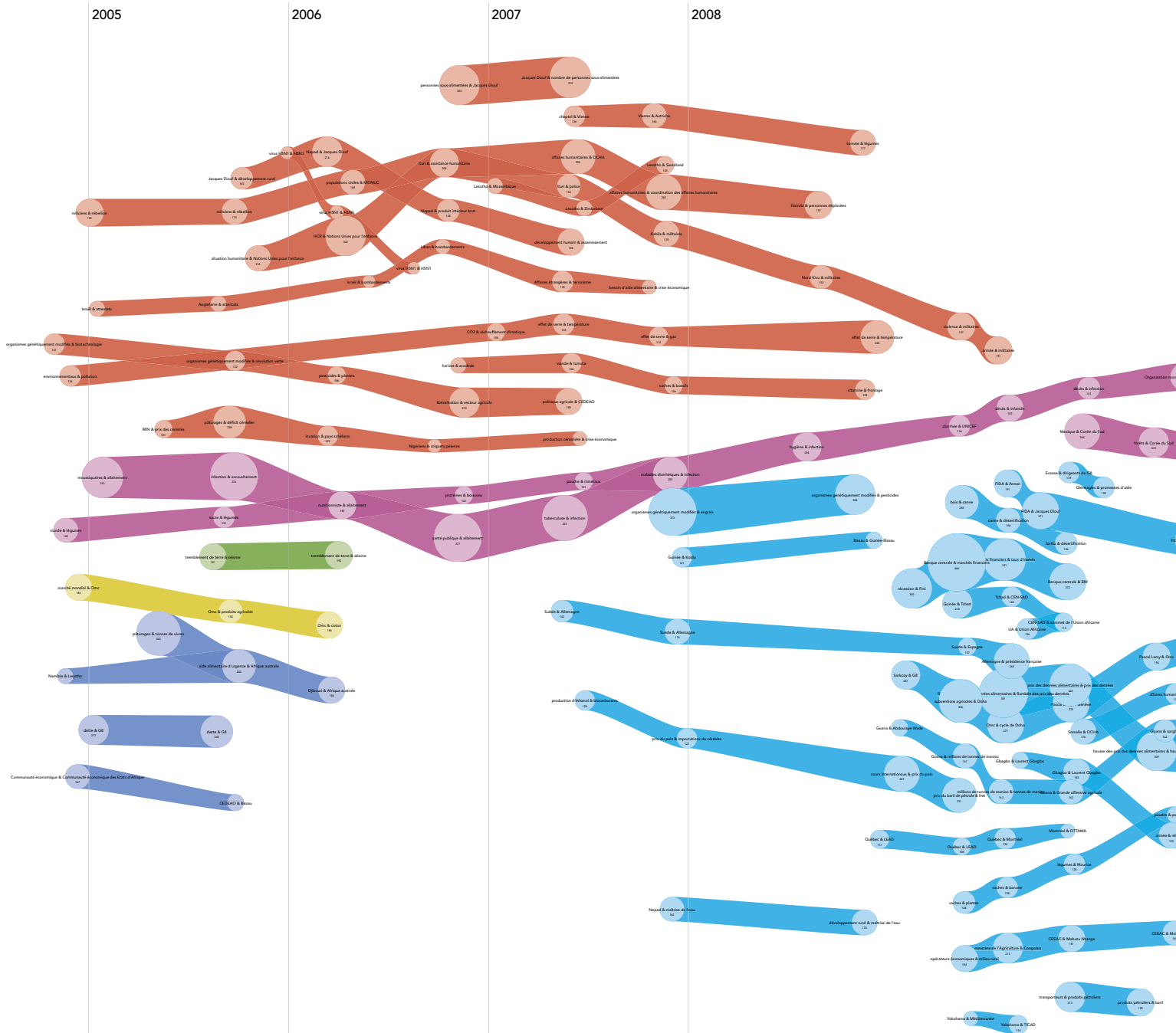
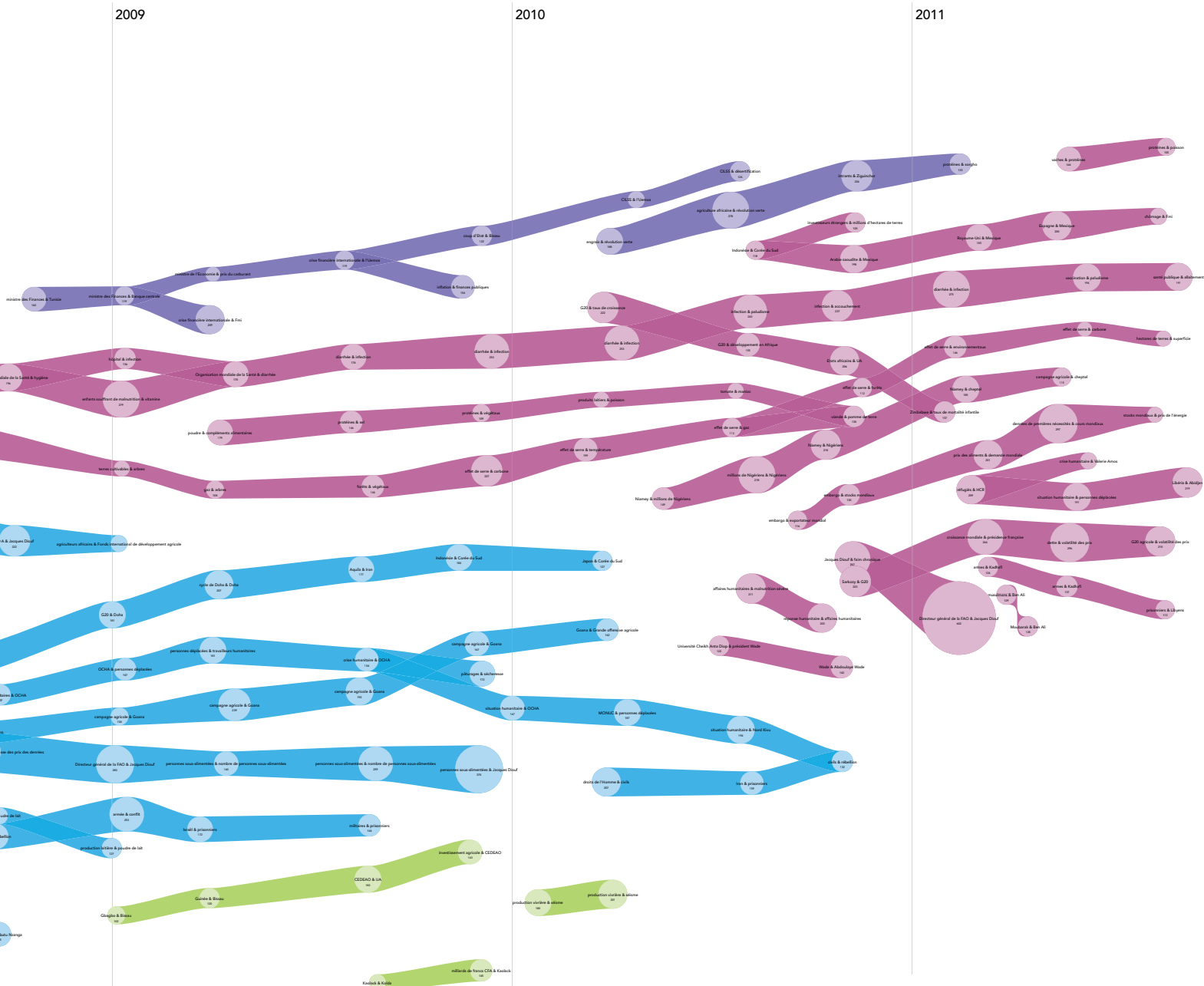


Streams of Media Issues

Monitoring World Food Security



This platform is a monitoring system for large corpora of press articles. It has been applied to a French-speaking corpus dealing essentially with food security. While the platform can be used as a simple browser, it also provides a series of analytical tools: by exploiting semantic dynamics, it is able to identify main media issues on a given topic. The specific instance of the platform which is being presented here depicts both the evolution of these food security-related issues in the 2000s and their geographic features on a global map.



This methods white paper arose from an on-going series of collaborative research projects conducted by the United Nations Global Pulse in 2011. Global Pulse is an innovation initiative of the Executive Office of the UN Secretary-General, which seeks to harness the opportunities in digital data to strengthen evidence-based decision-making. This research was designed to better understand where digital data can contribute to global development. This project was conducted in collaboration with the Complex Systems Institute of Paris Ile-de-France (ISC-PIF) and the Institute For Research, Innovation and Society (IFRIS).

For more information on this project or the other projects in this series, please visit: <http://www.unglobalpulse.org/research>

Methodology

Press corpus and lexical retrieval

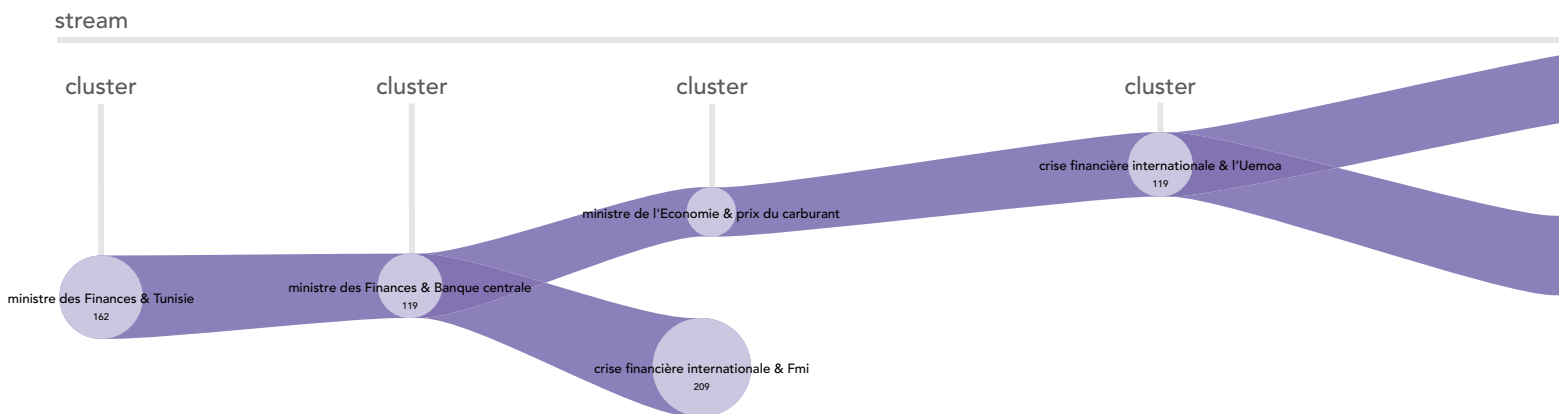
A press article corpus made up of around 20,000 articles published between 2004 and 2011 has been formed on the basis of a Factiva request. Textual content has been processed through lexical retrieval: each article has been turned into a list of terms. We suppressed terms which were too generic, and homogenized others, for instance by developing acronyms into their extended form. The corpus has been reorganized according to this final list of terms. Once **lexical retrieval** has been achieved, the corpus has been divided into 20 corpora of 1000 articles – a “period” – which have been processed separately.

Creation of clusters

The aim of lexical retrieval is to highlight frequent associations between terms. The most frequently associated words form **clusters**, which we label using the two most central terms of the cluster.

Linking clusters: drawing streams

Clusters are linked through a **stream** if they are likely descendants. In this case, “parents” and “children” have terms in common, identified by an intersection computation. Some clusters have no parents: in this case, a stream begins. Others have numerous parents: some streams merge into a single cluster. Numerous children may have the same parent: streams fork. Eventually, when a parent has no child, a stream dies. See figure 1 for an illustration of these concepts.



Filiations are determined by an optimization computation: only the most relevant streams are being represented on the interface. As is the case for clusters, stream names are based on frequency and centrality criteria. The number of streams is also determined by an optimization computation and their breadth depends on the size of clusters, which differs according to the number of relevant articles. Hyper-streams, i.e. groups of same-colored streams, emphasize a thematic similarity between streams.

Projection in time and space

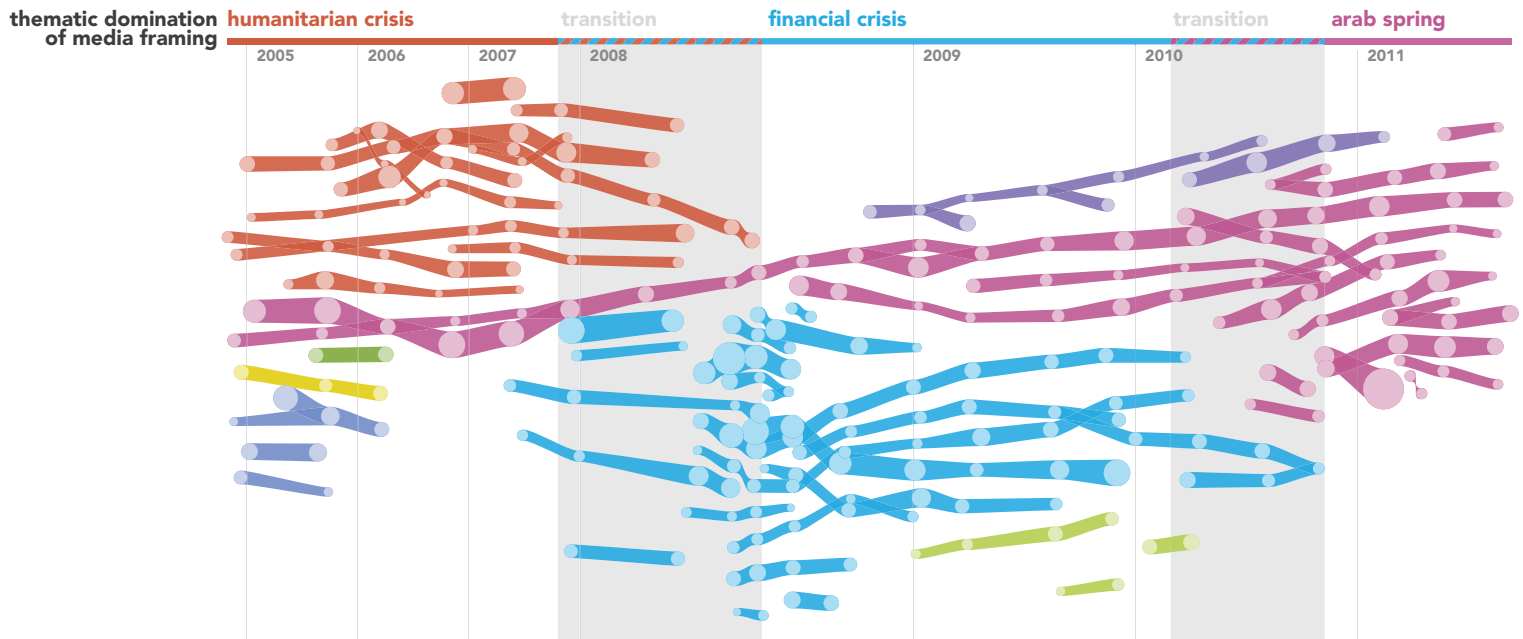
Clusters and streams are then projected onto a two-dimensional space, with time on the abscissa. It meets the following requirements: clusters belonging to the same stream are similar; at a higher level, two streams become visually closer when they share a growing part of common terms. The representation is stylized: relative distances are determined by an optimization computation. Since we retrieve geographical terms, we are also able to associate clusters with spatial information such as regional areas and countries. Note that this provides a spatial map of topics rather than a spatial representation of sources.

Scales of analysis

What kinds of interpretations can be made about each construct: hyper-streams, streams, and clusters? We will present them at a respectively global, medium and local scale and show how interactions between scales of analysis are relevant, especially in the case of the 2008 crisis.

The global scale: three sub-periods in the approach of world food security

Considering the relative positions of hyper-streams and their size, we notice that there are three main hyper-streams: a red one, a pink one and a light-blue one. Others (yellow-, dark-blue-, dark-green-, light-green- and purple-colored) are both remote from the core of the map and less cohesive. On these grounds, we can identify three phases: the blue hyper-stream appears in 2007 and gradually replaces the red one, ending in June 2008; then the pink hyper-stream, born in 2004, expands dramatically in 2010.



Hyper-streams gather different streams dealing with a common topic, but a closer look at streams is generally needed in order to make sense of these phases. The first and the third sub-periods focus on a local scale (famine is caused by an inefficient food production or distribution in a specific place) and a rather humanitarian conceptualization of the problem (food insecurity arises from political turmoil or natural disasters), whereas the second period features a mainly global framing (the food crisis is due to the rise in world staple food prices) and a more political stance (biofuels and speculation are here presented as likely causes of the 2008 crisis).

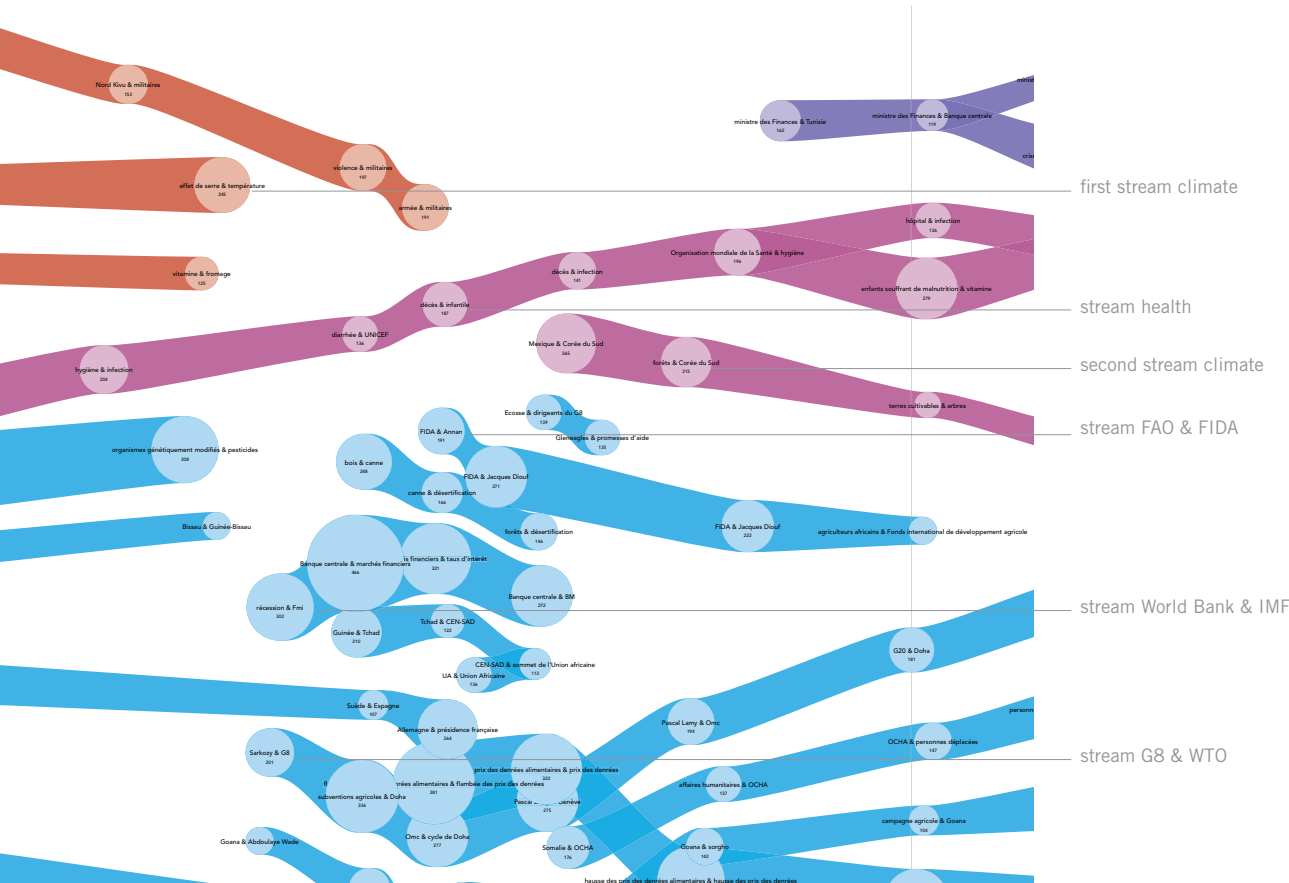
The **red hyper-stream** focuses on humanitarian crises due to natural disasters: in 2006, floods led to poor harvests in Southern Africa, especially in Mozambique and Lesotho where a cyclone occurred (see the “Lesotho – Zimbabwe” stream); in 2004-2005, locust attacks and drought threatened local food production in Niger, and to a lesser extent in some neighboring countries, such as Mali and Burkina Faso (see the “Nigerians – grain production” stream). Wars and conflicts are depicted as another cause of famines: the Darfur crisis and the political turmoil in Rwanda and Congo (see the “humanitarian situation – UNHCR” stream); but also the consequences of the Israel-Palestine conflict, both relating to the trade embargo against Gaza and the 2006 war between Israel and Lebanon (see the “need of food aid – economic crisis” stream). A third group of streams deals with controversies about the role of agricultural innovations in development: are GM crops the solution to persisting hunger (see the “CEDEAO – GMO” stream)? Is the so-called “double green revolution” (see the “human development – Nepad” stream) a better alternative given the context of climate change – as demonstrated by the Stern Report in October 2006 and the 4th Report of IPCC in February 2007 – and proliferation of environmental problems, for instance the damage caused to ecosystems (see the “greenhouse effect – environmental” stream)?

In the **light-blue hyper-stream**, stress is laid on the role of world prices in the 2008 food crisis (see notably the “increase in food prices – undernourished people” stream). As these streams are very close to each other, we can infer that this focus on world prices is linked with the discourse of international institutions, namely the G8 (see the “Scotland – leaders of G8” stream about the 2005 G8 in Gleeenagles), the World Trade Organization (see the “Doha Round – agricultural subsidies” stream about the Doha Round and about the 2009 G8 in L’Aquila), the World Bank and the IMF (see the “central bank – financial markets” stream) and at least the FAO (see the “FIDA – African farmers” stream). Even if the international stage is prevailing, African answers to the food crisis are also present, for instance regional economic cooperation (see the “Tchad – CEN-SAD” stream) and national measures (see the “crop year – GOANA” stream in case of Senegal). Note that previous topics do not disappear: the concern about the role of GM crops (see the “meat – tomato” stream dealing with an edible GM cotton), and humanitarian crises (see for instance the “OCHA – drought” stream about Somalia); yet they are less central than they were in the red hyper-stream. They also address new problems, respectively the role of biofuels in rising staple food prices (see the “wood – cane” stream) in the case of controversies, and food riots (see the “CEEAC – Mobutu Tzanga” stream).

The **pink hyper-stream** came back to a local approach of the problem, as it focuses on Maghreb and Mashriq. The birth of a new hyper-stream suggests that Arab revolutions are not directly connected with the global food crisis. Indeed, the “increase in food prices – undernourished people” stream stops in December 2010, whereas the “weapons – Khadafy” stream begins only in March 2011 and the “Muslims – Mubarak” stream in April 2011. Nevertheless, the link between the increase in food prices and Arab food riots is present inside of the “Director General of FAO – Jacques Diouf” and “world stocks – staple food” streams. Another important feature of this hyper-stream is the continuity of the “death – infant” stream, which is uninterrupted from 2004 to 2011. This stream deals with children vulnerability to hunger and with malnutrition as a factor of worsening infections: UNICEF and WHO promote breast-feeding as the best way to prevent malnutrition since the youngest age. In this hyper-stream, land-grabbing appears as an emergent controversial issue about global agriculture in the “foreign investors – United Kingdom” stream. Two topics are still represented: the global governance, as far as the so-called agricultural G20 is concerned; and the humanitarian focus, first in the “humanitarian situation – UNHCR” stream about Libya & Ivory Coast, and second in the “Niamey – millions of Nigerians” stream about the 2010 Nigerian drought.

Case study the 2008 world food crisis at the junction of three hyper-streams

The peak in food prices, which gave rise to hunger riots in many developing countries between 2007 and 2008, induced a larger production of related media articles. This phenomenon is visible through the size of the corresponding clusters. At the global scale, we may first notice the continuity of the “death-infant” stream (belonging to the pink hyper-stream) during the crisis. Second, the **climate issue** has been reframed during the crisis: the “climate change” stream (belonging to the red hyper-stream) stops in April 2008, whereas a “greenhouse effect” stream (belonging the pink hyper-stream) begins in September 2008. Third, since April 2008 three streams devoted to **international and global governance of hunger** have appeared.



Zoom on the 2008 world food crisis considering hyper-streams

1. The United Nations Organization (UNO) created a Coordination Team of the UN System High Level Task Force on the Global Food Security Crisis in April 2008; the World Bank set up in May 2008 the Global Food Crisis Response Program; the FAO organized a High-Level Conference on World Food Security in June 2008.
2. Declaration of the High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy, Roma, 3-5 June 2008. <http://www.fao.org/foodclimate/conference/doclist/fr/>
3. Source : <http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy>
4. The EU backtracked on its so-called « 20-20-20 » climate change and energy plan adopted in 2007. This action plan aimed at ensuring a variety of energy-related achievements by 2020, including the attainment of a 10% share of biofuels in energy consumption in transportation. On the 22nd of April, 2008 some representatives of the European Parliament asked for a moratorium on this decision in the context of world food crisis.

The World Bank and FAO streams are short, whereas the WTO & G8 stream is quite long: media coverage seems to focus on political measures taken by these former actors in spring 2008¹. Considering the climate issue, the extinction of stream “CO₂ & climate change” might be explained by the presence of biofuels issue, as the increase in food prices has stressed the competition between food vs. nonfood production. If so, the threat on food security may have become more present than the question of climate change in among articles dealing with biofuels. This reframing may perhaps result from the official interpretation of the food crisis by the FAO² or from a so-called informal study of the World Bank asserting the role of the biofuels in the increase of staple food prices³; it could also have been encouraged by the new position of the EU on this topic at that time⁴.

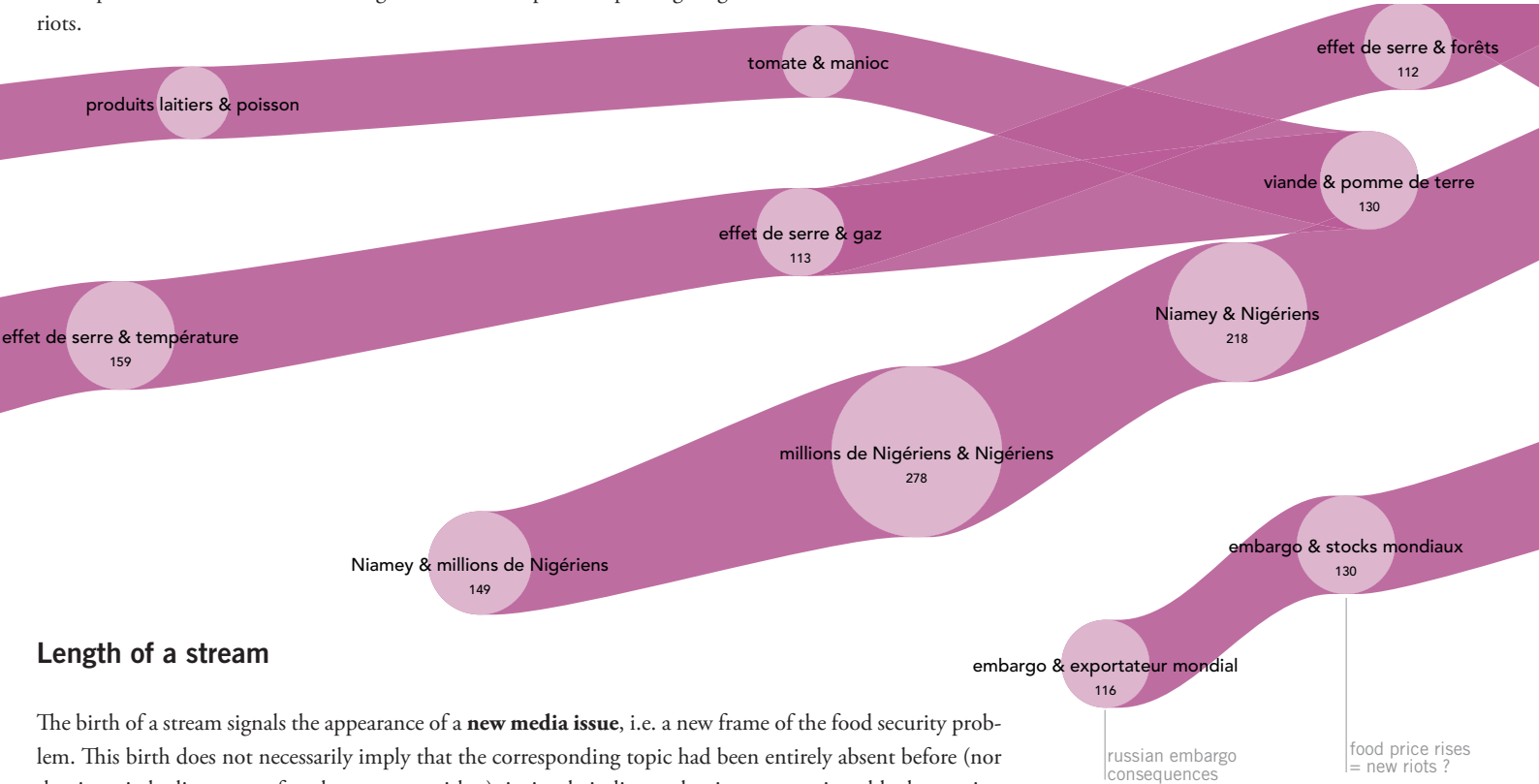
Streams as revealers of media issues in a competitive media space

Streams have four main meaningful features: their slope, their length, their relative distance to other streams and their structure in terms of fusions and forks. Each stream corresponds to a specific media issue on food security, since it dynamically connects clusters which share common terms. With “media issue” we denote a discourse proposing elements of conceptualization for a given problem (here for food security) whose use is relatively robust throughout the period.

Slope of a stream

Vertical trends are meaningful: streams are vertically organized according to their similarity and, if a stream goes up or down, its semantic composition is likely to vary. In other words, horizontal streams tend to be semantically homogeneous. To grab the slope of streams, we look at clusters: the growth rate of the stream “world stocks – staple food” (beginning in September 2010) is for instance probably due to an increase in generalization. Indeed, this stream begins with a cluster devoted to the consequences of Russian embargo on wheat prices and then deals with the general rise in staple food prices giving rise to the threat of new food riots.

Stream “world stock-staple food” (September 2010)



Length of a stream

The birth of a stream signals the appearance of a **new media issue**, i.e. a new frame of the food security problem. This birth does not necessarily imply that the corresponding topic had been entirely absent before (nor that it entirely disappears after the stream vanishes), it simply indicates that its presence is suddenly growing and becoming more consistent. A particularly interesting configuration occurs **when an issue is enrolling others** or when it disappears because some other issues become dominant.

An intermediate case is that of a stream which disappears for a moment and reappears later, under a distinct form. The evolution of **the trade issue** is a particularly revealing example. It roughly corresponds to the link between food security and inequalities within the agricultural world trade system exemplified by the failure of the Doha Round in July 2008: the imbalance between protectionism in the agro-exporter North and the demand for opening markets in the South has been denounced by many developing countries which blocked negotiations to protect their farmers, notably India and China opposed to the USA. This issue first appeared in December 2004, then became reframed in June 2008 after the food riots, and eventually has been recast again in September 2010, when Russian wildfires led to protectionist measures on wheat. Another interesting example is **the case of Niger**: this country appears in two streams, first in 2004 and then in 2010, while most African countries are not the focus of a specific stream. Why? The specificity of Nigerian famines probably relies on their causes, stemming from natural disasters rather than political turmoil: in 2004, this country underwent a locust attack followed by a severe drought; in September 2009 a new drought occurred, additionally worsened by floods⁵.

5. source: <http://www.emdat.be/>

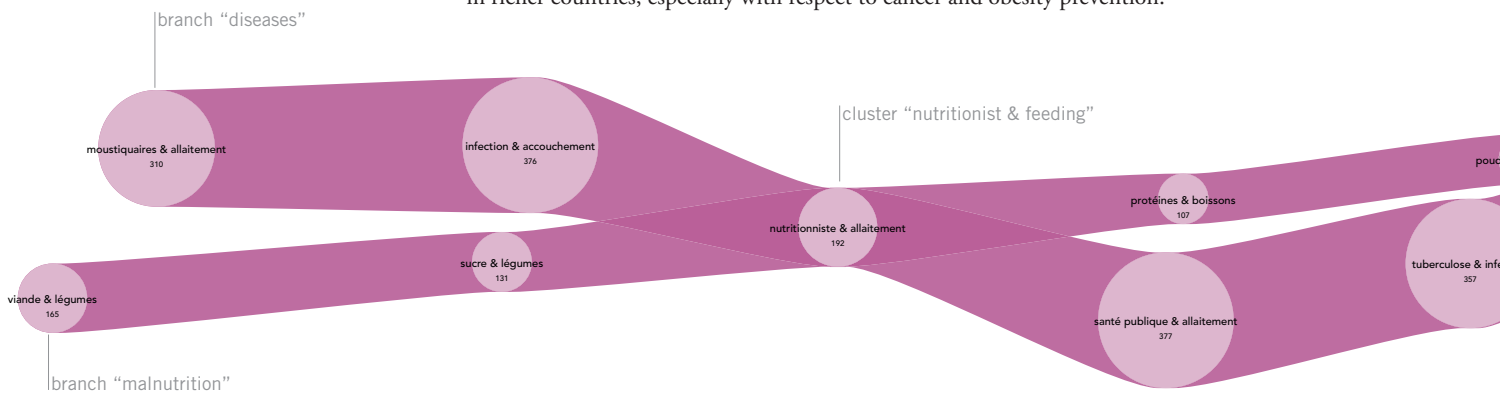
Relative distance between streams

A third indication of the importance of an issue is the relative distance between streams. Some streams are indeed significantly close to each other – they may even overlap, as is the case during the 2008 food crisis. When an issue becomes more present, it may either attract or push away other streams, depending on the a priori similarity: for instance, humanitarian problems are relatively remote from the core of the blue hyper-stream, which is occupied by economic and political topics.

Fusions and Forks inside a stream

Lastly, **merging and forking processes underscore specific relationships between sub-streams** (or branches) inside a stream. For instance, in the case of stream “death – infant”, the sub-stream devoted to nutritional determinants of hunger, especially worrying in the case of children (the so-called “malnutrition” branch) and the one dealing with interactions between hunger and diseases (the so-called “diseases” branch) converge in March 2006. This fusion can be understood by considering the growing concern about the influence of nutrition on health in poorer countries, because of the interactions between hunger and infections, but also in richer countries, especially with respect to cancer and obesity prevention.

Two sub-streams of the stream “death – infant” merging in the cluster “nutritionist & feeding” in March 2006



Micro-scale: clusters and press articles

The micro-scale analysis is useful for checking hypotheses previously formulated at the macro and medium scales. For instance in the case of the 2008 food crisis, the examination of articles may confirm or jeopardize the conception that biofuels are being framed in a different way before and after the food price increase and the recognition by international institutions of the severity of the crisis. Indeed, if biofuels are under harsh criticism after these events, warnings about their influence on food security are already expressed in the stream “greenhouse effect – environmental”, such that the transition is probably more gradual. For instance, we find in this stream both pro-biofuels [“Biofuels, the ideal guilty party” and “Second generation could save biofuels”] and anti-biofuels [“Crazy race for ethanol” and “Biofuels: eat or drive, do we have to choose?”] arguments.

Extract from the user interface showing content of stream “greenhouse effect – environmental” (April 2008)

The screenshot shows the 'pulseweb' interface. On the left, there are several streams with progress indicators. The main part of the interface is a list of keywords and their associated counts, followed by a preview of an article.

stream 10: effet de serre - environnementaux - température	effet de serre	20
stream 11: viande - tomate - haricot	température	19
stream 12: CEDEAO - organismes génétiquement modifiés - biotechnologie	climat	17
stream 13: Nigériens - production céréalière - crise économique	développement humain	16
stream 49: Omc - coton - marché mondial	pollution	15
stream 28: tremblement de terre - séisme	lutte contre les changements climatiques	15
	carbone	11
	réchauffement climatique	11
	changement climatique	11
	gaz	11
	Protocole de Kyoto	11
	PNUD	10
	CO2	9
	sécheresse	9
	planète	8
	riches	6

engagement sur une réduction des émissions de gaz à effet de serre allant de 25 à 40 % d'ici 2020, par rapport à 1990. Mais le Japon s'est jusqu'à présent gardé d'avancer tout chiffre, s'alignant pendant longtemps sur la position américaine en la matière.

Analyses; Les biocarburants, un coupable idéal
24/04/2008 – PHILIPPE TILLOUS-BORDE, PRÉSIDENT DE SOFIPROTÉOL, ÉTABLISSEMENT FINANCIER DE LA FILIÈRE FRANÇAISE DES HUILES ET PROTÉINES VÉGÉTALES (La Tribune)
Flambée des prix des produits agricoles. L'envolée des prix des céréales a mis les biocarburants au banc des accusés. Or la solution consiste d'abord à relever le défi du développement agricole dans les pays pauvres.

énergie; La 2e génération pourrait sauver les biocarburants
23/04/2008 – CLARA MILLAN (La Tribune)
Le 3 e sommet sur les biocarburants s'est ouvert à Madrid. Leur coût écologique et économique suscite des interrogations, mais une deuxième génération se profile.

Les agriculteurs francs-comtois face à un marché mondialisé
22/04/2008 – Vincent Patrin (Le Progrès)

In the stream devoted to climate change following the global crisis (“greenhouse effect – South Korea”), results are much more homogeneous. In the first and fourth clusters of this stream, we find mainly articles very suspicious of the growing production of biofuels: “Biofuels: an ecologic alternative both not very efficient and costly” “Biofuels: results of public investments are not satisfactory, said the OECD” and “Maurice Island in the race for biofuels” for instance. This example shows that interactions between macro and medium scales, which provide stimulating working hypotheses, and examination of the data available at the micro scale, can efficiently prevent misinterpretations.

