topics of soy, palm oil and oil palm, and the indirect effects of policies on the sustainable flow of these two;
- Identifying which countries could be or include interesting stakeholders for cooperation with the Netherlands, and on what priority or issue more than others; more precisely, the idea would be to target countries that are the most favorable to sustainability priorities and renewable resources. This is important in terms of potential collaboration with the Netherlands and because of the importance of Dutch policies regarding sustainability ambitions and objectives.

We initially expected the results to allow for the identification of particular sustainability priorities over time, such as impacts on the environment (e.g., through deforestation), but also in terms of human security (human rights), or food security. We would assess the extent to which the selected countries seem to focus their discourse on these priorities, relatively to other types of priorities (e.g., economic).

This report presents some findings based on a dual approach that was developed by HCSS for the automated analysis of various foresight sources (the MetaFore protocol), but that was applied here to a different source: governmental websites. Interested readers are referred to the HCSS online brochure⁵ and to some previous HCSS reports using the same approach.⁶ The tools used for this protocol are briefly described in the following sections of this chapter.

1.2 The study: Parameters, design, process

Nature of the Project and Research Mode

The project had an important methodological component, but also had to deliver useful substantive results on the basis of these new tools and methods.

It was agreed that the mode of research would be as automated and multilingual as circumstances would permit. Where the technology exists and is available for the different languages, the research mode would be mostly automated.

The final interpretation of these results still required human knowledge and creativity. The results of the (semi-)automated analysis were therefore (automatically) visualized and accompanied by an interpretation ('duiding') of these visuals by human analysts (HCSS + Ecosystem partners).

Research design and process

Defining the search 'formula'

We searched and retrieved a set of electronically available governmental webpages published on soy and palm oil since 2007 until today (precisely: 01/01/2007 – 30/09/2014), using government internet domains with the Google site parameter, respectively: gov.br for Brazil, gov.cn for China, gov.in et nic.in for India, go.id for Indonesia, and gov.my for Malaysia.

2007 was chosen as the first year of investigation as it corresponds to the year when the Dutch sustainable development policy was launched.

We searched this information for Brazil, China, India, Indonesia and Malaysia in original languages where relevant and possible.

The team checked the translation of each search terms using Google translate and studying a number of reports on the topics selected, to find out which expressions or pairs of words are commonly used.

- In Portuguese for Brazil = “óleo de palma” and soja
- In Chinese = 棕榈油 (for palm oil) and 大豆 (for soy)
- Indonesia (Bahasa) = “kelapa sawit” and kedelai
- Malaysia (Bahasa) = “kelapa sawit” and kedelai
- In English for India = “palm oil”, “oil palm” and soy

The webpages would be downloaded in all available languages (i.e., including the webpages on many countries’ websites in English or other languages) and textmined.

We aim to benchmark the countries’ perspectives and the discourse of their official departments over time, particularly on several priorities that would emerge from this search. We expected this search to provide us insights on the most salient themes and the strength of their connection to soy and palm oil. For example: in which context does Brazil place soy? Does China emphasize this dimension even more?

The results of the search would be gathered into a database that we subsequently can convert to another (bibliographical) management program (Zotero⁷), whereby the following would be required fields: a unique identifier for each page; the date at which it was scraped; the country and the ministry; the date of publication; and the scraped text.

Scraping as described the official websites into a database would then enable us to run some textmining tools on it. This requires an automated research mode followed by an interpretation by analysts. After exploring several options, we defined two research strands for textmining to identify relevant key topics: ‘R’⁸ and ‘topic modelling’.

- *Textmining with R* would provide word occurrences and correlations
- *Textmining with topic modelling* would provide word and topic occurrence

The results would be the analysis of an output consisting of statistics and visuals such as word clouds, streamgraphs, co-occurrence and correlation diagrams.

As the tooling was developed, it was agreed to increase the granularity of the analysis across time to any changes in importance and content that could be observed in the entire time period covered by the analysis.

The Team

HCSS assembled three teams to conduct this analysis. Two technical teams focused on the tooling that was developed specifically for this project. Another multilingual analytical team was assembled to analyze the data that were generated by the tooling. Members of these teams were located in India, Indonesia, Portugal, The Netherlands, France, and included one Portuguese, one Indian, one Taiwanese, one Indonesian, three Dutch, three French, one Serbian, two Italians, and one German.

The team coordinated its activities through various online tools, in particular Rizzoma, a web-based collaboration environment; and Google Apps for the actual writing of the report. Throughout the process, Rizzoma proved very useful in organizing the international work with our Ecosystem partners, in discussing with them and coming to a shared understanding of various substantive and methodological issues both synchronously and asynchronously, in keeping track of the research progress and documenting any adjustments that had to be made.

Textmining

Textmining tools essentially attempt to convert 'text' into meaningful 'data'. They employ a variety of computational linguistic tools to break down texts in meaningful units, to boil those units down to their very essence (e.g., by reducing various grammatical variants of a word to its basic meaning) and to then employ a variety of statistical tools to tease out significant patterns from those data. For this project, HCSS used different types of textmining tools: R and topic modelling.

The next section describes these steps in some more detail. Various limitations and caveats can be found in the Rizzoma online topic (access available upon request) and in the Technical Appendix.

First research strand: Textmining with R

R is an open-source, increasingly used, well-developed statistics system and programming language. We used it to generate word occurrences and correlations with one another. To put it in other words, it is a language and environment for statistical computing and graphics. R provides a wide variety of statistical and graphical techniques: statistical tests, modelling, time series analysis, classification and clustering.

Our technical team generated a script which enabled us to retrieve the occurrence (in frequency, or count) of words (uni-grams) across and from all webpages that emerged when searching on Google for soy and palm oil based on the defined ‘formula’.

The system goes through all documents, generating a list of these key words with their frequencies and correlation with each other. The most recurring words are provided by frequency tables.

WORD	TRANSLATION	FREQUENCY OF OCCURRENCE	NORMALIZED FREQUENCIES IN % OF TOTAL SUM OF FREQUENCIES
produção	production	8131	3,210040308
Brasil	Brazil	7106	2,805380203
produtos	products	5967	2,355713998
pagamento	payment	5847	2,308339156
ser	being	5441	2,148054276
valor	amount	5183	2,046198366
óleo	oil	4928	1,945526828
Ltda	Ltd	4726	1,865779178
investimento	investment	4613	1,821167869
sobre	about	4265	1,683780828
pregão	cry	4179	1,649828858
processo	process	4026	1,589425935
civil	civil	3706	1,463093024
peçoal	staff	3485	1,375844358

TABLE 1. SAMPLE OF A FREQUENCY TABLE FROM R

From these long frequency lists, the analytical team identified the words that should be taken out: prepositions like ‘the’, words such as ‘like’ or ‘such’, or auxiliaries like ‘will’ or ‘shall’ – connectors, generally. In the table above, ‘ser’, which means ‘being’ in Portuguese, was for example taken out of the list.

The analytical team also drew up a ‘focus list’ of the main key words to be sent back to the technical team. This refined list was necessary in order for the visuals generated through R to be readable. These were identified on the basis of the meaning they conveyed, the relevance to the topics, and their frequency (which would have to be among the highest). Secondary focus lists were also identified in case many other words from the original frequency list were pertinent.

Within these two ‘focus lists’, the analytical team then looked for words conveying a number of potential topics or clusters, based on the lexical fields these words could be intuitively connected to. Indeed, many highly frequently mentioned words typically connoted a dimension that could be clustered.

CLUSTERS	EXAMPLE OF WORDS
Commodities/Resources	Palm, oils, water, food, vegetable, rice, coconut, products, biodiesel
National focus/Political/Institutions	National, Brazil, region, South, state, government, law
Industry/Machinery/Logistics	Industries, material, process, fabrication, packaging, supply
Economic	Company, trade, consumption, production, service, business, price, export, import
Environment	Natural, air, species, land
External focus	Worldwide, international, countries, Europe
Health	Health
People/Society	People, life, school, university, society
Indicators/Admin./Time	Time, years, level, number, period, month, rate, increase, million, tonnes, hectares, office
Unclassified but recurring	Development, technology, science, data, information, Internet, system, new, quality, control, management, responsible

TABLE 2. SAMPLE OF WORDS FROM MAIN FOCUS LISTS REFINED IN CLUSTERS

Word clouds could be generated for each year from the entire frequency list (top 100), as well as for the entire period (2007 – 2014) based on the main and secondary focus lists. Looking at each yearly word cloud, we were able to identify and compare the prominence and appearance of some words both in general *and* over time.⁹



FIGURE 1. EXAMPLE OF A WORD CLOUD FROM R (HERE SHOWN FOR INDIA, "PALM OIL" SEARCH, RESULTS FOR THE YEAR 2009)

The words of the refined ‘focus list’ were also processed to produce a correlation chart, generated each for the entire period selected in this study (2007–2014) and for each year:¹⁰

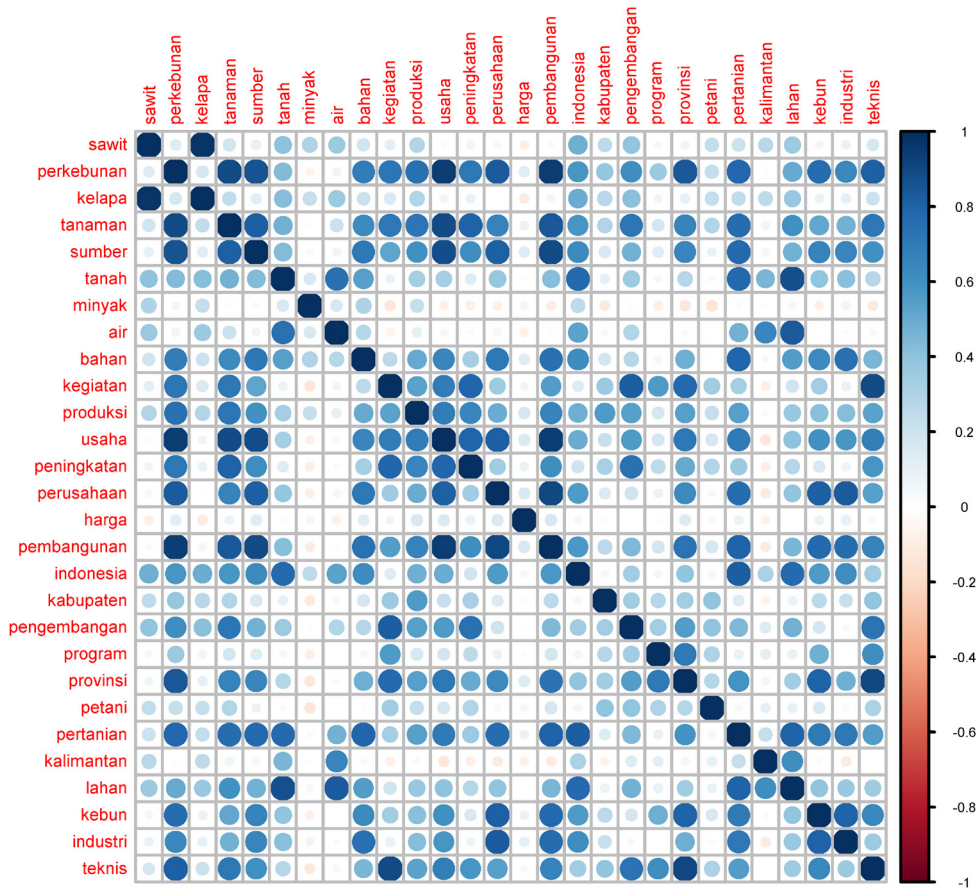


FIGURE 2. EXAMPLE OF A CORRELATION ‘BUBBLE’ CHART FROM R (HERE SHOWN FOR INDONESIA, “PALM OIL” SEARCH, RESULTS FOR THE YEAR 2013)

This graph shows the correlations between the main key words. One was generated for each year since 2007, and for the entire period. The bigger and darker the circles, the higher the frequency of co-occurrence between those two words. The coefficient for correlation appears on the legend on the right.

Next to those word clouds and correlation charts, the clusters identified by the analytical team for the focus words were processed into three more visuals, generated

each for the entire period selected in this study (2007–2014). Most visuals presented here required zooming in for analysis.

The first one (see an example below) presents the number of occurrences for all main focus words in the same bar. This is useful to see how many focus words were found in the research and overall how, over time, our clusters have evolved.

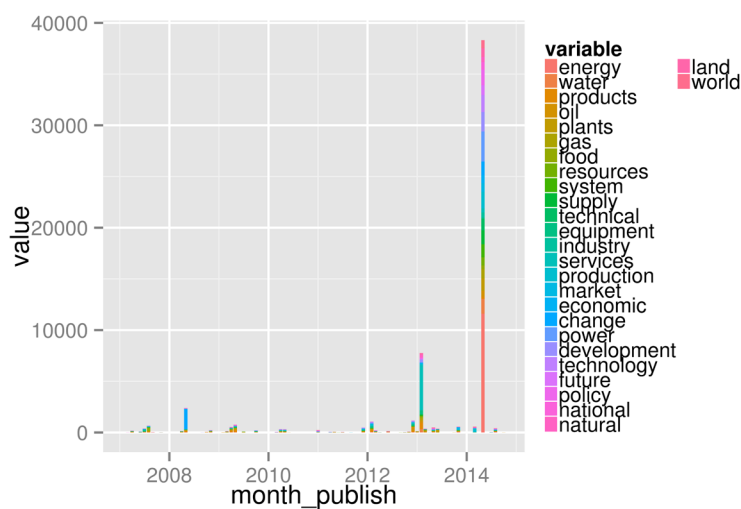


FIGURE 3. EXAMPLE OF THE FIRST HISTOGRAM OR STREAMGRAPH FROM R

The value indicates the number of occurrences of all focus words (for example, as shown in the figure above, from 0 to 40.000), and the colors in the bar represent each word shown in the legend. Fewer occurrences in some years may be explained by the fact that fewer documents were found. Inevitably, there has progressively been more resources made available online between 2007 and today. Based on the example above, we note that in early/middle 2008, the bar exhibits a value of around 2.500 (1/4 of 10k graduation). This means that in the documents found in this period, 2.500 overall occurrences of focus words were collected.

In this particular case, there are few occurrences from 2007 to 2013, and then a huge amount of occurrences in 2014. This is due to the fact that we have found few documents from 2007 to 2013, but a lot of documents for 2014.

In the beginning of 2014, we identify a huge peak – though it seems difficult to distinguish which cluster is more important. And in the beginning of 2008, we note a

peak with much blue, suggesting that the economic dimension was particularly salient in the discourse – words such as ‘market’, ‘economic’ or ‘change’ seem to have been referred to frequently.

A second graph presents the number of occurrences for each focus word throughout the entire period (scale from 2007 to 2014).

Taking the figure below as an example and zooming in on ‘plants’, this word is seldom used in 2008, then used a little in 2013, and then used even more in 2014. The value is the number of occurrences (from 0 to 12.000). We see that ‘plants’ in 2014 occurs around 1.500 times.

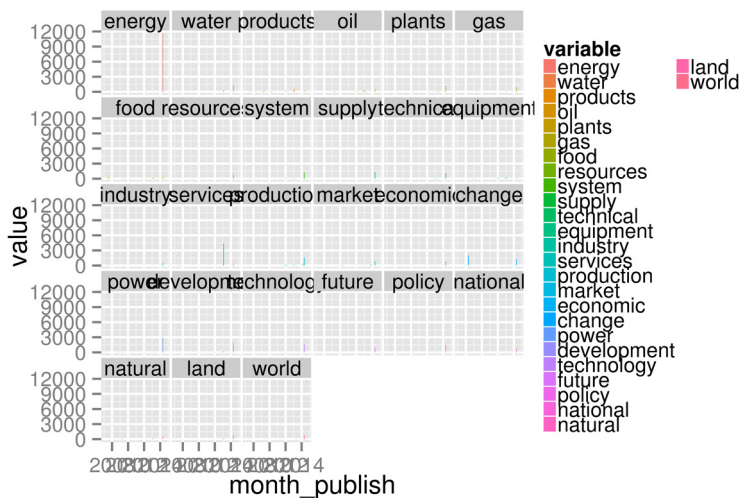


FIGURE 4. EXAMPLE OF THE SECOND HISTOGRAM OR STREAMGRAPH FROM R

The third graph is a ‘stream’ that shows the repartition and importance of the main list’s words in terms of presence or occurrence over time. Value 1.00 stands for 100%. 0.1 in the graph represents 10% of all main focus words’ occurrences.

Taking the figure below as an example – in the end of 2008, there is a limited ‘pink’ zone at the top, suggesting that a word like ‘energy’ is not often mentioned (less than 1%). In the same period, the huge orange zone means that words such as ‘products’ and ‘oils’ represent more than 50% of the total frequencies of the main focus words that were cited (at some point the orange zone goes almost to the top, representing

almost 90%). We note that there are a lot more references to commodities (as shown with the orange cluster) than what shows up in green. A large blue share is economic and remains so over time. In this graph, we find again the blue zone from the first graph in the middle of 2008: words such as ‘market’, ‘economic’ and ‘change’ **represent** around 80% of all focus words’ occurrences.

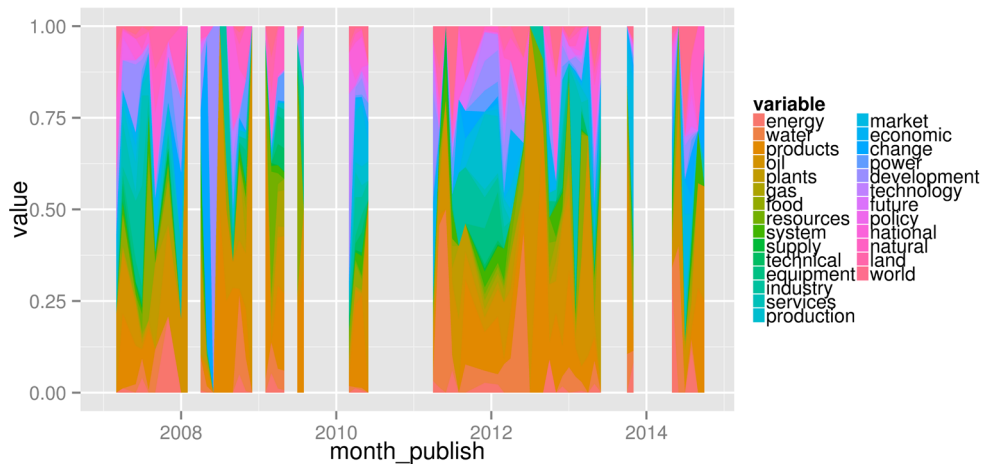


FIGURE 5. EXAMPLE OF THE THIRD HISTOGRAM OR STREAMGRAPH FROM R

R also generated advanced correlation diagrams such as the one shown below, each generated for the entire period selected in this study (2007–2014) and for each year. They would enable a more in-depth analysis of the first correlation chart. They show the strength of correlations between pairs of words, with a proportionality line (bottom left half of the graph), and a coefficient of correlation (top right half). The bigger the figure, and the more linear the line: the most important the correlation in terms of co-occurrence of both terms.

These were not used in our analysis, as they were too difficult to render accessible in terms of readability and user-friendliness. They however provide more strength to the reliability of our results.¹¹

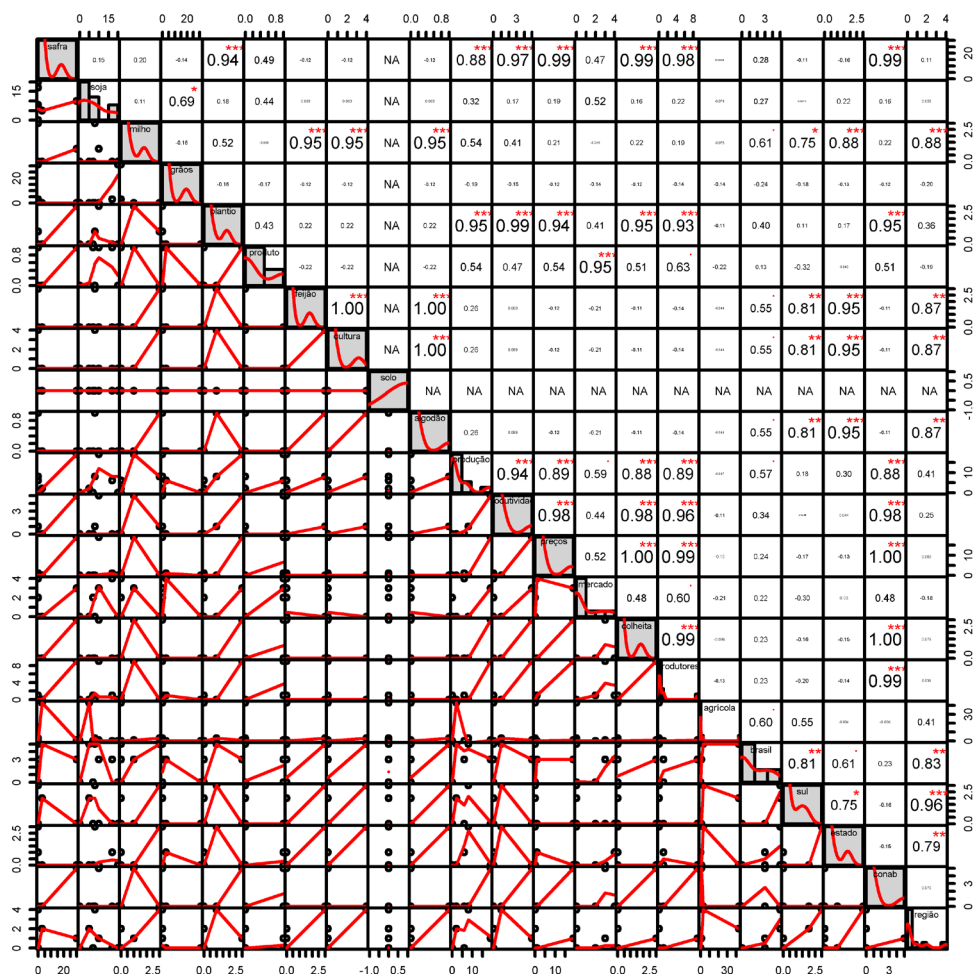


FIGURE 6. EXAMPLE OF A CORRELATION DIAGRAM FROM R

Second research strand: Textmining with topic modelling

In 2012, HCSS started using a new open-source text analysis tool called Papermachines.¹² The great advantage of this tool is that it is a plugin to one of the most popular open-source bibliographic management programs currently available: Zotero. It allows scholars to automatically download the bibliographical information as well as the actual underlying document from various full-text databases (such as Google Scholar, EBSCO, etc.) in a database format that can subsequently be used for formatting footnotes and bibliographies. Besides this use for bibliographical management, Papermachines can also use this bibliographical information to textmine

the underlying documents and to look at trends over time in the main topics that emerge from a set of documents – based on clustering algorithms that are very similar to those used in other textmining tools. Using contextual clues, topic models can connect words with similar meanings and distinguish between uses of words with multiple meanings. For a general introduction to topic modeling, see for example *Probabilistic Topic Models* by Steyvers and Griffiths (2007). Papermachines thus provides a ‘picture’ of a Zotero library’s contents, allowing the user to compare collections, identify patterns, and assess the topics on which the material is mostly focused.

For this project, HCSS developed a tool that allowed us to import our selection of studies into Zotero, and to then analyze those with the Mallet topic modelling tool that is available within Papermachines. Topics are terms that tend to ‘travel together through the texts’ – i.e., they co-occur more frequently within the same documents than one would expect probabilistically.

The process starts by downloading (‘crawling’) all the retrievable text-based webpages from the five countries’ websites. Once the initial set of webpages is downloaded, the technical team parses these pages to extract the key elements from the search formula that would be required for the analysis: month, year, title, text, governmental source. The process includes two steps: first, collecting URLs and creating a dictionary with key values (a list of all articles about soy or palm oil); second, extracting text for each article and filling these values with all the features, adding all the details to the database. Each scraping process is tailored to each of the governmental websites: one scraper retrieves links from search results from the websites; one parses HTML, PDF, DOC pages of retrieved results; one non-relational database saves the retrieved information; one algorithm is used to convert the database in BibText format.

All those elements are stored in an online ‘mongoDB database’ on the HCSS Off-Base (Database of Official Documents). The topic modelling tool then goes through all documents and tries to ‘learn’ (without any preconceived notions) which topics are important. Those topics were subsequently visualized in ‘streams’ supposed to convey the waxing or waning importance of these clusters over time. These topics and these visuals served as the basis for the analysis by the entire analytical team and then the reporting.

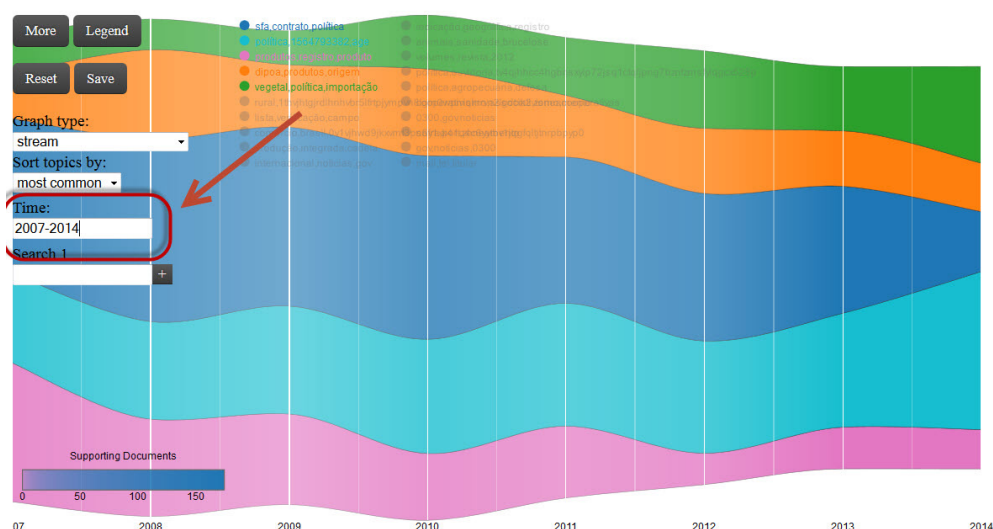


FIGURE 7. EXAMPLE OF A STREAMGRAPH FROM PAPERMACHINES

The horizontal axis shows the time in years, whereas the vertical axis represents the relative importance of the different topics within the entire set: ‘wider’ streams are more important, ‘narrower’ ones less. The legend of those color-coded ‘streams’ can be found on top of this streamgraph. For each stream, the main three words that dominate that topic are displayed. More details can be generated for each stream in the form of ‘word clouds’ like the following one:



FIGURE 8. EXAMPLE OF A STREAM WORD CLOUD FROM PAPERMACHINES

Each word cloud represents the most important words that ‘traveled together’ through the various documents and therefore were identified as forming a topic. The word cloud is color-coded to correspond to the color of the ‘stream’ it explains. The size of the words reflects their relative importance within this stream: larger ones are more important than smaller ones.

2 FINDINGS AND ANALYSIS

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2 FINDINGS AND ANALYSIS

In this chapter, we try to faithfully reconstruct the main topics that are contained on the websites of the various ministries and how these have changed over time. In essence, we let the websites tell their stories.

The first section provides some context and information that readers will find useful to make sense of our findings. The second section includes the results of textmining with R. The third section draws on the results of textmining with topic modelling.

2.1 Contextual information

Brazil

Across the textmining results generated from R, the lack of semantics identified for the environmental dimension was remarkable, particularly with respect to soy and Brazil. Indeed, Brazil has a reputation for tackling deforestation and reducing greenhouse gas emissions, caused by agricultural production in general. There are signs of a significant commitment towards such issues. For instance, NGOs and private sector actors have set up a moratorium on trading soybeans from the Amazon's deforested areas (renewed in 2014), and strict laws on forest protection aiming to reduce deforestation have been adopted (though bearing in mind that this 'Forest Code' has already been subjected to controversial changes). Members from the Agricultural Council of the embassy in Brazil provided information to explain this.

It is Brazil's political setting, attitude and philosophy that explains the fact that our output barely suggested a governmental focus on sustainability priorities. Firstly, Brazil's agricultural model is based on inclusion, meaning that it emphasizes the importance of ensuring the environmental sustainability of all products, rather than that of specific niche markets (e.g., more expensive products with a sustainability logo). This implies taking slow steps for everyone instead of, for instance, focusing on one product only. Secondly, Brazil's environmental and labor laws on production

already are very strict, and there has been a major forward stride towards sustainable agriculture in production. These are constantly referred to and stringently defended at the international level such as in global forums. At the same time, sustainability being generally held above legal requirements and regulations, the government tends not to interfere in this matter. Thirdly, it must be mentioned here that there is a lot happening in Brazil in terms of relevant, influential discussions. They mostly take place among other actors that are not part of the scope of this study. NGOs and the private sector are playing a strong role in discussing environmental protection and sustainability. Business organizations, involved in international trade, do (and need to) mention sustainability issues. These third parties' influence in these matters is very palpable within the debate taking place in Brazil, much more than at the governmental level for the aforementioned reasons.

China

The Dutch Agricultural Council for China confirmed that the issue of sustainability is not broadly discussed at the governmental level. The emphasis is decidedly on the economy, food security, and supply chain security. Food security is a concern with respect to meat products, but not for soy as feedstock or veggie proteins. The strongest pressure to incorporate sustainability concerns in the official discourse comes from the Dutch NGO Solidaridad.

Martin Ma, China Director of Solidaridad Network Organization explains: "Regarding the coverage of governmental websites on sustainability of soy and palm oil trade, the Solidaridad China team did a quick survey. The results were not too surprising: there was very little or no coverage on such topic. The root cause may be, according to Solidaridad's analysis, that the Chinese government is very cautious when it comes to the topics of sustainability and the production and trade of soy and palm oil, because the government's ultimate goal is to ensure the stable supply of commodities, as food security is directly linked with political stability in the world's most populous country. The Chinese government so far hasn't seen the crucial link between sustainability and long term stable supply unfortunately.

Though silent on this topic, the Chinese government, however, is not against international initiatives such as RSPO and RTRS. For instance, COFCO is a member of RSPO, and recently Ju-long, China's largest palm oil importer, was certified to RSPO. And the semi-official China Soybean Industry Association is a member of RTRS. In May 2013, at the RTRS 8th annual conference in Beijing, the Ministry of Agriculture also sent in a vice minister to deliver a keynote speech, followed by a keynote speech by the Dutch Ambassador to China.

As China lacks land and water to ensure food security, the central government's overall policy is to, besides maintaining domestic production, encourage Chinese enterprises to "go global", i.e., to explore opportunities in upstream production regions such as South America, and Africa. To avoid potential conflict with local communities, the MOFCOM published in early 2013 a guidebook on external investment related to environmental protection. Earlier in 2011, China's National Development Bank conducted an extensive survey on agricultural investment environment in a dozen of African and South American countries, which included a summary of local laws on environmental protection. Basically, the Chinese government is becoming more aware of potential reputation risks regarding Chinese external investment, and I am sure the government will do more to help Chinese investors to behave better overseas."

Summing up, Mr. Ma senses that "the Chinese government at this point is still reluctant to openly endorse international sustainability initiatives such as RSPO and RTRS. Yet it is open to hear more perspectives. Thus for your information, Solidaridad, in collaboration with the Paulson Institute, TNC and WWF, has reached an agreement to build a consortium in China to jointly engage both the Chinese private sector and the Chinese government to create more demand for sustainable soybean produced in South America. And Solidaridad is also going to build a regional platform (India, China, Indonesia) on palm oil so that stakeholders in Asia (including government entities) can have regular discussions on how to most effectively promote sustainability in palm oil trade."

India

India is woefully short in meeting its vegetable oil demand domestically. The total production of vegetable oils in India is around 4.5 MMT (million metric tonnes), while the demand has now exceeded 10 MMT. India is now importing close to 60 % of all vegetable oils from countries like Indonesia and Malaysia, which makes up for a significant contribution to the foreign exchange deficit. India is the biggest importer of palm oil in the world, accounting for almost 21% of all palm oil output from Indonesia (77%) and Malaysia (21%). It imports 72% of crude palm oil (cpo) and 28% of refined palm oil, depending on the import tariffs and export tariffs in exporting countries. In the context of imports, palm oil stands out in the vegetable oil mix. Palm oil is widely available in large volumes at a very low cost from grower countries like Indonesia and Malaysia (biggest producers in the world), which makes it suitable for large scale importation into oil deficit countries like India and China. The market cost of palm oil is also the lowest among all vegetable oils, making it a viable option for mixed soft oils.

While the acreage of oil producing crops has increased at a steady rate every year, the demand has not corresponded to this rise and increased at a much higher rate, making costly vegetable oil imports a necessary reality. Sunflower, rapeseed and cottonseed oils dominate the output mix in India, accounting for almost 85 % of the total produced. Even though palm oil is the most widely consumed vegetable oil in India, it accounts for a very little part of the locally produced oil, due to unfavorable growth conditions in most parts of the country. All year round, oil palm requires precipitation and black soil with humus rich topsoil, conditions that are not widely available in India – except for parts of Kerala, Andhra Pradesh and certain North Eastern valleys. This means that palm oil production in India is limited by irrigation and macro nutrients availability, and has to be grown in a relatively controlled manner, as opposed to the ‘plant and forget’ style cultivation in Malaysia and Indonesia.

In addition, the long gestation period of four years before trees start bearing viable means that it is not that attractive to farmers in India, who are mostly smallholders and do not have economic means to wait four years before the product can be sent to mills for crushing. The lack of a guaranteed income through supply agreements between farmers and palm oil millers/processors is also an issue in the context of enhancing oil palm farming in India.

To counter this import dependence, India has tried to introduce a multitude of agricultural programs at the national and state or governmental level with the objective of increasing the total oil output. Programs like OPDP (Oil Palm Development Program) were initiated in the mid 1990s, just after the economy was liberalized to boost local production and reduce import dependence with limited success. As the Indian economy kept expanding, the purchasing power of the general population also correspondingly went up, contributing to increasing consumption and the consequent demand for vegetable oils.

Soybean scenario

- Non genetically–modified, family–owned, smallholders cultivation;
- Number 5 producer in the world, number 4 in export;
- 6–7 million families produce soy on 10–12 million hectares of land

In India, soybean has a major oilseed crop and subsequent government efforts are put in for sustainable production. In a country where more than 40% of the population suffers from energy protein malnutrition, the crop can serve as an excellent source of high quality protein. As soybean is considered as a functional food, its inclusion in

routine diet is capable of providing overall health security to the Indian masses and the advantage thereof can be taken. To make India self-sufficient in edible oil production, soybean has to play a key role as the most important oilseed.

Through governmental agencies like the Directorate of Soybean Research (DSR) and All India Coordinated Research Project (AICRP), leadership is provided at the national level, both for conducting basic and strategic research as well as empowering and enabling cooperative centers in different climatic zones with respect to the production of improved varieties.

The Government of India is also initiating some measures for domestic reforms in agriculture too, with the objective of increasing the participation of private sector. Sustainability is also one of the emerging challenges that the soy sector is dealing with. The mission of the Indian government is to enhance and sustain soybean production and productivity through relevant crop improvement, production and protection technologies.

NGOs are also active in assisting small farmers in India to produce soy based on environmentally sustainable management practices. Solidaridad, for instance, has a Farmer Support Program (FSP) dedicated to this.

Indonesia and Malaysia

The following elements help in making sense of the descriptions generated from the textmining results. Information was gathered among members from the Dutch Agricultural Council for Indonesia and Malaysia.

On the political and administrative levels, the conversation on palm oil in Malaysia always boils down to financial and economic aspects, more than in Indonesia.

Currently, Indonesia feels very much under attack from Western countries, in particular the EU. Sustainability concerns are seen as a trade barrier. Indonesia and Malaysia disapprove of the compulsory ingredient labeling for plant oils in the EU, and the anti-palm oil sentiment of Western consumers, especially in France (where the label 'no palm oil' tends to be put on some products). This is due to concerns over health – as palm oil contains high saturated fat – and the environment (deforestation and other practices damaging ecosystems). Both countries see this 'black campaign' to reduce palm oil consumption as a way to promote the EU's own rapeseed and sunflower oil at the expense of Malaysian and Indonesian oils. Biodiesel is also subjected to this

campaign. The EU is criticized for its lack of knowledge about RSPO and other sustainability schemes.¹³

Large corporations that have made commitments regarding sustainable sourcing (such as Unilever) are gradually moving towards traceability – that is, land rights, origin, or which corporation it is from. Traceability adds to requirements of sustainable agricultural practices and certifications (e.g., RSPO–certified palm oil). Responsible sourcing of palm oil has in fact increasingly become ‘a race to the top’. In other words, many palm oil producing and processing industries and companies such as IOI, Unilever or FrieslandCampina add traceability as an extra element to their commitments towards sustainability and their image–building.

Traceability and sustainability schemes are difficult to deal with for smallholders. This implies that Western companies tend to buy from large companies, or to get their own palm plantations. But smallholders are also part of the solution towards implementing traceability and sustainability schemes, with many policies and projects from both public and private parties being particularly designed to help them become part of sustainable chains (of custody) and to improve their livings.

There are regular forest fires on the island of Borneo. That has a variety of causes, from individual smallholders to preparatory work for plantations. The haze of fires is reaching Singapore. Indonesia has been pressured by Singapore to act against forest fires and has signed agreements to do so.

In Malaysia, the institutional infrastructure (in terms of contracts, permits, enforcement, etc.) is more advanced than in Indonesia. However, the regions of Sarawah and Sawa are largely independent. They do not comply with Malaysia national institutions. They thus sell much of their palm oil to China and other countries that are less concerned with sustainability and traceability than Western markets. In Indonesia, although the regulatory framework seems fit, in reality there is not much happening in terms of sustainability improvement.

In both countries, local communities afford a limited priority to sustainability. The pressure is coming from the West.

In Indonesia, the reliance on palm oil is expected to only increase, as it will rise up to 20% of biodiesel (it is now 10%).

2.2 Textmining with R

This section presents the findings of the Google search generated based on R, retrieving information across and from all webpages that emerged when searching for soy and palm oil. The general output gathered from the search (including the visuals), and the way we structured it to be able to identify a number of common themes are described in the Technical Appendix. In this section, we present the main findings and results that can be observed from the data and visuals per country, and attempt to draw a number of conclusions where we felt there was sufficiently strong evidence to support these. We conclude with some cross-country comparisons.

Brazil and soy

Introduction and data

Brazil is the world's second largest soybean producer, producing 82 million tons of soybeans in the 2012/2013 harvest, the equivalent of 30,6% of the world's total production. The country is also the world's largest soy exporter, covering almost 40% of the world's exports of soybeans (37,9 million tons).¹⁴ Improvements in production techniques and methods, the insertion of new technologies and the use of improved seed are some of the reasons behind the increasing Brazilian soy production.¹⁵ This upward trend is likely to remain; by 2023 Brazil's production is expected to be of 123 million tons. Brazilian authorities and authors are confident that the progressive production increase will be mainly driven by productivity gains and not just through arable land increase; which is expected to increase but at a slower pace than productivity gains.¹⁶ Most Brazilian exports are directed to China, followed by the EU-28.¹⁷ 2014 has witnessed one of Brazil's best harvests, boosting the country's economy.

But in terms of environmental concerns, this boom in production comes with a cost – accelerated deforestation. In addition, agro-chemicals (such as the herbicide paraquat, banned in Europe¹⁸) are still used by Brazilian soy producers. Soy production severely affects surface water in Amazon and Cerrado, and rivers are becoming waste drains.¹⁹ In recent years, changes in production have tried to reduce the ecological footprint of this production. Indeed, currently around 75% of soy production makes use of the Biological Nitrogen Fixation (BNF), which is an important tool to reduce the use of toxic fertilizers, energy consumption and general achievement of a more sustainable production.²⁰

The purpose of the research is to understand the significance of the discourse on sustainability priorities of the Brazilian government on soy. We obtained data and information using the query 'soja site:gov.br' (English: Soy site:gov.br) for the period

between 2007 and 2014. This allowed us to examine 1) the frequency of soy-related topics mentioned across governmental websites, 2) which agents (including those from the government) appear to be mostly engaged in the soy business in Brazil, and 3) the priorities of the Brazilian government regarding the soy business and industry.

Based on the search results, we identified three major official websites that seem to be the most involved (or at least ‘vocal’) with respect to soy in Brazil. These include the Ministry of Agriculture, Livestock and Food Supply (MAPA); the Presidency; the Ministry of Development, Industry and Foreign Trade and the Ministry of Agrarian Development.²¹

Main findings

The Brazilian discourse on soy reflects an agricultural model rooted on production-based sustainability schemes. Its approach with respect to soy is mainly an economic and technical, industrial one. Over time, we note a significant emphasis placed on several economic dimensions of soy production and its correlation with other grains produced in Brazil (e.g., corn). A sustainable and steadily increasing production is essential to meet the internal demand for soy products, and consolidate Brazil’s position as one of the main soybean exporters.

The strategy includes innovation and technology, which appear to be important elements in increasing soy production and quality. There are indeed very relevant to the word ‘production’, which quite often travels alongside the word ‘productivity’. The correlation between both words reflects the goal of continuously augmenting production through productivity. Achieving a mature production model requires productivity gains, which production increases rely on. State-driven technological innovation is thus quintessential to boost production by reducing soybeans exposure to risks (e.g., plagues) and by developing new solutions to increase productivity.

It is worth adding here that a lot of attention and efforts are being directed towards making a better use of the millions of degraded hectares of land, by converting them for agricultural production, and increase opportunities for production and productivity growth while preventing more deforestation of other lands.

References to management and planning are consistent, indicating a strategic thinking in the development of soy production. In this regard, national guidance appears significant.

We note the limited significance of the 'Environmental' cluster. This result may seem surprising at first glance, considering Brazil's talks of environmental sustainability on the international scene. But they make perfect sense when considering Brazil's agricultural production model, based on economically sustainable schemes rather than on environmentally sustainable schemes. There are several reasons that can be put forward. Governmental policies emphasize a gradual approach to the agricultural model in order to level up its farmers. The government fosters this model as inclusive, that is, by emphasizing the importance of ensuring the environmental sustainability of all products. Indeed, sustainability being generally held above legal requirements and regulations, the government tends not to interfere in this matter. These discussions mostly take place among NGOs and private sector actors. In addition, Brazil's environmental and labor laws already are very strict, and there has been a major forward stride towards sustainable agriculture in production.

FIGURE 9. WORD CLOUD INCLUDING WORDS FROM THE MAIN AND SECONDARY FOCUS LISTS (2007–2014) – BRAZIL

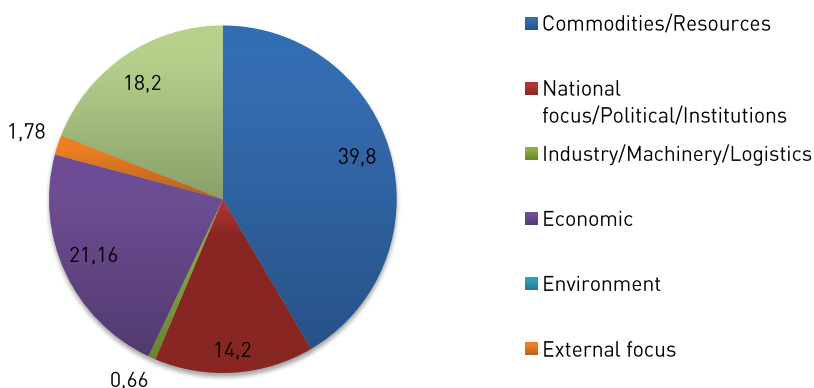


FIGURE 10. CLUSTERS IN % OF ALL CLUSTERS' FREQUENCIES - SOY, BRAZIL

China and soy

Introduction and data

China is the world's fourth largest soybean producer, producing 12.8 million tons of soybeans in 2012.²² The country is also the world's largest soy importer, with almost 60% of the world's soy trades going to China.²³ It is therefore a significant player in this sector. China's high soy import rate is due to the fact that the domestic soybean production cannot meet its growing consumption demand. Population growth has promoted the consumption of edible oil and protein. In addition, the rapid development of the crushing industry results in higher demand growth for soybean. In 2013, the total demand for soybean was about 73,8 million tons, which is 2,6 times more than in 2001. However, the surface of soy plantations and soy production in China are decreasing. In 2013, the soy planting area in China was 6,758 million hm², a decrease of 2,43 million hm² compared to four years before. China produced about 12 million tons of soybeans in 2013, a 6% decrease from the previous year,²⁴ and its net soybean import has grown from 0.92 million metric tons in 1996 to 58.06 million metric tons to 2012, which is equivalent to an annual average growth of 29.57%.²⁵

The purpose of the research is to understand the significance of the discourse on sustainability priorities of Chinese government on soy. We obtained data and information using the query '大豆 site:gov.cn' (English: Soy site:gov.cn) for the period between 2007 and 2014.²⁶ This allowed us to examine 1) the frequency of soy-related topics mentioned across governmental websites, 2) which agents (including from the government) appear to be mostly engaged in the soy business in China, and 3) the priorities of the Chinese government regarding the soy business and industry.

Based on the search queries' results, we identified four major ministries that seem to be the most involved (or at least 'vocal') with respect to soy in China: the Ministry of Commerce, the Ministry of Agriculture, the Chinese Agricultural Network and the Central People's Government.

Main findings

The Chinese discourse emphasizes the economic significance of soy supply. Commodity-related words such as 'product' and 'food' consistently appear in each part of our analysis, mirroring the significance of soy commodities in the Chinese diet and consumption. In addition, there is much to suggest that the government is strongly involved. Words pointing to a national or governmental focus not only have a high appearance rate, but also remain strongly correlated with other clusters or themes over time.

We also identify a shift in the focus of policy development regarding soy, from an ‘industrial focus’ towards an ‘economic focus’, or from a ‘domestic focus’ to an ‘international focus’. Prior to 2014, ‘development’ was often related to ‘production’ and ‘industry’, which could be associated with the increasing domestic production and industrial upgrades. In 2014, development became highly correlated with ‘export’ and ‘business’. The phenomenon could be attributed to China’s increasing reliance on soy imports and decrease in soy plantation.

The Chinese official discourse does not appear to emphasize the environmental dimension. China is facing the pressing challenge of a decreasing domestic soy production and rapidly rising soy consumption. Thus, the major focus of Chinese soy policy is rather straightforward: how to deal with the growing domestic demand for soy. It is mainly realized through maintaining a certain level of domestic soy production and importing. Therefore, the priority has been given to ‘economic balance’ rather than ‘environmental balance’.



FIGURE 11. WORD CLOUD INCLUDING WORDS FROM THE MAIN AND SECONDARY FOCUS LISTS (2007–2014) – CHINA

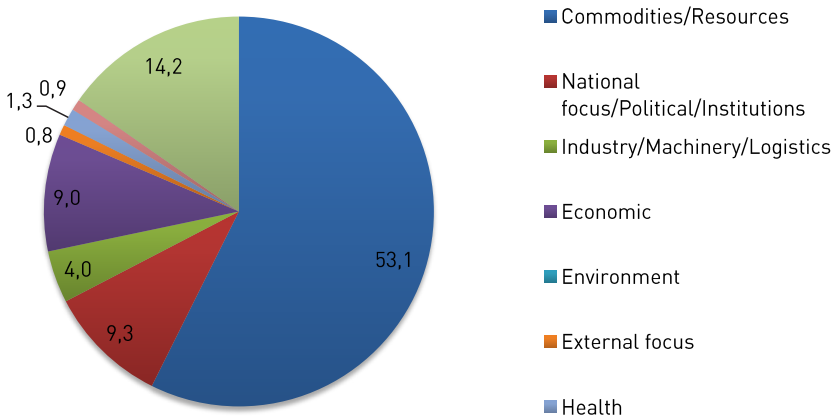


FIGURE 12. CLUSTERS IN % OF ALL CLUSTERS' FREQUENCIES – SOY, CHINA

India and palm oil

Introduction and data

Currently, India is the world's biggest importer of palm oil and is expected to hold that position as domestic consumption continues to rise. And as one of the highest edible oil yielding crops, palm oil is expected to help India attain vegetable oil security in the years ahead.²⁷ Nearly 60% of India's annual edible oil demand is met by imports, mainly of palm oil sourced from Indonesia and Malaysia. In more limited volumes, India also buys soybean oil from Latin America and sunflower oil from the Black Sea region.²⁸

The purpose of the research is to understand the significance of the discourse on sustainability priorities of the Indian Government on palm oil. We obtained the data and information using the query palm oil site:gov.in and palm oil site:nic.in for the years between 2007 and 2014. This allowed us to examine 1) the frequency of palm oil-related topics mentioned across government websites, 2) which agencies appeared to be most deeply engaged in India's palm oil industry and 3) the priorities of the Indian government for the palm oil industry.

Based on the search results, we found that the Directorate of Oil Palm Research, the Coconut Development Board and the Department of Agriculture And Cooperation under the Ministry of Agriculture, Government of India are the most vocal or engaged with respect to the palm oil business.

Main findings

The Indian discourse is concerned with the supply of commodities and resources. This reflects the large number of products and industries for which palm oil is used.

The discourse also has a strong economic dimension (particularly trade) which is only to be expected given that India is the world's largest importer of palm oil. The country suffers from a huge gap in its demand and supply capacities, and consequently has to import more than 65% of its demand for edible oils (which is primarily palm oil). Also, it is hardly a coincidence that India's demand for palm oil sky rocketed in the 1990s – it went from 100.000 to over 8.8 million metric tons in 2014 – at the time its economy was liberalized. Liberalization, along with globalization and privatization, reinvigorated the Indian economy, lifting millions out of poverty and improving living standards significantly.

While this focus on the economy and commerce is strong and sustained, India's palm oil discourse across official governmental websites remains almost silent as far as human security challenges and environmental issues are concerned. There were some

references to schools and education, research and development but no mention of the environmental cost of potentially damaging palm oil cultivation practices. Yet this should be considered as a matter of concern, especially since the Indian Government is now seeking to improve palm oil cultivation within the country, so as to meet the growing demand.

Over time, India’s palm oil discourse also seems to have become more ‘internationalized’ with increasing references to its major trading partners Indonesia and Malaysia. In addition, some other ‘Asian’ powers, such as Japan and Australia, are also mentioned. But this focus remains regional, as the West does not emerge from our results.



FIGURE 13. WORD CLOUD INCLUDING WORDS FROM THE MAIN AND SECONDARY FOCUS LISTS (2007–2014) – INDIA

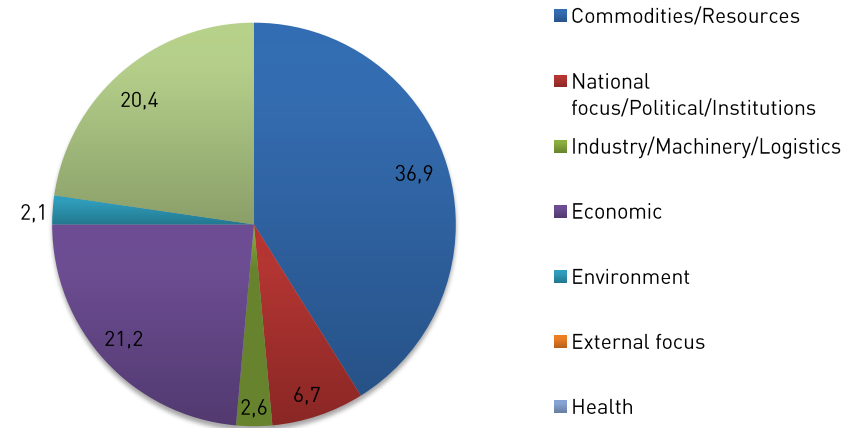


FIGURE 14. CLUSTERS IN % OF ALL CLUSTERS’ FREQUENCIES – PALM OIL, INDIA

Indonesia and palm oil

Introduction and data

Indonesia is the world's largest palm oil producer, providing half of the world's supply (28.400 million metric tons out of 56.233 million metric tons).²⁹ Its production has increased steadily since the 1980s due to the expansion of plantations. Indonesia is also the world's second largest palm oil consumer (7.913 million metric tons) after India. Indonesia features as one of the most important global player in the palm oil industry.

Because of environmental concerns and the threat of substitute products, Indonesia is seeking to increase value-added activities in this industry. The rate of deforestation as a result of oil palm plantation expansion has endangered directly its local environment and indirectly the global environment. Indonesia has the world's third largest tropical forest, yet it ranks second with respect to tropical deforestation (498.000 Ha/year).³⁰

Sustainability has thus become a very important element to maintain a balance between palm oil industrialization and environment preservation. According to the RSPO (Roundtable on Sustainable Palm Oil), sustainable certified products represented only 17% of the total production in 2013.

This research examines the extent to which the Indonesian government and its agencies have placed priority on sustainability issues regarding the palm oil industry, among other topics that may be discussed as relevant.

Main findings

The Indonesian discourse reflects a focus on the production aspects of commodities (including agriculture and resources) as well as the economic dimension (investments, pricing) and economic actors (companies), industrial activities, and their expansion. Some emphasis is placed on people, labor and society. Environmental concerns are not subjected to a particularly intense discussion, although there are signs that this focus is increasing over time.

Based on the frequency word list, we can conclude that the terms being discussed most frequently pertain to commodities (including agriculture and resources) and the economic domain (including production activities), while discoursing mentioning the people, society, environment and sustainability got less frequently discussed.

Commodities and economic terms are well-reflected in the histograms, and we note the emergence of the industrial cluster.

Research Focus Area	Percentage
Commodities/Resources	39,3
Economic	15,6
National focus/Political/Institutions	10,3
Industry/Machinery/Logistics	9,0
Environment	6,4
External focus	5,2
Health	1,8

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Malaysia and palm oil

Introduction and data

Malaysia is the world's second biggest palm oil producer (19.216 million metric tons) after Indonesia, as well as world's fourth consumer after India, Indonesia, the EU and China.³¹ The country suffered from the world's highest rate of deforestation worldwide among other palm oil producers (such as Paraguay, Indonesia or Guatemala) between 2000 and 2014: its percentage forest loss rate accounted then for 14,4% of its 2000 cover (Indonesia's is 8,4%).³²

Just as is the case for Indonesia, this environmental impact has become a major concern. Both countries have initiated the RSPO, the Roundtable on Sustainable Palm Oil which is currently based in Malaysia.³³

Main findings

The official discourse in Malaysia is focused on economic and national interests (identity, regions where plantations are located), as well as on energy. Environmental and social concerns are barely mentioned.

According to our analysis of the frequency word list, the terms most frequently discussed point to commodities (including agriculture and resources) and the economic lexical field (including production activities). Industrial activities are also discussed, to a lesser extent, as well as trade – from an exporter's perspective. Our histogram results also indicate the predominance of both clusters, and the correlations reveal the importance of the commodities, economic, industrial and trade patterns. Relevant activities seem to be described too, as indicated by the presence of words such as 'expenditure' and 'service'.

There is a strong reference to national identity as the word 'Malaysia' really stands out, but there isn't much discussion involving topics such as people, society, environment and sustainability. As observed for Indonesia, though, the word cloud analysis reveals that the issue of sustainability has progressively gained attention over time.



Several key topics have emerged across the selected countries' policy discourses. The variation of emphasis on these themes is highlighted in this section.

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Soy: Brazil and China

Brazilian official discourses point to the importance of a production-based sustainability scheme, whose priorities are national economic development, technological innovation and the improvement of productivity. Just as observed for China, they are not strongly characterized by environmental concerns when it comes to soy production – the angle is more economic, for reasons explained in the section ‘Contextual information’. We note the interaction of references to commodities and resources with references to market trends and production.

Similarly to Brazil, China does insist on commodities and resources, and distills a strong economic dimension within its discourse. One particular feature of the Chinese discourse is its strong national interest and policy angle, reflected in a (perhaps typical) governmental involvement. Also interesting, is the correlation of development with production and the market, indicating significant concerns for the challenge of a rapidly rising demand for soy and a decreasing domestic production.

Palm oil: India, Indonesia and Malaysia

India’s discourse suggests an emphasis on the product itself and relevant commodities, as well as on economic matters, particularly imports. The focus on environmental issues or human security seems very limited. Quite understandably as India is not a producer of palm oil, there is no focus on industrial processes.

Indonesia and Malaysia both discuss palm oil and other relevant resources. Economic, industrial (agricultural), technological activities are quite well represented in the discourse, too. The Indonesian official rhetoric is particularly characterized by references to industrial development. The enhancement of techniques which are necessary to achieve this expansion correlates with references to plantations. As far as Malaysia is concerned, an emphasis is placed on national interests and identity, the regions where plantations are located, and energy (closely interacting with finance, gas, imports and trade across the webpages). Environmental and social concerns are barely mentioned.

2.3 Topic modelling

This section presents the main findings of the topic modelling approach of this project. In the Technical Appendix, we include the visuals of the topic-modelling as well as our preliminary analysis for the five countries in alphabetical order. Our intention was to present a number of key takeaways, and the streamgraph with its different streams that reflect the most important and/or intriguing topics that were detected for each

country. This should include an analysis of the most striking observations our team was able to identify, and offer some comparative observations across countries.

As explained in the Limitations section earlier, and in spite of going to great lengths to produce the best results possible, we were not able to get all the 20+k articles that Google has indexed. Our results are thus based on a quite limited amount of data, which thus cannot reflect a clear and loyal picture of the official discourses. The file generated for India did not get processed at the time this report is being delivered. The objective for this section has then simply become to share a line of work that we expected to be more promising, but that does reveal additional information which could prove helpful when reviewed by the Dutch embassies' Agricultural Councils.

Brazil and soy

The sustainability of production increases appears to be an important topic on Brazilian official discourse. New technologies and innovation are crucial to achieve the objective to increase production required to satisfying growing demands, in order to remain a major soy producer and exporter. Biotechnology (e.g., modified genetic seeds) and new methods of organizing the soy productive chain are necessary to mobilize to increase production and assure certified quality standards. China is the largest importer of Brazil's soy. That position is reflected in the official discourse, and is gaining importance by the year.

The analysis for Brazil is based on 599 files, including 460 with no date stamp. 215 texts, in Portuguese and dating from 2009 until 2014 were extracted into

China and soy

Our results for this exercise were not closely related to the sustainability of soy in China. Rather, security issues seemed highly addressed, as suggested by the presence of 'weapon' and 'nuclear' in 9 of the 15 topics identified. Yet here, it seems difficult to connect both terms with anything that may be relevant for soy. The economic dimension is also significant in the Chinese official discourse, with words such as 'economy', 'trade' and 'financial' frequently identified. These often travel together with words such as 'government', 'nation' or 'national'.

It seemed difficult to determine the official perspective regarding soy in China, due to the limited results that we managed to process, and given these were rather loosely related to our research topic. Two themes still stood out – they concerned environmental and social dimensions. Both have increased in significance since 2009.

They may not be as strongly represented as the economic and security dimensions, but seems to have gradually received more attention from Chinese officials.

We obtained 1.561 web items reflecting the Chinese official discourse on soy for the period between 2007 and 2014. 24 texts were correctly processed for this specific topic modeling, which seems much too limited compared to the original number of items. It was still possible to identify several topics that commonly appeared, 15 of which being of equivalent weight (0,01% of the corpus). Yet such limitations in the results should be examined carefully, and did not prompt us to analyze the output in-depth.

Our results are only remotely related to soy or soy sustainability in China. The three most common topics discussed in the Chinese official discourse are closely related to political, financial and human rights issues (each weighing about 0,01% of the total corpus). The word 'financial' appears in each of the three topics' word clouds (as shown in the figure above). The results also suggest that the government is strongly involved in each topic. The word 'nation' indeed was found in two of those, and the word 'policy' in the third word cloud.

Looking at the original links and sources for these topics, we find that the first and third main topics were extracted from the website of the Ministry of Land and Resources of the People's Republic of China. Interestingly, the word 'human', 'rights' and 'issues' are the most salient words in the second main topic, indicating that these have become an important concern for the Chinese government and policy.

We specifically analyzed two topics, the environmental and social ones. On the streamgraph, we can identify their upward trend since 2009, reflecting their growing importance within the Chinese official discourse. The topics include the words 'global', 'environmental', 'consumerism', 'sustainable', 'economy', 'December' and 'political'. These gather growing attention from 2011 to 2012.

Indonesia and palm oil

Our examination of the streamgraph shows that the official conversation on most of the topics identified has gained in importance between 2007 and 2014, with the exception of an 'environment' topic.

We note a prominent 'official' topic, which was less reflected in the findings from R. The other four clusters are relatively less important, particularly the theme connoting

concerns for the environment or sustainability. This suggests that although not ignored or absent, this dimension does not gather considerable attention from the Indonesian government.

For Indonesia, 2,156 official documents on palm oil were collected; 551 of these were extracted and processed through Papermachines.

Malaysia and palm oil

We identify a steady and modest attention on topics related to plantation, palm oil, trade and labor. Official discourses mostly and increasingly revolve around the topic of Research and Development.

The ‘Labor’ topic is remarkable for the specific words it includes: ‘child’ – ‘forced’ – ‘labor’, explicitly reflecting a major challenge. These did not emerge from the R output.

Interestingly, the word ‘plasma’ appears in a ‘Palm oil’ topic, referring to plasma farmers.

For Malaysia, 824 official documents on palm oil were collected; 515 of these were extracted and processed through Papermachines.

Cross-country comparisons

Several key topics have emerged across the selected countries’ policy discourse. The variation of emphasis on these themes is also highlighted in this section.

Soy

Brazil focuses on monitoring its production, and as such, bases this production on a holistic approach aiming at increasing productivity while ensuring the sustainability of agricultural practices and the agribusiness model. Brazil emphasizes research, and its major importer, China. Interestingly, concerns point to sanitation, health, quality and control of its products – which may not be surprising given Brazil’s position as major global exporter.

It is difficult to establish a fair comparison with China, given the limited output gathered. But the angles appear to reflect security, economic and human rights dimensions. There are some references to environmental concerns.

Overall, for Brazil and China, strong statements cannot and should not be drawn from this picture, due to the limited size of our sample.

Palm oil

While Indonesian discourses emphasize the role of policies, Malaysia's strongest focus is on R&D activity, as well as industrial activities to a lesser extent. Topics common to both countries include trade, land and plantation activities. Indonesian official websites clearly mention environmental and social considerations, while Malaysian references point to human rights issues.

3 SUMMARY OF MAIN FINDINGS AND RECOMMENDATIONS

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Brazil

Brazil is a major soybean exporter that emphasizes what is at stake economically rather than in terms of sustainability. State-driven technological innovation is a major driver to increase productivity and mitigate the risks soy production is exposed to – thus boosting production, and satisfying growing demands.

The remarkable absence of an environmental lexical field or perspective can be explained by the fact that governmental policies foster inclusion and a gradual approach to the agricultural model in order to support its farmers. It also reflects a general attitude that considers sustainability as beyond legal requirements. Brazil's environmental and labor law in production are already very strict. And important discussions on sustainability priorities are taking place among very active NGOs and private sector actors.

Many opportunities for the development of sustainable approaches to agriculture are already being seized by both Brazil and the Netherlands. A lot of efforts are already being made to consolidate a framework for improving the sustainability performances of Brazil as a major soybean exporter.

Brazil's strategy focuses on innovation and technology to increase soy production and quality. The discussion on how to improve sustainability can also focus on innovation and technology as tools for raising the standards and enforcement.

China

The Chinese discourse emphasizes the economic significance of soy supply, food security, and the involvement of the central government at many different levels. China is facing the pressing challenge of a decreasing domestic soy production and rapidly rising soy consumption. Dealing with growing domestic demands for soy is thus a predominant concern, rather than sustainability issues.

Sustainability is not yet a key issue in Chinese policy-making. The economy, food security and thus supply chain security are the main topics related to soy imports. With an economic and industrial focus, a dialogue on improving sustainability should address these dimensions.

India

The Indian discourse is concerned with the supply of commodities and resources, and the economic dimension (reflected by e.g., trade) is a major way in which palm oil is viewed by this major importer. India may seek to increase the role of private sector actors and technologies in agricultural production – areas that may set ground for discussion. Next to insignificant references to human security challenges and environmental concerns, India seems to focus its attention towards Asian partners.

The focus for India is largely directed towards import security and price developments. As the largest importer of palm oil (similarly to the position of the Netherlands), their import tax regime may have an influence on price development in Malaysia and Indonesia.³⁴

Indonesia

The Indonesian discourse reflects a focus on the production aspects of commodities (including agriculture and resources) as well as the economic dimension (investments, pricing) and economic actors (companies), industrial activities, plantations, and their expansion. Some emphasis is placed on people, labor and society in the first research strand's output. Sustainable agricultural practices remain less of a concern. The second strand reveals some consideration for environmental and social matters, next to the key role of policies and trade.

In the Indonesian perspective, sustainability concerns emerging from the West are seen as a trade barrier, and the EU is perceived as hindering fair competition.

The Indonesian government addresses mainly production capacity and expansion for a growing export. In line with expanding production capacity, a fruitful dialogue could address different ways of improving sustainability performance along the way of expanding production – especially because agricultural activities are often mentioned by the Indonesian government. It may be relevant to keep in mind some concerns that remain over small shareholders (farmers).

Malaysia

The official discourse in Malaysia is focused on economic and national interests (identity, regions where plantations are located), as well as on energy. Environmental and social concerns are barely mentioned in the first research strand's output, and do not emerge from the second set of results – which rather points to the importance of R&D, trade and industrial activities, as well as human rights issues (labor protection).

On the political and administrative levels, the conversation on palm oil in Malaysia always boils down to financial and economic aspects, more than in Indonesia.

As Malaysia mainly focuses on economy and national interests, then the issues of sustainability should also build on these notions. The global food processing industry, which has a large buying power, is raising its sustainability standards ever so more. In order to maintain the trading relationship with these global multinational companies, there is little choice other than to raise the bar for sustainability and traceability.

CONCLUSIONS

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We attempted to summarize the main findings in a way that would render more accessible and readable the complexity of the output generated by our textmining tools. The collaboration with members of Dutch Agricultural Boards proved extremely helpful in further analyzing and making sense of these results.

Perhaps one of the most surprising results of this study was that what was expected to stand out, turned out to be missing. The environmental dimension, concerns for society, human rights, health – human security as a whole, were not the main elements characterizing the official discourses of Brazil, China, India, Indonesia, Malaysia. These indeed appeared to be mostly concerned with economic sustainability, rather than environmental balance and human security as a whole.

China's discourse includes the role of central policies, and reflects the concerns of a soy importer over the challenges of a growing domestic demand and the economic implications of trade. For Brazil, this can be explained by its position as a major soybean exporter, primarily driven by the objective to protect its producers and increase its productivity and the quality of production through technology and innovation, in order to face the growing global demand. The fact that the scope of our study is limited to official discourses, it does not do justice to the very active discussions taking place among NGOs and private sector actors regarding sustainability and environmental issues. We also highlighted the general attitude of the government, which consists in treating sustainability as an inclusive matter, whose importance is above and goes beyond legal requirements. The strict environmental and labor laws that already exist in Brazil were also emphasized. It is therefore important to take these elements into consideration when examining our findings.

With respect to the other commodity, India's position as importer of palm oil also typically reflects concerns for economic aspects such as trade and pricing, rather than

the protection of the environment and human rights. For instance, the country does not directly deal with the consequences of expanding plantations. As exporters that heavily depend on external demand, Indonesia and Malaysia do not emphasize environmental and social dimensions as much as they discuss investments, resources, the role of companies, the position of small shareholders, production capacity, or the expansion of plantations.

Official commitments made by members of a country's Ministry of Agriculture at global, major conferences may resonate strongly and may influence significantly in our perception of these priorities – more so than statements formulated, written and published all year long on the official website of that same Ministry.

Our study brings some evidence of a gap between 'the walk and the talk', and of the possible bias in interpreting a country's position and priorities. We also provide a number of recommendations to help in addressing this broad range of concerns when communicating and working with these countries. This may complement and improve the way communication is built between the Netherlands and these countries, in order to foster a better understanding, allow for a more efficient collaboration, and lead to fruitful benefits.

ENDNOTES

ENDNOTES

- 1 Only English websites, due to limitations of big data analytics for Chinese characters.
- 2 See Annex 1 of the Technical Appendix for an overview of statistics on the production and export of palm oil and soy for the countries addressed in this study.
- 3 Round Table on Responsible Soy, RTRS certified products.
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