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Phytosanitary protocols and constraints relating to apple exports - comparison of three major exporting countries: France, Italy and Chile

Jean Marie Codron, Pasquale Lubello, Iciar Pavez Lizarraga

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PHYTOSANITARY PROTOCOLS AND CONSTRAINTS RELATING TO APPLE EXPORTS –

COMPARISON OF THREE MAJOR EXPORTING COUNTRIES: FRANCE, ITALY AND CHILE

Projet ANR Sustain' apple

Summary Report D 4.3

July 2019

Jean-Marie Codron (INRA/MOISA), Pasquale Lubello (SUPAGRO/MOISA) et Iciar Pavez (postdoc/MOISA)

Abstract

The Sustain'Apple project[1] deals with phytosanitary regulations in international trade and the institutional devices to comply with those regulations. Phytosanitary regulations are issued by new destination countries (mostly in Asia and North and South America) to avoid importing and disseminating quarantine organisms (in particular pests) and limit the economic effects of regulated non-quarantine organisms. Our report focuses on public and private devices which formulate, negotiate and implement the phytosanitary protocols that exporting countries must comply with, to get access to targeted markets. By comparing France with Italy and Chile, we have been able to identify strengths and weaknesses of the French system. The interest for such a comparison arouses from the two following questions : first how can we explain the contrasted market positioning between France and Italy on one hand and Chile on the other hand, Chile having by far the largest market share in destinations with phytosanitary constraints; second, how can we explain low institutional efficacy in preparing and negotiating phytosanitary protocols as revealed by professional leaders who regret lack of information from and weak cooperation with plant protection services. The institutional devices comparison has been conducted after having positioned the markets of the three countries and identified, for each of them, issues of quarantine pests and phytosanitary constraints imposed by main customer countries.

[1] Codron J.M. (resp. scientifique), Colleu S. (collab.), Hutin C. (collab.), Varlet P. (collab.). (2018). *Sustainable management of sanitary and phytosanitary risks in the apple value chain. Synthesis of the results of the Sustain'Apple project*. Montpellier (FRA): INRA, 36 p.

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List of the inteviewees

France:

- Bertrand Bourgoin DGAL SDQPV Expert National Arboriculture Fruitière
- Clara Pacheco DGAL SDASEI BEPT
- Juliette Auricoste DGAL SDASEI BEPT
- Jean-Christophe Naudin FAM
- Maryse Saboulard FAM
- Laurence Bouhot Delduc DGAL SDQSPV Responsable coordination activités et suivi des affaires internationales en santé des végétaux
- Boris Ollivier DGAL SDASEI chef BEPT
- Aline Vinck DGAL SDASEI
- Denis Allex DGAL SDASEI SIVEP
- Joel Francart DGAL SDQPV
- Charlotte Trottin DGAL SDQPV
- Pierre Varlet ANPP
- Vincent Guérin ANPP
- Marc Peyres (Blue Whale)
- Vincent Mathieu Hurtiger CTIFL
- Delphine Marie Vivien CIRAD
- Tuong Lan Dinh (Doctorante, Vietnam)

Italy

- Alessandro Dalpiaz (Direttore, ASSOMELA)
- Giulia Montanaro (Relazioni Internazionali, ASSOMELA),
- Wolfgang Graiss (Responsabile Qualità, VIP),
- Werner Schuler (Responsabile Qualità, Coperativa GEOS),
- Loris Marchel (Responsabile Qualità, APOT)
- Simona Rubbi (Relazioni Internazionali, CSO)

Chile

- Alexis Calabran Rodriguez SAG Region del Maule
- Pablo Reyes Muñoz SAG Region Metropolitana
- Gonzalo Rios Kantorowitz SAG Division Asuntos Internacionales Subdepto Negociaciones Internacionales
- Antonieta Urrutia Anabalon SAG Division Asuntos Internacionales Subdepto Negociaciones Internacionales
- Jaime Gonzalez SAG Division Asuntos Internacionales
- Hector Galleguillos Villouta SAG Division Asuntos Internacionales
- Leticia Venegas Müller SAG Division Proteccion Agricola y Forestal, Regulaciones Fitosanitarias & ARP
- Claudio Javier Moore Siques SAG Division Proteccion Agricola y Forestal Subdepto Certificacion Fitosanitaria
- Jorge Concha Torres SAG Division Proteccion Agricola y Forestal Subdepto Certifiacion Fitosanitaria
- Roberto Mir SAG Jefe Depto Phytosanitary Regulation and Plant Protection Division
- Rodrigo Astete Rocha SAG Jefe Division Proteccion Agricola y Forestal
- Alvaro Sepulveda Luque SAG Division Proteccion Agricola y Forestal
- Eduardo Fuentes entomologo Universidad de Talca Laboratorio de Sanidad Vegetal
- Mauricio Lolas Caneo fitopatologo Universidad Talca Facultad Ciencias Agrarias
- Valeria Lepe Martinez Centro de Pomaceas Facultad de Ciencias Agrarias Universidad de Talca
- Luis Sazo Universidad de Chile Facultad Ciencias Agronomicas Depto Sanidad Vegetal
- Juan Carlos Sepulveda FEDEFRUTA gerente general
- Ricardo Adonis Fundacion para el Desarrollo Fruticola
- Paulina Escudero ASOEX responsable preparacion protocoles fitosanitarios
- Mariano Allende INGLOBO

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Introduction

Long-distance trade with Asia and the Americas is gradually becoming an objective for major apple exporters. As this trade continues to develop, importing countries are becoming aware of the associated risks to their environment and their domestic production, in particular due to pests travelling with the fruit and which are not welcome visitors to these countries, either because they were not previously there or because of major ongoing efforts to eradicate them. In an attempt to protect themselves, importing countries are introducing border regulations prohibiting or regulating imports. These are referred to as phytosanitary regulations, which some seek to label as non-tariff barriers.

For France, which exports about 40% of its production, market diversification has become essential to remain competitive. At present, these diversification efforts primarily target Asia and the Americas, regions of the world where stringent phytosanitary constraints apply.
In order to develop its long-distance trade activity, France must both be fully aware of these phytosanitary constraints and endeavour to negotiate to ensure they are made more acceptable.

Regarding phytosanitary regulations, it is first and foremost the public authorities' responsibility to contact the importing countries to understand their wishes and constraints with regard to phytosanitary matters and, if there is any possibility of negotiating these, to collect all the elements of the dossier and take the necessary measures to propose a memorandum and negotiate it. Good coordination with private actors within the value chains concerned is, of course, highly desirable to ensure the success of such an enterprise. Action is also both necessary and desirable vis-à-vis with the international bodies, and in particular the International Plant Protection Convention, with a view to furthering the standards governing these phytosanitary constraints defined on a bilateral basis.

It should be noted that the public authorities play a far less predominant role with regard to the rules governing pesticide residues – the other key SPS[2] constraint that exporters have to deal with. While this constraint, which is particularly severe in a certain number of northern European destinations, falls under the supervision of the public authorities (national and European), through the definition and control of the maximum residue limits, it primarily exists as a result of private standards – more stringent than the public standards – imposed by mass retailers, in particular in Germany.

The aim of this document, which summarises the work carried out within the framework of task 4.3 of the Sustain'Apple project, is to shed light on the considerations and actions of both the public authorities and the operators within the value chains when cooperating with the public authorities to identify the phytosanitary constraints and when negotiating

[2] The acronym SPS (sanitary & phytosanitary) is used by the WTC for the SPS agreement. It includes both regulations on pesticide residues, contaminants and food additives in fruit that might jeopardize human health (S: sanitary) and regulations on the presence of harmful organisms that affects plant health (PS: phytosanitary).

with countries already or potentially importing from France. This report is a synthesis of the work conducted within the framework of task 4.3 of the Sustain'Apple project.

We considered that an effective means of providing a degree of clarification was to compare France with Italy and Chile, two countries competing with France on the international markets and ranked among the top apple exporters worldwide. We chose Italy because it is a neighbour of France with a relatively similar profile, and Chile because it has long traded with destinations applying phytosanitary constraints and therefore has a good knowledge and good experience in managing these constraints.

Several questions were addressed, shaping the organisation of our document:

1. On which distant destinations do the three exporting countries focus, for how long has this been the case, to what extent (volumes exported) and with which level of market penetration? And which of these distant destination countries apply phytosanitary constraints?
2. Which pests, identified as such in the importing target countries, are present in each of the three exporting countries? How are these pests qualified by the importing target countries? Are they subject to quarantine[3]?
3. Which phytosanitary constraints are imposed by third-party countries to the three exporting countries ?
4. What approach does each of these three exporting countries take in response to these constraints? Which national institutional measures are taken to this end, to what extent are they coherent and what are the strengths and weaknesses of each one?
5. What is the role of the International Plant Protection Convention (IPPC) in managing phytosanitary constraints? How does it contribute to facilitating the implementation of phytosanitary constraints and the solutions adopted to comply with them? What are the limits of this Convention and how can France negotiate these limits?
6. What are the main conclusions we can draw from this comparative analysis? To what extent is overcoming phytosanitary constraints a factor of success in conquering and developing new markets? What are the main differences and similarities between these three countries in addressing phytosanitary problems? What recommendations can be made in terms of institutional organisation in France?

We primarily called on interviews conducted with leading plant protection responsible persons on phytosanitary questions, be it in terms of identifying and complying with constraints in foreign countries or preparing and negotiating protocols. We also interviewed private trade associations and their members as well as the organisations responsible for serving as a relay between these associations and the public authorities. Finally, we used the existing databases relating to phytosanitary constraints: the Servicio

[3]Quarantine pest is “a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled”. International Plant Protection Convention (IPPC) :
https://www.ippc.int/static/media/files/publications/en/2013/06/06/1329129099_ippc_2011-12-01_reformatted.pdf

Agrícola y Ganadero_ SAG database (Chile)[4] and the Expadon database operated by France AgriMer (France)[5].

I. Position of the three countries with regard to distant markets applying phytosanitary constraints

Table: Distribution of the three countries' exports by destination (as % of the volume exported by each country)

Volumes as a % of total vol	Chile			France			Italy
	2015	2011	2006	2015	2011	2006	2015
Europe	17.2			72.3			70.0
Middle East	9.6			18.8			28.5
Latin America	34.6	30.5	27.7	0.6			0.3
Asia	15.6	15.1	13.3	4.9	3.4	1.0	1.1
USA/Can	15.6	12.3	14.3	-			-
Total %	92.6			96.6			99.9

We can distinguish the destinations which focus primarily or even exclusively, on pesticide residues (green in our table) – this is notably the case of the European Union – and the destinations which focus primarily on phytosanitary aspects (red in our table) – this is notably the case of several key countries in Asia, North America (US, Canada) and Latin America (Mexico, Colombia, Brazil, etc.).

If we calculate the distribution of each country's exports according to this distinction, the table above shows a significant difference between Chile on the one hand and France and Italy on the other. Both France and Italy export primarily to destinations which do not apply severe phytosanitary constraints – the common market of the European Union in which both countries are bound by the EU SPS legislation and have free transit, and to a lesser extent, the Middle East with the exception of Jordan and Israel – while the volumes exported to Latin America, Asia and North America account for only a small percentage of total exports (5.5% for France and 1.4% in the case of Italy). France and Italy are thus, because of Europe, mostly faced with sanitary constraints, i.e. pesticide residue requirements as their share of exports to Europe exceeds 70% of their total exports. It should be noted that these two countries sell almost half of their produce on their

[4] http://www.sag.gob.cl/ambitos-de-accion/productos-vegetales-diferentes-paises/
[5] https://teleprocedures.franceagrimer.fr/Expadon/Login/Login.aspx?ReturnUrl=%2fExpadon%2f

domestic market where customers may also be very demanding in terms of residues (private standards) and of agro-ecological indicators[6].

The situation is different in Chile, which exports only one quarter of its goods to Europe and the Middle East, with two-thirds of exports sent to destinations primarily applying phytosanitary constraints, i.e. Asia, Latin America and the US/Canada.

Observing the change in distribution over time (for example since 2006), we note a high level of stability for Chile which began diversifying its export markets as early as the 1990s[7]. France and Italy, on the other hand, are at the very beginning of this process (in terms of volumes) of exporting to destinations focussing on phytosanitary constraints.

Table showing the main destinations applying phytosanitary constraints and the volumes in thousands of tonnes, as well as the dates of the phytosanitary agreements signed

Year 2015	Chile			France			Italy	
	10^3 tons	Nb QO	First agreement	10^3 tons	Nb QO	First agreement	10^3 tons	First agreement
China	25.8	26	1994	2.5	7	2000		ban
Taïwan	40.9	8	2006	0.9	3	2012		In progress
Thaïland	0.4	34	2013	5.7	10	2012		ban
Vietnam	0.1		2013		8	2015		In progress
Indonésie	0.04	3			2	2017		2014
Philippines	0.2	4	1989					
USA	79.3		1980	-	5	2014		2013
Canada	10.9	6	1991					
Mexico	1.8	12	1992			In progress at the EU level		In progress at the EU level
Venezuela	6.0	1	1991					
Colombia	76.8	6	2000	1.6	1			
Peru	43.1	12	2013					
Brazil	35.8	15	2009	3.8	1		4.0	
Israël	-			4.9	22		5.1	
New Z	-							

[6] Scandella D., Vernin X._(2018). SPS risk management strategies adopted by French distributors *In*. *Sustainable management of sanitary and phytosanitary risks in the apple value chain. Synthesis of the results of the Sustain'Apple project*. Montpellier (FRA): INRA, 28-29.

[7] The turning point for Chile was the cyanide crisis with the United States in 1989: the US had blocked fruit imports from Chile after discovering a tiny quantity of cyanide in a grape exported by Chile. This affair caused serious prejudice to Chile as the ban lasted more than two months; Chile strongly suspected the US, and in particular Californian producers, of undermining the Chilean fruit industry to protect their production of early grapes which were in competition with late exports from Chile.

Finally, the table also shows the contrast between Chile and the two European countries with regard to the dates on which bilateral phytosanitary agreements were signed. With the exception of the relatively early agreement between France and China (2000), all the other agreements signed by France[8] and Italy are more recent than 2012, and some of those identified have yet to be signed. In the case of Chile, the first agreement signed with the United States dates back to 1992 and followed a long series of institutional coordination and scientific collaboration between the two countries which began in the 1960s/70s (see later). The agreements subsequently signed with certain countries in Asia and Latin America benefited from this solid experience obtained with the United States. An initial cooperation agreement was signed with China in 1994, immediately followed by an apple protocol.

It should also be noted that Italy's weak presence on markets with severe phytosanitary constraints (Asia and, to a lesser extent, the Americas) only applies for apples and not for kiwis. In the latter case Italy, which occupies a dominant position among northern-hemisphere exporters, has succeeded in adopting a solid position on a number of markets applying phytosanitary constraints (China, Taiwan, South Korea, Vietnam, Thailand, Brazil, Mexico, etc.).

If we compare the volumes exported by the three countries in terms of absolute value (and not %), the same contrast is observed. Generally speaking, Chile exports much more than France or Italy towards Asia, the US and Latin America. We can nevertheless note that France is present in a certain number of Asian countries applying phytosanitary constraints unlike Italy, which primarily sends its non-European exports to North Africa, the Middle East and, to a lesser extent, Asia and South America, although to countries without phytosanitary constraints. It should be noted that Italy lost some of its North African markets as a consequence of Arab springs. Finally, we can observe that France, although less present in Asia than Chile, enjoys a much better showing in Thailand than Chile.

Let us take a closer look at exports of apples to each of the key destinations applying phytosanitary constraints.

To the US: Chile has a long-standing and constantly evolving relationship with the US. APHIS (the US national plant protection organization, NPPO) began working in Chile in the mid-1960s to develop the fumigation process necessary to export grapes to the US. In 1967, the SAG was created at the request of APHIS both to finance APHIS engineers who had come to experiment with the required methyl bromide fumigation and to issue a legal phytosanitary export certificate. An initial APHIS/ASOEX/SAG convention with monthly meetings of three parties assumed control of this grape fumigation process. Apples were soon incorporated into this convention. In 1980, having monitored the 19 Mediterranean fruit fly eradication campaigns conducted in Chile since the beginning of the 1960s, the US acknowledged Chile (with the exception of the northern Atacama-Arica desert and Iquique regions) as being free from this pest. Thanks to this recognition, Chile is spared the cost of cold treatment against the fly, estimated at USD 0.60 per box.

8 It should be noted that the Vietnamese and Indonesian markets were already open to French exports before the agreement was signed, but that the revision of their regulations led them to require an agreement to be signed.

France's relationship with the US began at the end of the 1970s. Exports, primarily from the Loire Valley, were stopped at the end of the 1980s following the discovery of leaf blister moth. They only recently began again with the signing of a bilateral agreement in 2014 stipulating pre-clearance controls. Italy, which had not previously had an agreement with the US, obtained access to the American market a year earlier than France in 2013. Negotiations in the apple sector are under way through the EU with a view to replacing national bilateral agreements with an EU-US agreement (without pre-clearance). These negotiations have stalled somewhat since the arrival of President Trump and as a result of both the producers' lobby and the Washington Apple Commission.

To China: Chile's relationship with China is relatively long-standing, with Chile signing a global cooperation agreement with China with regard to SPS matters as early as 1994, accompanied the same year by an apple protocol focusing on Mediterranean fruit fly. In 2000, the protocol was extended to other species. Risk analysis have gradually become more comprehensive[9]. In 2013, a global cooperation agreement was signed between the two ministries of agriculture. In 2014, Chile suffered the appearance of a new parasite, the neofabraea fungus which is particularly difficult to detect, as the protocol with China provides for a sample being placed at ambient temperature for fifteen days in a laboratory accredited by the SAG to reveal the possible presence of the fungus. The problem was resolved the same year following a temporary freeze on imports while a delegation visited the orchards and the Chileans tabled proposals to combat this fungus.
France has a longstanding agreement dating back to 2000, which includes production regions free from the Mediterranean fruit fly and does not, therefore, provide for cold-treatment during transit in accordance with the APHIS standard. The Chinese market is not yet open to Italian apples. The Italian authorities have initiated dialogue with their Chinese counterparts to establish a protocol for apples and pears, but China has advised them to deal with one product at a time, and Italy has indicated a preference for pears, as apples are already the subject of negotiations with Vietnam and Taiwan.

To Taiwan: Chile sends large quantities, primarily of the Fuji variety. In 2007, the market closed for one or two years due to the presence of codling moth larvae in the fruit on arrival. The agreement does not provide for the use of pheromones to protect against codling moth, but only for pesticide treatment which can be incompatible with distributors' residue constraints in certain countries of the European Union. France signed an agreement in 2012, but is far from exporting the volume of products sent by Chile. The French value chain nevertheless endeavours to push the public authorities to promote these exports to Taiwan. More than 1,000 hectares of apple orchards with different varieties of apple are now annually approved for export to Taiwan. Italy is currently finalising an agreement.

[9] The list of quarantine organisms for apples is not, however, as complete as that established today for pears, conversations on which have been ongoing since 2016. For example, the codling moth is on the list for pears but is not included in the apple protocol. There are several reasons for this: updating a protocol takes time; the Chinese trust the Chileans and they know, in particular thanks to their regular visits to Chilean orchards, that there are relatively numerous codling moth traps in the apple orchards as Chile must satisfy Columbia's demands for five times more traps than China.

To Vietnam: apple exports were called into question in 2013, with Vietnam wanting to implement risk analyses and review its agreements accordingly. Every year, Vietnam imports more than 150.000 tonnes of apples, two-thirds of which come from China. In 2012, before the embargo, France exported 500 tonnes of apples. France obtained renewed access to the market at the end of 2015 following a successful phytosanitary audit conducted in summer 2015. Italy is currently negotiating an agreement for apples. Italy seeked to negotiate three dossiers simultaneously for apples, pears and kiwis. As Vietnam wanted to address one product at a time, Italy opted for apples first. Chile's exports were blocked after the revision of the agreements and have never started again. Chilean interviewees consider that negotiating withVietnam has been harder than with China and claim having difficulty to convince Vietnam that Chile is free of the Mediterranean fruit fly. The opinion that Vietnam is a complex country in this matter is also shared by certain French exporters.

To Indonesia: the main concerns here are logistics and Mediterranean flies. Logistics are problematic because imports to Indonesia are channelled through the port of Surabaya, some 1,000 km from Jakarta representing a 3-day journey by truck during which the cold chain cannot be guaranteed and which may be detrimental to the final quality of the apples. The problem of Mediterranean flies applies to apples without the Med fly-free area status. California was granted this status in summer 2015, Chile and France (Loire Valley) already have it while Italy does not, thereby obliging it to have its orchards and packing houses approved and to implement cold treatment[10]. Following an audit by the Indonesian authorities, France was also granted permission to send its apples directly via the port of Jakarta without the need to conduct pre-export tests on each export batch in laboratories accredited by the Indonesian authorities as required by the new Indonesian law in force since February 2016. An innovation introduced by Indonesia with regard to Chile should also be noted: Indonesia asked the SAG to supervise safety aspects (pesticide residues monitoring) during export in the future.
To India: India is the third-largest apple producer worldwide. It noticeably increased imports of foreign apples in 2011 (180 kt compared to 110 in 2010), primarily from the US, China, Chile, New Zealand, Italy, Iran and Afghanistan. France is not among its main suppliers, although French exports are increasing (3 kt in 2014, 7 kt in 2015 and 12 kt in 2016). For the Association of Italian Exporters (Assomela), India has become a key market with a view to absorbing the production previously exported to Russia. This shift is not, however, straightforward as Indians do not necessarily like the same varieties as Russians. Indians like the Gala and Red Delicious varieties, which are sweet (high Brix degree) and not necessarily crunchy. The main obstacle to imports lies in the high customs duties (50%) at certain periods of the year. During a few months in 2015, India also introduced protectionist logistics measures (obligation to import via the sole port of Bombay-Nhava Sheva). In phytosanitary terms, India reserves the right to request cold treatment for the Mediterranean fruit fly before or after transport by boat. According to our Italian sources, cold treatment is generally performed before shipping (cold chamber), as it is perceived as being less risky (as better controlled) and less costly. The small volume exported by France

[10] The law in Indonesia has been more restrictive since February 2014 with regard to imports of agricultural products; it requires analyses to be conducted on the food safety of products by accredited laboratories, stipulates quotas for certain products, including apples, and – in the case of Italy, which is not deemed free of fruit fly – imposes in-transit cold treatment for apples.

is not treated. In Italy, cold treatment is performed before departure. It could be performed on arrival, but Italy fears that it would not be in control of the process. Furthermore India imposes fumigation by methyl bromide upon arrival (although apparently not in the case of apples imported from Italy)[11].

To Mexico: Mexico is closed to apples from France and Italy. According to our Chilean sources it is one of the most complex markets in terms of phytosanitary constraints. An agreement was signed with Chile in 2006 and is regularly updated. This requires pre-clearance (control in partnership with the importing country before shipping; see definition in chapter III) in the presence of Mexican inspectors throughout the entire export campaign. Chilean exporters rank Mexico as the most demanding country, in particular refusing exports for minimal non-compliances (temperature variation rising to 0°C whereas it must not exceed -0.5°C, a variation caused by the light restriction imposed by the authorities between 6 p.m. and midnight and which could not be avoided for want of a generator). New negotiations are ongoing, if currently on stand-by, with Italy following numerous attempted negotiations at both European and national level over the past 10 years). According to our contact partners, the election of President Trump and the deteriorating political relations between the two countries could favour diversification of apple supplies to Mexico. However, with the recent NAFTA renewal, US apples which are exported to Mexico, keep being subsidized and thus remain competitive with regard to Mexican apples. Mexican producers often complain about such unfair competition. They would like the Mexican market more open to other supplier countries in order to decrease US market supremacy on their domestic market.

II. Definition of quarantine: not merely a natural fact but a construct; main concerns of the three countries with regard to this quarantine

To explain the limited presence of France and Italy on markets applying strict phytosanitary constraints, our first thought is that Chile enjoys a more favourable situation in terms of contamination by pests. To explore this hypothesis, we must first define the notion of a quarantine organism (QO).
The IPPC standard (ISPM no.16) defines the conditions required for an importing country to qualify a pest as a "quarantine" organism. The pest must be absent or only present in a limited zone and there must be an official monitoring programme (if the organism is absent) or an official containment programme aimed at eradicating the organism if present. Any country implementing such a programme is authorised to demand the same measures from the exporting country. If, following a risk analysis, the importing country deems there is a risk, it can either prohibit imports or demand measures be taken (in the orchards, on the product, etc.). This notion of quarantine is therefore important in understanding the severity of the measures imposed by a given country: a country can impose the same measures if, and only if, it imposes on itself.

[11] Until now, India accepted fumigation on arrival, and six-month exemptions could be renewed from 2009 for protein peas and other products (?) from 2014; today, it no longer wants to renew these exemptions and the last one was difficult to obtain (Sept-March 2017), with India stating it would no longer issue any exemptions; France must therefore submit a dossier with alternative solutions, such as phosphine; the dossier must present scientific proof justifying the effectiveness of the solution for pests as defined by India.

ISPM no.16 also defines another type of pest which is not a quarantine organism but is nevertheless regulated. This final distinction (regulated non-QO) remains vague in terms of applications (the European and Mediterranean Plant Protection Organization -EPPO is currently addressing this issue) and would primarily relate to propagation material.

Defining criteria	Quarantine pest	Non-quarantine pest
Pest status	Absent or limited distribution	Present and may be widely distributed
Pathway	Phytosanitary measures for any pathway	Phytosanitary measures only on plants for planting
Economic impact	Impact is predicted	Impact is known
Official control	Under official control if present with the aim of eradication or containment	Under official control with respect to the specified plants for planting with the aim of suppression

The notion of quarantine thus relates to a given importing country: what is a quarantine organism in one country is not necessarily a QO in another country. This is in particular the case for Cydia Pomonella (codling moth) with Chilean importers.

Table: status of the codling moth in different importing countries for exports from Chile

Codling moth	Quarantine organism	Non-quarantine organism (purely commercial problem)
Asia	Taiwan Philippines China	Thailand Korea
Latin America	Colombia Brazil (recently) Bolivia Ecuador	Argentina Peru Mexico

NB: QO supposes that the pest is subject to containment in the country

Furthermore, if a pest is not present on its territory or a part of its territory, an exporting country may endeavour to gain recognition as a pest-free area. This is what Chile did with regard to the Mediterranean fruit fly. This recognition, which involves a long process governed by the IPPC, exempts the exporting country from the treatments imposed if it does not benefit from this status. Chile obtained this recognition in 1995, but must continue to monitor any reappearance of these flies (14,000 traps managed by the SAG public body, at an estimated cost of USD 4 million) and implement any exceptional measures required to eradicate them if an event should arise (an event refers to the discovery of a fly at a given point). The events are interpreted officially[12] as the result of

[12] With regard to the occasional resurgence of fruit flies, the thirty-year-old controversy remains – at scientific level – between the official version interpreting these reappearances as events linked to

introduction by a traveller. They must immediately be declared to the importing countries concerned, thereby triggering a "regulated area" plan which, in particular, requires cold treatment to be performed for exports destined for countries which have identified the fruit fly as a quarantine organism. This special plan is costly for Chile, which must apply, for the duration of three life cycles of the fly, the measures specified in each bilateral agreement concerned.

In the case of Italy, it is difficult to speak of regions free form the Mediterranean fruit fly. Even in the most northerly province of Alto-Adige, it is difficult to exclude the presence of this QO. Relatively small zones could certainly be defined, but monitoring them would be very costly. According to our contact partners at the CSO (Centro Servizi Ortofrutticoli), it would prove very costly to guarantee over time, the absence of fruit fly especially in light of the proximity of the province of Trentino, which is also an exporter and is more severely contaminated by this fly (approx. 500 hectares concerned in a total of 9,000 hectares in the Trentino Alto Adigio (TAA) region . For the moment, therefore, South Tyrol prefers to comply with the cold treatment measures which may be imposed by importing countries which list the fruit fly as a quarantine organism.

France, which suffers from fruit fly on part of its territory, has not attempted to divide its territory into segments to obtain recognition of the area not afflicted as fly-free, doubtless for the same reasons as South Tyrol. The only exception is with China in the agreement signed in 2000.

The decision to qualify a pest as a quarantine organism therefore depends on the importing country and it can have severe consequences for the exporting countries in terms of phytosanitary constraints. Although the SPS Agreement states that phytosanitary measures must be based on scientific principles, it is sometimes subjective, imprecise and unpredictable:

- subjective because it takes a risk analysis into consideration which includes biological and natural factors as well as economic, environmental and social factors which are often difficult to evaluate objectively. In the case of polyphagous – and thus multi-crop – pests, the regulations may extend to a large number of species or, in contrast, be limited to the species demonstrating a strong economic impact. The line between an organism affecting a specific crop and a polyphagous pest is not always very clear. It is therefore up to the exporting country to convince the importing country that the pest is absent from the crop governed by the agreement. This often requires the support of extensive scientific proof.
- imprecise because in the event of any doubt, some countries refrain from preparing precise lists: this is the case in particular in the US which retains the possibility of adding pests to existing bilateral agreements. This incompleteness of

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introduction by travellers and the unofficial version, which is nevertheless supported by a certain number of scientists around the world, of a very-low-level endemic existence which only results in resurgences if an exceptional set of events occur (James Carey, American Entomologist, Fall 2010); this controversy, which could have highly significant economic consequences (obligation to perform cold treatment for relatively extensive areas) for certain key exporting countries currently recognised as being fly-free (California, Australia, South Africa), is not the subject of particularly active research and is only maintained by the scientists themselves (entomology conferences)

the rules may be sometimes perceived by the exporting country as a form of protectionism of the importing country.

- unpredictable as certain countries sometimes unexpectedly introduce in the list? organisms previously ignored along with methods, not clearly defined, of combating these organisms. This is the case, for example, of China which identified the presence of a fungus in 2001 (Neofabraea Alba) in apple exports from Chile and closed its market when concern was observed. This obliged Chile (public authorities and private operators) to negotiate rules (accredited orchards and fungicides) which could help authorise renewed imports. This was also the case of the woolly apple aphid which China added to its list of quarantine organisms some ten years ago. As this aphid was detected in Chilean exports, Chile – which had not previously had to combat this pest – was suddenly obliged to perform two or three pesticide treatments. Such an obligation may put in trouble exporting countries which also wish to export to countries applying severe pesticide residue constraints.

With this definition of quarantine established, we can now compare the main pests which concern each of our three exporting countries in their relations with importing countries.

Chile is affected by three main pests for apples: the codling moth (*Cydia Pomonella*), the obscure mealybug (*Pseudococcus Vibumi* as well as *Pseudococcus Calceolariae* and *Longispinus*) and the San Jose scale (*Diaspidiotus perniciosus*).

The codling moth, which is a priori non-polyphagous, specific to apples (and to some other species including walnuts) and present more or less worldwide, poses problems with some countries where it is not found and which have designated it a quarantine organism. In Asia, this is the case of China, Taiwan and the Philippines and in Latin America of Colombia, Brazil, Bolivia and Ecuador. Brazil succeeded in eradicating the codling moth and declared itself free of this pest in 2014. Argentina, the main supplier of apples to Brazil, consequently found itself in a very difficult position. Taiwan proved uncompromising vis-à-vis the US by prohibiting apple imports after a container was discovered containing codling moths in 2007. It should be noted that the codling moth is much more difficult to eradicate than the Mediterranean fruit fly. The technique of sterile males works with flies insofar as the females only reproduce once. With codling moths, this technique has thus far failed, as shown in Canada where attempts have been made over the past 40 years to use this technique on a restricted area, because the females can reproduce two or three times, thereby lowering the probability that a female is only fertilised by a sterile male. Interesting results are observed in certain regions (the CTIFL intends to conduct tests in France on apple and walnut trees).

Obscure mealybugs (*Pseudococcus viburmi*) are monitored by China and the Latin American countries. Observed as early as the 1950s, San Jose scale (*Diaspidiotus perniciosus)* was successfully controlled using traditional treatments. It nevertheless reappeared with a resistance to organophosphates that are used frequently which caused, in the years 2008-2013, a high level of rejects by importing Latin American countries which had included San Jose scale in their list of quarantine organisms. From these years, organophosphates were replaced by other chemical products which solved the problem.

Chile is also affected by a type of mite (*Brevipalpus Chilensis*), specific to the country as its name suggests, which first posed a problem in the 1960s/70s with regard to the US and recently with regard to Brazil which included it in its list of quarantine organisms.[13] After the Brazilian market had remained closed for a year, Chile finally negotiated a "system approach" control (see later) which is an alternative to undesirable fumigation with methyl bromide.

Chile is only affected by one single quarantine fungus (*Neofabraea Alba*), and only with regard to China. Detected by China in Chilean exports in 2001, this still curbs Chilean exports from the regions south of Talca (more humid) and in particular for the Pink Lady variety (later harvest). To combat this fungus, China imposes orchard accreditation and a certain type of fungicide treatment. Other fungi exist in Chile which are identical to those found in France (apple scab, powdery mildew, botrytis, etc.), but they are not quarantine fungi. As in France, they are managed according to productive and commercial criteria.

Finally, although declared a Mediterranean fly-free area since 1995, Chile suffers regular appearances of flies referred to as "events", that Chile ascribes to travellers. These events occur in the central zone (region V and metropolitan, rarely region VI) and affect grapes more than apples.

France is affected by numerous pests which are designated quarantine organisms by its apple importers, primarily the Mediterranean fruit fly, the codling moth, the obscure mealybug and the San José scale. These are therefore more or less the same as in Chile, with the exception of the Mediterranean fruit fly which has been eradicated in Chile but continues to exist in France and is doubtless the main French concern with regard to countries where it is exempt (in particular Asia). These countries prohibit exports from the most severely affected southern areas while the other regions must perform very costly cold treatments. As in Chile, the San Jose scale had been reduced but has experienced a resurgence with the treatments for codling moth. To combat this pest, treatment by pesticide is still used, although alternative methods are currently being studied.

It should also be noted that France is jointly responsible with the European Union for the consequences that the presence of a pest could have in one of the EU member states; Chile recently raised the problem of *Epiphyas postvittana*, which is present in the UK but not in France but which requires the latter to apply treatment for *Epiphyas* if it wants to export to Chile. Chile demands fumigation, although this is prohibited in the EU, nevertheless noting that France can also follow a procedure to be recognised as an *Epiphyas* -free zone.

Insofar as the main apple pests affecting the three exporting countries are qualified as quarantine organisms by the importing countries, we can conclude that they are almost the same in all three countries: the codling moth, the obscure mealybug and the San José scale. Two pests nevertheless differentiate the three countries: these are the

[13] There are many Brevipalpus varieties. Only one is very dangerous because potentially infected by a virus that can destroy large-scale plantations of fruits like citrus. The Chilensis variety is not dangerous, but given the difficulty in discriminating this variety against other Brevipalpus varieties, countries sensitive to the virus, prefer to include the Chilensis variety in their list of quarantine organisms.

Mediterranean fruit fly, which is no longer present in Chile (with the exception of certain occasional reappearances due to travellers), and the Brevipalpus Chilensis mite which is specific to Chile and thus not found in France or Italy. Incidentally, it should be noted that it is not because Chile has been declared a fly-free zone that it is longer concerned by the matter. It has nevertheless included the fruit fly on its list of quarantine organisms (six pests in total, but only the fruit fly affects apples) and must therefore maintain an intense monitoring system (14,000 traps managed by the SAG) and react immediately if an event should arise by means of a very costly control program designed to eradicate any flies which have succeeded in reproducing following this event while also controlling all shipments of products originating in the area concerned (at a cost of hundreds of thousands of euros for each event, according to the Chilean Ministry of Agriculture).

III. Constraints imposed by third-party countries on the three countries concerned

In order to compare the effect of the constraints imposed by third-party countries on the three countries concerned, it is first necessary to identify the different types of constraint and the different types of control associated with these constraints. We will then see if there are any differences in the constraints between the three exporting countries with regard to a single importing country before endeavouring to explain the reasons underpinning any such differences.

The technical content of solutions designed to combat quarantine organisms

The first solution is naturally, to inspect the product before shipping. This is generally done by the public authorities responsible for plant protection before they issue a phytosanitary certificate indicating the lack of undesirable quarantine organisms. The sampling rate is generally stipulated for the phytosanitary conditions, regardless of whether these are imposed unilaterally or the result of a negotiated agreement. In Chile, the default sampling rate is 50% of the cube root of the batches sent. The rate may nevertheless be much higher; in the case of Taiwan, for example, 2% of parcels must be inspected; for a total of 8,000 parcels (i.e. approximately 160 tonnes), 160 parcels will be inspected compared to only 10 in the minimum case.
Inspections conducted by companies on the packaging line before inspection by the National Plant Protection Organization (referred to as pre-inspection) can also be requested.

More comprehensive solutions go beyond a simple inspection and include phytosanitary conditions in the orchard such as the monitoring of quarantine organisms by setting traps and taking regular samples and the application of phytosanitary treatments. The importing countries can also request prior agreement of orchards and packing houses applying to export their produce, grant authorisations to those which are compliant. The authorisations are initially granted after inspection by the plant protection authorities in the exporting country. Audits by the importing country are also often performed. Product treatment may also be required. More often than not, this involves cold treatment at the packing house or during transit and/or fumigation before shipping, during transit or on arrival. As the latter solution is not always desirable for the commercial quality of the product, a more systemic solution, referred to as the system approach was developed some fifteen years ago by the USDA and is currently becoming more widespread in Chile.

It is reserved for quarantine organisms that are difficult to detect (case of Brevipalpus Chilensis or Lobesiana in Chile), replaces fumigation, which is detrimental to the quality of the fruit, and avoids the need for costly inspection fruit by fruit. It has just been accepted by Brazil for use on kiwis imported from Chile (portalfruticola 1 June 2016). It is only valid for regions with minimal infestation, involves conducting an intensive inspection at all levels of the production/packaging process and calls on all private and public stakeholders. The importing country may also pay an annual visit to check that the system functions correctly.
At this stage, special acknowledgement should be given to the solution which involves applying for recognition as a pest-free area. We saw previously that this solution generally takes several years and that recognition is not endorsed by an universal standard[14]. The country must often undertake bilateral negotiations to obtain this recognition, at least with certain large countries. Chile, which declared itself a fruit-fly-free zone in 1995, was recognised by the US, its long-time trade partner. The scale of the monitoring system still in place and recognition by the US were strong arguments to obtain recognition from a vast majority of third-party countries. Major players, such as Japan and China, nevertheless demanded individual negotiations. Japan granted recognition in the mid-1980s but China only granted this status in 2015, both after 10 or 15 years of negotiation and on-site studies.

It is true that after 1995, several events (occasional introduction of flies by travellers) cast doubts over this recognition and drove importing countries to take measures for the areas concerned by the reappearance of flies. Once again, the export system in the areas concerned varied from one importing country to another. While the US and most countries defined a hazard radius of 7 km around the point of introduction and limited the duration of the embargo to three fruit fly life cycles without any resurgence, a certain number of countries extended the embargo, in particular Japan, Korea, Taiwan and China. China also applied the embargo to the entire region around the point of introduction. It was only in 2015 that it adopted conditions similar to those imposed by the other countries (duration of three cycles, albeit with a radius of 27.2 km). It should be noted that while all countries now recognise Chile as a being a fruit-fly-free zone, recognition continues to be governed by bilateral negotiations and is not automatic. This is illustrated by both Indonesia and Vietnam, which recently revised their legislation and proved difficult to convince of the absence of fruit flies in Chile.

Also significant is product treatment which, for apples, primarily involves cold treatment and/or fumigation. Irradiation is not used but it is currently being studied in Chile and the US is pressurising the European Union to authorise this treatment.

Fumigation can be implemented using methyl bromide (CH3Br) or phosphine (PH3). Methyl bromide is prohibited for soil by the Montreal Convention, but not for fruit. The European Union also prohibits it for fruit. Authorised by the US and Taiwan, which stipulate

[14] The CIPV records the declaration of a given country indicates the principles of recognition, but does not conduct checks and has no police force to implement sanctions. Recognition of a protected zone is not acquired in absolute terms; it is addressed bilaterally after inspection of the zone and the protective measures by the importing countries. A signatory country which does not want to give recognition must provide valid grounds for this.

cold treatment + fumigation (T108-a) as an alternative to cold treatment (T107-a), methyl bromide is nevertheless not widely used for apples as it is severely detrimental to the quality of the fruit; it is, however, commonly used for grapes which are exported to the US as it overcomes the problem of Brevipalpus Chilensis and Lobesia, two quarantine organisms which are difficult to detect by means of inspection. According to the European Union, India is the one country which poses fumigation problems for apples, but it circumvents the EU ban on fumigation by fumigating goods on arrival. Phosphine, which – unlike methyl bromide – does not damage the fruit, requires numerous precautions and suitable equipment. It is used in Chile in the event of codling moth problems on apples destined for Colombia. In light of the presence of *Epiphyas postvittana*, Chile proposes this solution for France to export its apples to Chile.

Cold treatment primarily concerns Mediterranean fruit fly (Ceratitis Capitata) and the codling moth (Cydia Pomonella). Free from fruit fly in almost all apple-producing regions, Chile only turns to cold treatment for the codling moth. In reality, this cold treatment is called upon if a codling moth larva is discovered during the harvest, on the packaging line or during the subsequent inspection by the SAG. It involves storing the batches in a cold room for 42 days and is only authorised by the Chilean authorities (SAG) for Colombia, but not China. France, which is not fruit-fly-free, is required to perform cold treatment for all shipments to those countries which require it, i.e. Thailand, Vietnam, Taiwan and the US. China is an exception to the rule, the agreement negotiated in 2000 (i.e. much before the other agreements) only requiring a simple cold storage (during at least 14 days at temperatures between 0.5° and 1°[15].

Since 2002, the temperature/duration pairings of the APHIS (USDA) standard for cold treatment against fruit fly are 1.1º/14 days or 1.67º/16 days or 2.22º/18 days. The temperatures are ceiling levels not to be exceeded and are all below 3 or 4°, which is the average cold chain temperature during transport by container in order to maintain commercial quality if cold treatment is not mandatory. The temperature/duration pairing for codling moth is very different as it requires at least 42 days' cold treatment. In the first case (fruit fly), treatment can be implemented before departure or during transit. In the second case (codling moth), cold treatment must be performed before departure as the duration of the journey is generally less than the 42 days required for the cold treatment.

For fruit flies, the treatment is more often than not performed during transit. The sensors and the temperature recordings required by the APHIS standard must be implemented in approved containers, and generate a surcharge of 5% compared to untreated apples (exported from Chile, the US, New Zealand or Australia). French exporters are not satisfied with this surcharge. They would like to abandon the APHIS standard and are collecting scientific evidence on the effectiveness of initial conservation in a cold room to eradicate the fruit fly. Their aim is the recognition of such as standard (alternative to the APHIS standard currently required, with slight differences, by almost all importing countries), but this may take several years for the standard to be recognised by the sanitary authorities of the importing countries. Negotiation costs may prove to be prohibitive if recognition requires bilateral agreements, as it is difficult to replicate negotiations. We believe that

[15] Kiwi is not concerned in the same way, the more recently negotiated bilateral protocole between France and China requiring, for its part, a cold treatment.

only an international framework such as the International Plant Protection Convention could facilitate such recognition at a reduced cost[16].

Cold treatment before shipping is certainly less costly than cold treatment during transit but also displays certain disadvantages. It is not desirable, and is even prohibited, for perishable products such as grapes and cherries. It is nevertheless possible, and perceived as being safer and less costly by the operators, for less perishable products (apples, kiwis). It must nevertheless take account of the profitability of the product according to the export schedule: the first fruit exported often obtains the best price and gains at least three weeks if cold treatment is performed in transit instead of before shipping. Italy, which has exported kiwis to China since 2009, therefore has an agreement which has always accepted that treatment be performed either before shipping or in transit. To date, treatment has been performed in transit, but Italy is now also interested in implementing the process before shipping. In January 2018, it submitted a successful request for the Chinese to visit Italy to inspect the cold rooms equipped to perform for this treatment before shipping. During this visit, Italy obtained approval for the pre-shipping cold treatment implemented method along with authorisation for certain establishments to adopt this practice.

Options available to exporting countries to deal with the phytosanitary requirements of the importing country

The exporters' first option is not to export. It happens when the targeted market is deemed unprofitable, or when, in light of what they have observed with regard to rival exporting countries or other exported products, the exporters believe that the cost of negotiating and of complying with the constraints will be far greater than the gains obtained. For Chile, this is the case of Israel, Morocco, South Africa, Australia and Japan. Chile has observed, for example, that very few countries currently export apples to Japan and, among those that do, only in very small quantities because of Japan protection over its market and its producers. Furthermore, it already has some experience of protracted negotiations with Japan when approving cold treatment conditions for fruit fly during the 1980s and while it succeeded in validating these conditions, it nevertheless limits itself to exporting kiwis and cherries.

In contrast, certain countries – boosted by some of their exporters – have negotiated, despite the fact that the negotiation process and the implementation of phytosanitary constraints are very costly. This is the case of Chile and Mexico, which is renowned for applying the most complex constraints which are also the most costly to comply with but which remains a commercial target for certain Chilean exporters despite the low volumes traded to date. Primarily importing apples from the US, Mexico is deemed a niche market which could grow considerably in importance in the future.

[16] Lubello P., Mathieu-Hurtiger V., Codron J.M. (2018). French apple exports and cold processing against the Mediterranean fruit fly: is it possible to escape the USDA standard on which all international protocols are based? *In*. *Sustainable management of sanitary and phytosanitary risks in the apple value chain*. *Synthesis of the results of the Sustain'Apple project*. Montpellier (FRA): INRA, 20-21.

At present, when certain export companies wish to send their produce to a destination, several scenarios may arise once the importing country's authorities have been contacted: a first scenario is when the importing country remains mute with regard to phytosanitary conditions, often because it is too small and remote or institutionally too weak to satisfy such a request. Generally, the exporting country nevertheless issues a phytosanitary certificate testifying – after inspection and packaging – to the absence of the main pests in accordance with the exporting country's own rules (in Chile, the tolerance threshold for pests, including non-quarantine organisms, is 4% (no more than 4% of batches containing the harmful organism), and batches exceeding this threshold cannot be exported). In certain cases, however, the exporting country may agree not to issue a certificate, instead – to protect itself against subsequent complaints – requiring that a letter of responsibility be signed transferring this responsibility from the exporting country to the importing company. This approach is adopted in Chile for occasional demands from small, remote markets like Samoa.

A second scenario, which is not very common, is when an importing country refuses imports (or does not follow-up the export country's request). This can be for two reasons. First, for sanitary reasons, when the exporting country is unable to meet the constraints imposed by the importing country. This is the case, for example, of Tunisia where the market is closed to French imports (even if negotiations are currently under way), officially due to the risk of disseminating Erwinia Amylovora. Second, for non-sanitary reasons: this was the case of South Korea which, during its bilateral multi-sector multi product negotiations with Chile, excluded apples from the general trade agreement for blatantly protectionist reasons (the country is a major apple producer). To re-establish the balance, Chile responded by excluding imports of Korean washing machines. The clearly protectionist strategy of South Korea with regard to apples is reflected in its trade balance: imports are virtually non-existent and exports are reduced to certain products sent to Taiwan and the USA.

The third scenario is the most frequent. It is when the importing country answers unilaterally, without wanting to negotiate with the exporting country. Its demands are generally limited to a list of pests it defines as quarantine organisms for which it wants assurances – in the form of a certificate issued by the exporting country – that they are not present in the batches shipped there. This list of pests is based on a risk analysis, varies in length from one country to another and is more or less relevant to the exporting country.

In certain cases, the importing country can implement a parallel system of import permits which it issues at the request of an importer, specifying the authorised volume. The importer then gives this permit to the exporter who sends it to the country's phytosanitary authorities which will issue a phytosanitary certificate in accordance with requirements. We feel that the import permit system makes sense for occasional demands. In the event of recurrent shipments, it can be seen more as a classical protectionist barrier (at best with a regulatory objective)[17]. This is particularly the case in Morocco, which allocates a quota

[17] According to our sources, for example, the few import permits granted by the Algerian authorities are not designed to reduce the phytosanitary risk from imports but simply to reduce apple imports in order to limit the outflow of currency from the country.

of 4,000 T of EU apples in order to protect its own market and domestic production. There are even some cases where an agreement has been signed between the two countries but where the import permit system remains (case of Peru and Colombia vis-à-vis Chile for example). Some years ago, the European Union studied countries using import permits and many countries abandoned this system in the wake of the study. Ten countries issue import permits for Chilean exports (according to the SAG database): Argentina, Bolivia, Colombia, Paraguay, Peru, Uruguay, India, the Philippines, Sri Lanka and Thailand. In the case of France, 27 countries issue import permits (exp@don database): Algeria, Angola, Bahrein, Bangladesh, Benin, Colombia, Costa Rica, El Salvador, Ethiopia, Honduras, Israel, Ivory Coast, Jordan, Kenya, Liberia, Mauritius, Myanmar, Nigeria, Oman, Pakistan, Singapore, Sri Lanka, Sudan, Tanzania, Thailand, Uganda and Vietnam.

In the final scenario, the importing country agrees to negotiate with the exporting country, generally leading to the phytosanitary conditions applied to the product (list of organisms not accepted and sampling rate for controls) being extended to conditions applying to the orchard (monitoring quarantine organisms, phytosanitary treatments, list of authorised orchards), the packing house (compliant equipment) and the product treatments (cold, fumigation, etc. to eradicate a quarantine organism either at the packing house or during transit). The negotiations give rise to a protocol, i.e. the set of rules to be respected, and a signed agreement. The process leading up to a signed agreement often lasts several years. The exporting country first of all selects the priority projects and prepares the cases for negotiation. Initial contact is then made, sometimes during annual days organised under the aegis of the FAO with the importing country requesting that a risk analysis be conducted by the exporting country. The former then submits its remarks concerning the analysis provided, requests any additional analyses and suggests a means of managing the risks identified. These different elements are, of course, discussed and negotiated, in particular during visits made by the importing country, finally resulting in a negotiated agreement.

The number of countries with which agreements have been signed or are in the process of being signed is relatively small; these are mainly countries in Asia and the Americas.

The table below illustrates the considerable progress that Chile has made compared to its two European rivals; the first agreement signed by Chile dates back to 1992 and was concluded with the US, a very demanding country in phytosanitary terms; this agreement was the result of more than twenty years of cooperation between the US and Chile during which solutions were explored to protect against certain pests – first the Brevipalpus Chilensis mite then the Mediterranean fruit fly (*Ceratitis capitata)*. France and Italy have only recently signed agreements, with the exception of the agreement signed by France with China in 2000. France has nevertheless made more progress than Italy in terms of signing agreements (six agreements signed compared to only one by Italy).

Table of main destinations applying phytosanitary constraints with volumes in thousands of tonnes and the dates of the phytosanitary agreements signed

Chiffres Qté Export 2015	Chili			France			Italie	
	Qté exp	Nb OQ	Accord négocié	Qté exp	Nb OQ	Accord négocié	Qté exp	Accord négocié
Chine	22.5	30	2009	2.5	7	2000		ban
Taïwan	39.3	8	2006	0.9	3	2012		En cours
Thaïlande			2013	5.7	10	2012		ban
Vietnam					8	2015		En cours
Indonésie					2	2017		2014
USA	78.3		1992	-	5	2014		2013
Mexique	1.8	12	2006			en cours au niveau UE		en cours au niveau UE
Colombie	75.6	6	2000	1.6	1			
Pérou	43.6	12	2013					
Brésil	35.8	15	2009	3.8	1		4.0	
Israël	-			4.9	22		5.1	

Source in Chile: http://www.sag.gob.cl/ambitos-de-accion/productos-vegetales-diferentes-paises/

Controlling compliance with phytosanitary constraints

Controlling phytosanitary constraints involves numerous public and private stakeholders. On the public wide, several sub-directorates of the DGAL play a role (SDASEI and, within this, BEPT, SDSPA, SDSSA, SDQPV). The DGPE and DG Treasury area also involved, along the decentralised state departments and the customs office. Abroad, the network of economic services, economic attachés, agricultural affairs advisers and, in certain countries, their assistants specialising in SPS issues also have different roles to play.

Even if the public authorities (plant protection) play a central role in the issue, numerous private stakeholders are involved in the process including exporting companies, farms, farm workers, analytical laboratories, service providers and numerous control bodies in the importing country. Protocols may support these control measures and, for certain tasks, authorise the delegation of control rights by the exporting country's public authorities to private operators within the value chains.

The public authorities of the importing country inspect the product upon arrival and sometimes indicate in the list of constraints what should/can be done if a quarantine organism is found. They can also indicate the sampling rate, given that the sampling rate for a country recognised as being reliable can fall dramatically. The European Union, for example, has lowered its complete inspection rate for Chilean fruit from 100% to 5%, with the remainder subject to mere documentary control. With the fee charged proportional

to the volume inspected, the savings for Chile are highly beneficial. If stipulated in the protocol, the foreign authorities can also exercise their supervisory right to visit the exporting country with a view to inspecting the orchards and stations. Every year, Chile receives delegations from China and Taiwan with regard to apples.

Finally, importing countries can work in partnership with the public authorities of the exporting country to perform inspections before the produce is shipped from the country of origin, referred to as pre-clearance. In Chile, pre-clearance applies to apple exports to the US and Mexico (at one point, Japan applied this process for kiwis before returning to a more standard inspection process including visits to the country to inspect the system but not the batches themselves). Their inspectors are present in Chile throughout the apple season. The US has practised pre-clearance with Chile since the 1980s with a certain trust developing over time such that the constraints have been relaxed somewhat: the list of organisms to be monitored has been constantly reduced while the number of inspectors from the USDA has fallen considerably as they now content themselves with supervising the SAG inspectors. Pre-clearance also avoids the need for inspection on arrival, although Mexico continues to conduct inspections on arrival despite pre-clearance.

France would appear to be more reticent to accept pre-clearance; it accepts temporary pre-clearance, as was the case with kiwi exports to South Korea, but does not wish this to become the rule as would surely be the case with the US. It justifies its position by claiming that it has spent considerable time and money training its inspectors and does not see why American inspectors would be more competent in conducting this type of inspection. It hopes that collective EU negotiations with the US will succeed, but progress has been slow. Having seen Italy abandon the collective position to undertake bilateral negotiations and accept pre-clearance, France has followed suit. Today, France is in favour of a system approach instead of pre-clearance, but the US imposes much more severe conditions (32 quarantine organisms instead of 4) which have dissuaded France from requesting a change in the inspection system.

The public authorities in the exporting country are involved in inspection at several points, in particular issuing a phytosanitary certificate testifying that the product has been inspected just before shipping and complies with the phytosanitary constraints imposed by the importing country. They are also involved prior to the product inspection, certifying compliance with all the additional constraints imposed by the importing country or indicated in the bilateral protocol including the monitoring of quarantine organisms, compliance of orchards and packing houses, etc.

Generally speaking, the public authorities themselves manage the quarantine organism monitoring system, be it a question of pests present in the country or those which are not present and are subject to strict monitoring in light of possible resurgences (the case of the Mediterranean fruit fly in Chile) or pests absent from the country but indicated in the importing country's list of quarantine organisms. The monitoring terms are generally defined by the exporting country's authorities, but can also be subject to a clause in any bilateral protocol. This is the case, for example, of Taiwan which is particularly vigilant in the case of the codling moth, demanding that Chile implement a stricter monitoring system (up to one trap per hectare, representing five times the normal rate).

Except in the event of special requirements on the part of the importing country, the authorities in the exporting country can delegate monitoring tasks to the production and export companies, the agro-chemical countries or accredited specialist organisations. They adopt this approach on a relatively systematic basis when it is not a case of quarantine organisms and content themselves with checking the information collected by the private operators before issuing the phytosanitary certificate containing the information requested by the importing country. Private operators, for example are tasked with setting traps, recording what is caught, performing analyses, recording and communicating the results to the public authorities. The latter thereby benefit from a service allowing them to offset the reduction in their human resource budget and nevertheless retain a supervisory role with the official responsibility of reporting to the importing country when this is required.

For delegation to be effective, trust is an essential requirement. The producer or export has no interest in lying, for if the produce is blocked on arrival, the entire country is affected. The export market is like a public good which can be jeopardised by the "free riding" behaviour of one exporter or producer who attempts to hide the number of pests caught in the traps under their responsibility. The measures adopted to control this free-riding include supervision by the public authorities and filtering within the profession. In France, this filtering process is carried out by INTERFEL (fruit and vegetables interprofession) and CRUNCH, the major exporters' club. In the case of Italy, screening is done by the cooperative system, which is dominant in national production.

With regard to supervision by the public authorities, France and Italy differ from Chile in that exportation is not their main goal. France boasts a good domestic monitoring network which is nevertheless not dedicated to exports. When an importing country includes a pest in its protocol which is not monitored by the French network (because it is of no concern to France, for example because it is contained by natural enemies), there is a procedure, initiated by the French Plant Protection Organization, which allows pests to be included in the national monitoring protocol for which data is required to be able to issue the phytosanitary certificate for export of the goods.

Another important task fulfilled by the public authorities – this time specifically for exports – is to inspect products ready for shipment. Previously conducted in the port before shipment, the development of the container means that this inspection is now performed in the packing house after packaging. The Plant Protection Office is notified by the exporter of its intention to export a given number of crates of a certain product to a certain destination. In conducting the inspection, it refers to the instructions indicated on the official site (SAG website for Chile, Expadon database managed by France Agrimer for France). In particular, it applies the sampling rates specified in the protocols, imposed by the importing country or determined as standard by the exporting country. In Chile, for example, the minimum rate is 50% of the cube root of the number of crates, but this rate can reach 2.5% for certain countries, representing a rate 20 times higher. Chile estimates the inspection time for China to be four times longer than for the European Union.

Inspection time depends on several things: the competence of the inspector, the number of organisms to be monitored, the type of organism (surface inspection of the fruit for certain organisms and inside the fruit for others) and the focus of the importing country on one particular pest, causing the inspector to be particularly vigilant. Certain organisms are not visible to the naked eye, requiring either a magnifying glass or a visit to the laboratory (requirement applied by Brazil for the Brevipalpus Chilensis mite). For certain organisms that can only be identified in a laboratory (virus, certain fungi, etc.), the inspector monitors symptoms before sending the fruit to the laboratory.

While tolerance is zero for quarantine organisms, it lay be 4% (in the case of the SAG) if the country has no demands concerning the pest (codling moth for Chilean exports to Saudi Arabia) or if the organism is not harmful (harmless ants, for example). The SAG estimates that it has refused to issue a certificate for the intended destination due to the presence of a quarantine organism or foreign body for 2,000 crates out of a total 50 million crates.

The product can also be inspected by the producers and exporters under the supervision of the public authorities. This inspection (also referred to as a pre-inspection) is carried out upstream of the final inspection conducted by the public authorities. It is requested by a certain number of demanding countries and for certain quarantine organisms which are difficult to detect; this is in particular the case of the codling moth in exports destined for Taiwan, the neofabraea fungi in exports destined for China and the Brevipalpus Chilensis mite in exports heading for Mexico. In the case of Taiwan, the pre-inspection must be conducted in the orchard, at the beginning of the packaging line and once packaging is complete. Pre-inspection would appear to be an initial requirement before the implementation of the more comprehensive "system approach" which, as we recall, is designed to control harmful organisms particularly difficult to detect (see above).

The benefit of finding a quarantine organism as early as possible in the export chain is clear. In the case of monitoring the codling moth for exports to Taiwan, the sanction is the same as the final sanction applied by Taiwan (in 2007, closure of the Taiwanese market to Chilean apples for 2 or 3 months). The sanctions applied internally are the exclusion of the producer if the exporter makes the discovery or the exclusion of the exporter if the SAG makes the discovery.

The phytosanitary certificate is mandatory for goods to leave the country[18]. For countries with no phytosanitary constraints, the certificate is simply a document testifying that an inspection has been carried out. In Chile, for example, it is specified that the rate of each harmful organism observed of the sample taken is no more than 4%, that the sampling rate is 50% of the cube root (minimal rate) and that all the SAG inspectors are trained/qualified and equipped with a 20x magnifying glass. For countries with phytosanitary constraints (sometimes referred to as additional constraints), the certificate is a sort of summary of everything certified by the SAG (product origin, accreditation of the orchard or station or exporter, import permit, additional declarations, cold treatment,

[18]The phytosanitary certificate is not always required by the importing country. However, France and Chile make it mandatory for any export operation.

etc.). With progress in the field of IT, documentation costs for the certificate are relatively low; which is more costly, however, are the controls and underlying actions.

As with monitoring, the public authorities can delegate a certain number of inspection tasks. In particular, this option is adopted for orchards (inspecting traps and recording other observations on the trees, correct implementation of treatments imposed by the importing country, etc.) which can be controlled by the producers (and their employees) or by the exporters (and more particularly their technicians). When the inspection of the orchards is requested by the importing country with a view to drawing up a list of approved orchards (i.e. approved for exports), the possibility of delegating the task must be authorised by the importing country. This authorisation is generally given, the only case of refusal that we are aware of being by the US for France (authorisation was granted for Chile). It should be noted that France nevertheless has the possibility of having the inspection carried out by the FREDONs (regional federation for the defence against harmful organisms), which have an official agreement with the DGAL. Generally speaking, the packing houses cannot adopt the delegation option and the inspection must be carried out by the public authorities or the accredited bodies; we nevertheless observe varying requirements from one importing country to another (in particular the frequency of inspections: every year or less frequent).

We can no compare the export fees, which are the cost of public service provision for pre-export inspections. In France, a simple phytosanitary certificate (documentary inspection) costs 11.43 euros, rising to 15 euros, per batch inspected (between one and three containers). If a batch inspection is required, the fee is variable and is applied in proportion to the volume, albeit at a declining rate. In other European countries, these costs are much higher and the European Union is working on harmonising the costs (30 euros in Belgium and 70 in the Netherlands). In Chile, the inspection cost is about 0.08 euros per crate inspected weighing more than 10 kg (the case of apples). In total, the cost in Chile is similar to the European average but higher than the rates practised in France.

To these costs are added the foreign countries' inspection costs (stay and salary of foreign inspectors, possible construction of inspection buildings) in the event of a pre-clearance agreement. These costs are particularly high at the beginning due to the learning process. Over time, the costs fall considerably, as demonstrated by the case of Chile. There, the costs are currently borne by the exporters' association (ASOEX), which re-invoices the exporters at a rate of 0.045 dollars per crate for batches destined for the US, 0.22 dollars per crate shipped to Mexico and 0.01 per crate sent to China. France is at the very beginning of the process and these costs are particularly high. The collective costs (APHIS management costs and meeting costs between APHIS and ANPP) are borne by the ANPP and CRUNCH while the direct shipment control costs are borne by the exporters.

IV. Quality of the institutional measures for preparing and negotiating protocols

Table comparing the types of stakeholders and the measures involved in negotiating the protocols

Stakeholder	Chile	France	Italy
Public authorities Plant protection for the negotiation	SAG	DGAL/SDASEI/BEPT	Min Agri MIPAAFT, phyto office DISR V-Central Phytosanitary Office
Professional associations representing apples	ASOEX (not apple-specific)	ANPP, CRUNCH (apple-specific)	ASSOMELA (apple-specific)
Link between public authorities and private organisations	Close cooperation	France Agrimer SPS export committee	CSO in cooperation with ASSOMELA and phyto office for improved coordination with MIPAAFT
Preparation of dossier selection by private organisations		INTERFEL commission	
Exploration of technical solutions	Foundation for fruit-growing development (FDF) and academic experts	DGAL experts CTIFL	Regional and provincial Phytosanitary Offices Edmund Mach Fundation (Trentino), Limburg Research Centre (Alto Adigio)

Once the phytosanitary constraints were identified for the three countries, we endeavoured to compare the ability of these countries to negotiate phytosanitary protocols. To this end, we began by identifying the individual and collective players concerned by these negotiations before describing and comparing first the different means of preparing and determining the protocols to be negotiated and then the negotiations themselves. We also analysed the multilateral framework of the International Plant Protection Convention, how it works, the standards governing the phytosanitary constraints within the apple value chain (in particular the cold treatment standard) and the way the three countries participate in the implementation of the convention.

The public authorities play a key role in negotiating phytosanitary protocols

Chile is one of the countries with the longest-standing phytosanitary tradition in the world. The first plant pathology unit was founded in 1896 to protect the winegrowing sector against phyloxera. The first eradication campaign targeting the South American fruit fly

(*Anastrepha fraterculus*) was launched in 1934. The SAG was created in 1967 with the remit of ensuring sanitary protection of the agriculture and stock farming sectors. Within this organisation, it is the Division of International Affairs (Division Asuntos Internacionales) which is responsible for negotiating phytosanitary protocols. The Division de Proteccion Agricola y Forestal within the same national directorate (and more particularly the Regulacion y Certificacion Fitosanitaria department) provides the Division of International Affairs with technical expertise and is assigned the audit missions by the importing countries. Other departments of the SAG, the laboratories department and the quarantine stations provide technical support on request. It should be noted that the SAG is subject to certain budgetary restrictions and until now has overcome these primarily by means of improved organisation of export controls. The USDA, which has accompanied Chile since the 1960s/70s, provides decisive aid, helping make Chile a highly efficient country in phytosanitary terms.

In France, the equivalent entity in the Division of International Affairs is the BEPT (third-party country export office) which falls under the aegis of the Sub-Directorate of European and International Health Affairs (SDASEI), itself a part of the DGAL (Directorate General of Food) which is a division of the Ministry of Agriculture. The BEPT issues instructions to the DRAAF and the DD(CS)PP with regard to certification and ensures the data relating to the export health and phytosanitary conditions stored in the EXP@DON database are updated. The SDASEI is assisted by a second entity, the Office of European and Multilateral Negotiations (BNEM), responsible for multilateral negotiations, which ensures coordination with the European Commission and is also the point of contact for the WTO's SPS agreement (notifications of draft regulations). The Sub-Directorate for the Plant Quality and Protection (SDQPV) provides the SDASEI with technical expertise relating to national, European and third-party country regulations and health requirements. It receives audit missions from importing countries. It also issues instructions to the DRAAF and DD(CS)PP with regard to the approval and official inspection of exporting entities. Other bodies within the DGAL also provide case-by-case assistance according to the different topics (laboratories, contaminants, etc.).

In Italy, the Ministry of Agriculture (MIPAAFT), and more precisely the "phytosanitary bureau", is responsible for negotiating protocols. The technical elements are prepared by Assomela and the CSO in collaboration with the regional or provincial phytosanitary offices with the technical and scientific support of the different research institutes (in particular the Edmund Mach Foundation and Laimburg). Negotiations are held at the level of the Central Phytosanitary Bureau in Rome which, among other things, deals with communicating the lists of orchards and units approved by the territorial phytosanitary services. It is often the latter who actually conduct the controls within the territory and who grant the phytosanitary certificates.

The public authorities' relays in importing countries for negotiating protocols

In Chile, major resources have been deployed to negotiate and maintain relations with importing countries, first and foremost with the US by accepting that the US experiment with solutions in Chile to combat certain pests (first Brevipalpus Chilensis then the Mediterranean fruit fly in apples). As this cooperation developed, Chile accepted the pre-clearance process, financing inspection centres directed by USDA with the participation of

inspectors from the SAG. This policy of developing major resources was also applied to China, another significant market. In particular, Chile set up an experimental 24-hectare farm in 2003 with plantations of the main varieties of fruit consumed by Chinese consumers. This farm was located in a major tourist area, attracting numerous visitors. Initially, the aim was to create greater proximity with the Chinese, teaching them to produce and consume the fruit that Chile exported there. Today, only one agricultural engineer remains. The plantations are limited to three types of fruit – blueberries, cherries and plums. Other exporting countries adopted the same approach, in particular Australia and New Zealand. Also, Chile has agricultural attaché offices in eleven Chilean embassies (EU, USA, China, India, Korea, Indonesia, among others) in charge of supporting the process of opening markets and monitoring SPS issues that may hinder Chilean exports.

France has a far weaker policy in this domain. It has relays in embassies with the agricultural advisors and, in certain embassies, with SPS affairs liaison officers. The BEPT works on a daily basis with these officers who are attached to the Ministry of Agriculture, with the number increasing over the past 3 years from 13 to 20. With regard to apples, the SPS affairs liaison officers are based in China (for China and Taiwan), Singapore for South Asia (and, since 2016 in Hanoi too), the US for the NAFTA zone and in Brazil for part of South America. Much to the regret of the managers of the plant-based sectors, the vast majority of these officers are unfortunately graduates of veterinary schools and therefore do not always pay adequate attention to these sectors. In countries with no agricultural advisors, the DGAL works with the embassies' economic departments. The BEPT recently created sheets relating to shipments intercepted at the borders in order to collect more in-depth information concerning the reasons for these interceptions and to introduce quicker solutions to manage them. Seminars and conferences intended for professional organisations are held in France together with the agricultural advisors and SPS affairs liaison officers, in particular at the Salon de l'Agriculture trade show. They represent a forum to present the markets in third-party countries along with the prospects for French exports while providing updates concerning the negotiations conducted by the DGAL (with the support of FranceAgriMer) with a view to removing the SPS barriers to these markets.

Italy has an even weaker policy than France with respect to distant markets applying phytosanitary constraints, with the exception of the US market to which Italy began exporting again a full year before France. On other markets applying phytosanitary constraints, Italy would appear less well equipped than France. Italy has shown with kiwis that it can be highly effective in opening Asian markets. The delays observed in the apple sector are not, in principle, a problem of the negotiators' skill but would appear to an issue of either human resources or weaker political desire in light of the importance of European markets. Finally, we can observe that animal products are in a better position than plant products as there would appear to be more staff in the representative authorities abroad capable of negotiating. It should be noted that these human resources fall under the auspices of the Ministry of Health.

Finally, we observe that contacts with the NPPO of third-party countries can be made during international meetings, for example the annual meeting organised by the FAO with the NPPO in all countries. The NPPO of exporting countries often play a key role in maintaining the network of relations, initiating new approaches or resolving health crises.

During this annual meeting, lobbying is also observed during the closing meetings when the ambassadors or their representatives are present; this allows discussions to be opened on other agri-food issues; the benefits are mutual as the third-party country often wishes to open the possibility of exporting to France.

The role of exporters' associations and other private stakeholders

In Chile, apple exporters are generally multi-product producers and members of ASOEX, the Association of Fruit Exporters which brings together several hundred fruit exporters with the aims of opening and consolidating foreign markets and, more particularly, participating in the implementation and maintenance of bilateral phytosanitary agreements. With ASOEX representing all fresh fruit, the phytosanitary dossiers to be negotiated are prioritised within ASOEX, between the different product committees. For the past twenty years, ASOEX has worked in close cooperation with FEDEFRUTA, the National Association of Fruit Producers some of which are also exporters but usually smaller size companies. In the past, relations between these two associations were more strained: a dozen major exporters account for half of all exports and the number of exporters was somewhat limited (sixty). Since then, with the opening of the markets and the diversification of export products, the number of exporters has increased significantly (currently more than 300 exporters), in particular allowing greater scope for producer-exporters, the market structure is less concentrated (20 exporters now account for half of all exports) and the relations between producers and exports are more cordial thanks to the development of written agreements, greater transparency concerning liquidation prices facilitating comparison with others and closer cooperation between the two associations in the different fields, including that of phytosanitary constraints. In this respect, it should be noted that the current General Manager of Fedefruta, Juan Carlos Sepulveda, was the Regional Director of the Sag before taking up his current post. Also of note is the technical expertise provided to export companies with regard to phytosanitary issues through the research programmes of FDF, the Foundation for the Development of Fruit-growing, which is closely linked with ASOEX, and through the research work and expertise of academics often working as advisors to major exporters with a view to developing phytosanitary programmes ensuring that they comply with the different constraints of the countries to which the companies export their produce.

In France, apple exporters are relatively specialised in apples, which are by far the most commonly exported fruit. They are represented by the ANPP, the National Association of Apple and Pear Producers and Exporters. The largest exporters, and more particularly those which operate on distant markets, have formed a club called CRUNCH with the main aim of promoting the quality of French apples. When becoming a member, the new exporter must present their internal control plan, identify the stations with which they work, sign a brand user licence then comply with the specifications. The CRUNCH is also the "coordinator" of the pre-clearance programme, guaranteeing the safety of payments intended for Aphis inspections. CRUNCH pays some collective fees (meetings fees, Aphis management fees) and re-invoices the control fees directly attributable to the shipments to the members who exported the goods.

In Italy, apple exporters are also highly specialised in apples. They are represented by ASSOMELA, which is a consortium of 12 members only one of which is a private operator

(Rivoira in Piedmont). All other members are cooperatives or consortiums of cooperatives. The four largest members (Marlène, Val Venosta, Melinda and La Trentina) are located in the region du Trentino-South Tyrol. ASSOMELA represents 75% of Italian production and its main tasks are to promote and support the opening of new markets and to monitor all export-related problems. Within the framework of the FROM cooperative created to promote the quality of Italian apples, it can call on legal and phyto experts who increase its effectiveness in preparing protocol files. Generally speaking, Assomela takes action when a problem is collective (affecting the majority of its members). One example is the case of exports to Israel. Assomela intervened with the Italian authorities (ministry in Rome, diplomatic headquarters in Israel) in order to understand why exports to Israel were being blocked. This remit and the general operations of Assomela are not funded by the EU nor by Italy but by its members. With regard to phyto problems, Trentino-South Tyrol is provided with support from the "extension services", namely Beratusirng and FEM (San Michele), which provide "objective" consulting.

Interfaces between public authorities and private stakeholders

In Chile, the needs of the private sector are taken into account within ASOEX, both in the product committees and in the ASOEX general commission, and then through close cooperation with the SAG. This SAG/ASOEX cooperation has proved particularly successful in the partnership with APHIS (USDA) for the pre-clearance programme signed in 1982. It still applies and is both necessary and desirable to accompany public efforts with regard to phytosanitary issues, a fact stressed by the President of the government, Michèle Bachelet, who announced to the 2008 National Convention of Fruit Producers an unprecedented budget increase for the SAG in order to overcome the new challenges of international markets and to ensure compliance with the new standards.

In France, the link between the DGAL and the professionals is guaranteed by FranceAgriMer, the national agricultural and maritime products institution which is an administrative public entity governed by the state. It is a forum for discussion and arbitration between the French agriculture and fishing sectors. The Exporters Support Service (SAEXP), which has resource persons specially assigned to each sector, serves as the interface between the professional organisations (or individuals) and the DGAL with regard to exports to third-party countries. A professional wishing to open a market currently closed on SPS grounds therefore contacts the federation or national union for their sector which in turn contacts FAM/SAEXP. It also provides any information it has been able to collect. The SAEXP exporters support service fulfils administrative functions (preparing files), monitors and updates phytosanitary constraints, organises audits by inspectors from third-party countries and mobilises the different stakeholders (operators within the sectors, technical institutes and universities) to develop proposals.

These proposals are discussed twice a year in the SPS export committees set up in 2012 by the DGAL and coordinated by FAM. France Agrimer, the DGAL SDQPV, the DGAL SDASEI and DG Treasury (responsible for negotiating tariff barriers) take part in these committees. The plant export committee covers fruit and vegetables, potatoes and cereals. Fruit and vegetables account for the majority of this activity with apples and pears (ANPP) assuming a predominant role within fruit and vegetables. The other fruit and vegetables (in

particular kiwis) are represented by Interfel. The aim of the Export Committee is to discuss priorities and define a roadmap for priority products. Using the roadmap, FAM analyses the committees' conclusions and consults the agricultural advisors or their SPS assistants. Priorities are defined according to economic interest, presented by operators, and the feasibility of negotiations as determined by the BEPT, and possibly the economic departments. Feasibility in particular takes account of the lack of human resources in the NPPO of third-party countries which often refuse to handle two requests presented by an exporting country at the same time.

Example of an SPS committee's review stating the negotiations in progress for the fruit and vegetables sector, reported to the ANEEFEL Congress in March 2016)

Jean Christophe Naudin (FAM) reported the negotiations in progress for the fruit and vegetables sector.

- 3 new markets have recently been opened (or re-opened): Vietnam for apples (70 containers shipped in 6 months), South Africa for shallots and India for apples since January.
- 2016 will be the second campaign for shipping French apples and pears to the US and the third for shipping kiwis to South Korea.
- Certain markets are now mature and are approving new structures (orchards and/or packaging stations). This is the case of China for kiwis and Taiwan for apples.
- Consisting of professionals, the FranceAgriMer fruit and vegetable export committee decided on 26 November 2015 to initiate negotiations aimed at opening new markets: South Africa and Australia for apples, Vietnam and Japan for kiwis; the US, China and Taiwan for baby kiwis; Brazil, Australia and China for shallots. The shallots/Brazil and kiwis/Vietnam files could be cleared in the coming months. All these contacts and negotiations result in trade between France and the countries concerned.
- In 2015, France received 33 foreign delegations

The professionals, in particular those of INTERFEL and the ANPP, have conducted a number of highly successful concerted actions with the public authorities, leading to tangible results including the lifting of the US embargo and reopening of the American market to French apples and pears in 2015, and the 2014 technical seminar in Taiwan presenting the know-how as well as the sanitary and phytosanitary quality of the French agribusiness sector which allowed more than 1,000 hectares of orchards of different varieties of apples to be accredited. Generally speaking, despite these occasional success stories, the professionals are not entirely satisfied by the cooperation with the public authorities and would like to work more closely with them, as they believe is the case in other European countries such as Belgium or the Netherlands. In particular, they raise concern about the insufficient information from the public authorities and the lack of resources provided by the public institutions when negotiating agreements. To make the SPS export committee more effective and enjoy more information concerning the existing agreements, in particular those signed by their competitors (Chile, New Zealand, South Africa and Argentina in the apple sector), they introduced a specialist professional commission in 2015, coordinated by INTERFEL.

In Italy, the CSO (Centre for Fruit and Vegetable Services) is a forum bringing together all operators in the fruit and vegetables sector in the fields of production, packaging, logistics and conservation. Founded in 1998, the CSO is a cooperative with more than 65 members, including ASSOMELA. Its aim is to develop synergies between all its members in order to increase their competitiveness, in particular with regard to opening new markets and removing health and phytosanitary barriers. It is financed by its members' subscriptions and European funds (the latter only for funding advertising campaigns). Unlike FAM, the CSO is not a public entity. It is a private organisation, and therefore less dependent on the public authorities, which specialises in fruit and vegetables (FAM also deals with cereals, animal products, etc.) and calls on the participation of all the operators in the sector (and not only producers/exporters). All CSO operators acknowledge that there is insufficient staff in the public authorities responsible for negotiating agreements and that it will be necessary, now that that Italy is increasingly focussing on countries applying phytosanitary constraints, to work with these authorities to develop better diplomatic and technical relations in order to ensure greater efficiency in preparing files and signing agreements. Our contact partners informed us that they feel that the collaboration between the public authorities and professionals in France was better, which may be due to the higher number of open markets.

The arbitrage between the files earmarked for the negotiation of agreements falls under the aegis of the public authorities. As in France and Chile, it is necessary to take account of the limitations of NPPO staff in third-party countries. This often obliges exporting countries to classify their priorities with regard to a single importing country. Having submitted a request to China with regard to apples and pears, Italy had to indicate a priority for pears. When dealing with Vietnam, which also wanted to deal with only one request at a time, Italy was forced to abandon kiwis and pears to prioritise apples.

The CSO, which represents the producers of fresh fruit and vegetables in Italy, and via Assomela, the producers of apples, plays a key role in the arbitrage of dossiers, given the economic weight of these speculations. The market opportunities also play a major role. In this way, the Italian kiwi sector, which is a leader on the European market, succeeded in opening numerous markets where phytosanitary constraints are applied (US, NZ, Australia, Canada, China, Taiwan, India, South Korea, etc.), unlike the apple sector which has only signed two phytosanitary agreements, with the US and Indonesia. Political determinants ensuring that regional balances are respected must also be taken into account. Consequently, table grapes are become more important than apples with a view to ensuring a balance between northern and southern Italy. Finally, it should be noted that when determining priorities, there is no formal interference between fruit and vegetables and the other key products exported (Parma ham, gran padano, Italian wine, etc.) insofar as the latter are handled by the Ministry of Health and not the Ministry of Agriculture as is the case for fruit and vegetables. In reality, fruits and vegetables would appear to be less of a priority on the political agenda than the other products mentioned, in light of their economic importance.

Preparing and negotiating the file with the importing country

A dossier is generally initiated by the exporting country. It is the interested parties themselves, i.e. the exporters or the producers-exporters who submit a request to the

exporters' association in their country, which in turn communicates this to the public authorities (NPPO) who then deal with the importing country.

It is the importing country which sets the rules in order to protect its domestic territory. To evaluate the risk of introducing a harmful organism, it asks the country wishing to export to present a technical dossier for the product to be exported with a view to conducting a phytosanitary risk analysis. In the case of apples, for example, the dossier describes the apple production process, orchard management, the treatments carried out, harvesting, storage in the packaging stations and the harmful organisms that can be found in the exporting country. On the basis of this information, the importing country conducts a phytosanitary risk analysis (risk of introducing a harmful organism) in accordance with the international standard (criteria to be respected, recommendations) and determines the different means of managing this risk. If it cannot be managed, the country will prohibit imports.

In France, the BEPT (SDASEI/DGAL) is the main party involved in preparing a dossier once the priorities have been set by the SPS export committed coordinated by France Agrimer. It assesses the level of recognition of the French sanitary system by the third-party country and the negotiation steps required including answering a questionnaire, conducting a phytosanitary risk analysis, organising an audit and / or inspection mission by the country concerned, defining the approval of establishments' mechanisms and providing a sanitary certificate template. The technical sub-directorates of the DGAL are involved in analysing the third-party country's requirements and developing the arguments required for the negotiation process. In certain cases, the ANSES can be asked to provide an opinion. The professionals also play a role in this procedure and are contacted through FranceAgriMer, which submits all technical (and possibly economic) elements to the DGAL that facilitate its negotiations. In particular, the technical dossier is prepared jointly by the administration and the professionals applying to export with a view to conducting the phytosanitary risk analysis. The dossier is approved by the DGAL before being submitted to the third-party country.

The importing country also conducts a phytosanitary risk analysis and, in a cooperative climate, shares its conclusions thereby facilitating an exchange of views and the possible adjustment of the risk management solutions. Like most exporting countries, France has its own list of harmful organisms. If it adds such an organism to the list, it must take action by mobilising additional resources. As the resources are increasingly limited, it initially only includes organisms deemed to be significant on the list intended for the importing country. If the importing country requests information about other harmful organisms, it naturally answers their questions. If a new constraint is added, the Human Resources department is consulted with regard to feasibility. France has prepared several technical dossiers on a product-by-product basis, so that when a sector submits a request to export to a new country, it can already send the basic elements to this country, although it must still answer any questions received.

The foreign NPPO then may conduct an audit mission. This mission is carried out at the beginning of the dossier examination process but can be renewed every year after the agreement is signed. It is relatively time-consuming and costly (€15/20 thousand per two

or three-day audit), calling on the export department of France Agrimer, the most knowledgeable experts of the SDQPV and interpreters, the aim being to convince the foreign guests that the risk management system is effective. The mission also presents an excellent opportunity to explain new risk management techniques (such as the benefit of pheromones). It should be noted that certain countries (Japan, US) refuse to have their mission paid for in order to avoid any suspicion of corruption, and come with their own budget.

In Italy, the dossier is prepared in three stages: first by the value chain concerned (for example ASSOMELA, in the case of apples), then by the CSO (of which ASSOMELA is a part), which determines the priorities among all fruit and vegetables and consolidates the dossiers in collaboration with the phytosanitary offices of the most-affected regions , and finally by the Ministry of Agriculture, via the NPPO. At value chain level (e.g. apples), the preparation process is triggered when ASSOMELA is asked by its members to examine the dossier. ASSOMELA studies the feasibility of the request using documents and compares this with the constraints imposed on rival exporting countries. The dossier comprises the following elements: land areas concerned, description of the integrated production method, the product management in the stations, the packaging and storage procedures, diseases and product treatment solutions. The technical aspect of the dossier is prepared by FEM, the Limburg research centre and the phytosanitary office that has been created to accelerate the opening up of new markets.

The CSO compares the priorities examined individually per value chain. For each priority 1 dossiers (product x country), the CSO appoints a person to consolidate the dossier in the country of destination. The CSO and ASSOMELA also consolidate the dossiers with the input of the members and the regional phytosanitary offices concerned. The CSO then sends these consolidated priority dossiers to the phyto office of the Ministry of Agriculture. To ensure direct dialogue with this ministerial office, a cooperative body manned by its own employee was created two years ago, incorporating some of the main entities of the fruit and vegetables sector and the CSO as well as ASSOMELA, APOT, the Confederation of Cooperatives and Fruitimprese (the National Association of fruit and vegetables businesses). Other institutional channels serve to lobby the ministerial office, the Confederation of Italian Cooperatives, the agricultural unions and the ministerial round tables, for example the phyto products lobby.

Finally, the Ministry of Agriculture performs the final consolidation of the dossier before interacting with the importing country. The sectors feel this process is very long due to a lack of human resources. It should be noted that the Ministry of Agriculture only handles dossiers relating to plant products, with the Ministry of Health dealing with animal products.
In Chile, it is the Association of Exporters (ASOEX) which completes the preparatory work on the dossiers, “working on a daily basis” in close cooperation with the SAG. When Chile wants to open a market, the initial visits are often conducted solely by the SAG, followed quickly by joint visits by the senior representatives of both institutions (ASOEX and SAG). The presence of ASOEX in the negotiations ensures increased pressure and more rapid progress: while finalising a protocol often takes a great deal of time, the presence of ASOEX shortens the process somewhat. It also makes it possible to avoid accepting unworkable

measures and to enjoy a more commercial vision. Regular meetings are organised with certain countries. With China, for example, such meetings are held twice a year, bringing together the directors of the NPPO accompanied by the executives of ASOEX. Audit missions (4 or 5 Chinese visitors for one week) are also organised every year to inspect the orchards and packing stations, check the application of phytosanitary measures, the packaging, certificates such as type Global Gap, BRC, etc.

V. Summary/Conclusion

Our investigations began with a significant contrast being observed between Chile, France and Italy with regard to market positioning in countries applying strict phytosanitary constraints. Of these three apple-exporting countries which are among the most competitive worldwide, Chile ships more than two-thirds of its exports to countries applying phytosanitary constraints whereas France and, more particularly, Italy ship less than 5 to 10% of exports to these countries. The same contrast was observed with regard to the dates on which these markets were opened, with Chile enjoying a relationship with these countries dating back more than 50 years while, with one notable exception (France's agreement with China), France and Italy can look back on less than 5 to 6 years of cooperation.

We wanted to explain this contrast relating both to apple volumes exported and the history of the market position through two types of argument: macroeconomic or institutional arguments and meso-institutional arguments, in particular the characteristics of the publics-private mechanisms enabling the phytosanitary constraints to be prepared and negotiated.

We initially provided framing elements, raising the question of the natural and biological differences between the three countries: are the quarantine organisms identified by the importing countries the same for all three countries? Our conclusion is that the natural/biological constraints play a relatively small role in explaining the contrasting market positions. The main quarantine organisms identified concerning the three apple-exporting countries are almost identical (codling moth, obscure mealy bug, San Jose scale), with two notable exceptions: the Mediterranean fruit fly, which is no longer present in Chile (other than in the event of very occasional reintroductions due to travellers) and the Brevipalpus Chilensis mite, specific to Chile but not found in France and Italy.

We then provided framing elements allowing the different types of constraint imposed by importing countries to be identified: high or low level of constraints, negotiated or non-negotiated constraints, with or without import permit, relating to product inspection only or also relating to the production process. We also examined the differences in terms of content imposed by importing countries: quarantine organisms listed, inspection sampling rate, players other than the NPPOs involved in the inspection, type of treatment authorised, system approach, etc.

Lastly, we provided framing elements highlighting certain key characteristics of the phytosanitary constraints applied by importing countries:

- the current trend of implementing or reinforcing phytosanitary constraints; several countries (Brazil, Vietnam, etc.) have begun revising their agreements by conducting a

risk analysis; more often than not, they have begun with new products. Some have decided to freeze imports until the revision is complete. However, most exporting countries with a long-term relationship have succeeded in retaining the original conditions during the transition period;

- the importing country's NPPO limited human resources hampering the examination of the dossiers; for instance, most importing countries refuse to examine more than one dossier at a time, thereby forcing the exporting countries to set an order of priority;
- the competence acquired and the adversity to the risk of introducing new quarantine pests, which generally go hand in hand and which vary considerably between the NPPOs of third-party countries; this adversity is specific to the local NPPO and depends very little on the supplying country. It is characterised in particular by the number of quarantine organisms included in the constraint, with some countries (China or Taiwan, for example) limiting themselves to the most significant pests while others (such as Korea) take the precaution of including almost every quarantine organism they can identify, even those which are not relevant for the exporting country. It should be noted that risk adversity diminishes among long-standing suppliers which have developed a degree of trust, resulting in the constraints being relaxed (for example between Chile and the US);
- the complexity and/or severity of certain agreements (Mexico or Japan, for example) and the trend towards constraints being expanded or strengthened: the countries conduct new risk analyses, revise protocols and review agreements already in place.

To explain this contrast, we identified macroeconomic or institutional arguments and meso-institutional arguments. The former include the factors we have just examined which are specific to the importing countries and not dependent, or only to a very small extent, on the exporting countries, i.e. the limited human and financial resources, the competence acquired and the adversity to phytosanitary risk, the complexity of the constraints imposed and the desire to expand or revise existing constraints. The macro-institutional arguments also include institutional factors which depend on both the importing and exporting countries such as factors of cultural and political proximity (France and Vietnam) and/or the duration and accumulation of experience (Chile and the US), which facilitate dialogue as well as the negotiation and implementation of phytosanitary agreements, political and economic factors preventing certain types of trade (Korea and Chilean apples, Taiwan and Chinese apples, etc.) or basing phytosanitary agreements for apples with other agreements (Indonesia conducting joint negotiations with France with regard to apples and palm oil). In this respect, we have seen the role played by embassies' economic departments under the aegis of the Ministry of Budget in FAO/NPPO meetings.

To this list of macro-institutional determinants must be added more economic determinants specific to the apple sector which explain the priorities of the three countries on markets applying phytosanitary constraints. First, there is the size of the domestic market which, in countries with small markets, explains the priority given to exports. There is also the geographical proximity of markets capable of absorbing exports from the three countries studied. In the case of France and Italy, the large European market explain the late decision to export to markets applying severe phytosanitary constraints, which are for the most part distant markets.

If we now consider the meso-institutional arguments, we refer to the analysis of institutional mechanisms for the preparation and negotiation of phytosanitary constraints. This analysis highlights a certain number of differences which can, in part explain the contrast between the three countries. Such differences concern public stakeholders, private stakeholders, the interfaces between public and private stakeholders and the involvement of public authorities in the International Plant Protection Convention.

With regard to public stakeholders, we can point to the competence level which depends on experiences already acquired and the possibility of learning from more experienced countries (Chile with the US), resource sharing between livestock and plant sectors (France is an example of this imbalance in favour of the animal sectors) and resource allocation in the importing countries (existence of dedicated SPS experts in certain French and Chilean embassies abroad, which is not the case for Italy; Chile's investments in a show farm in China). Naturally, these dedicated resources (including human) depend on the size of the markets; they are also the result of strategic choices). Finally, it is important to underline the role played by the European Union in negotiating agreements (with the US at present, with Asia in the future) and we can question both the desire of its members to accept this collective bargaining and the advantages/disadvantages of such a collective approach.

With regard to private stakeholders, we note the influence that the apple sector has in the preparation and negotiation discussions which is linked, in particular, to the weight of this sector among all fruit and vegetables. One major difference between France and Italy is that France focussed its efforts on the apple sector, which was its export leader, whereas Italy gambled more on kiwis, for which it was the leader in the northern hemisphere. Another difference, this time between Chile on the one hand and France and Italy on the other, is that Chilean exporters are generally multi-product exporters whereas French and Italian exporters tend more to be single-product operators. The associations representing them with regard to arbitrages and the preparation of the dossiers are not the same: in Chile, ASOEX represents broader interests while ANPP in France and ASSOMELA in Italy focus on apples. The advantages/disadvantages analysis weighs economies of scale or scope (the case of ASOEX) against the benefits of improved targeting of priorities. In the case of Chile, the disadvantage of according lower priority to apples at present is offset by the fact that Chile is already firmly established on markets applying severe phytosanitary constraints to apples. It is almost important to incorporate the strategic arguments relating to the choices made by the three countries. When certain large-scale exporters are already present on large markets applying phytosanitary constraints, the choice may be made to open less developed market where there is less competition. The question can also be raised for so-called "complex" markets such as Mexico, which imposes severe, and sometimes unforeseeable, constraints where profitability may prove to be a problem. France and Italy appear to recoil from this investment while Chilean interviewees consider that, despite being costly and time-consuming, Mexico may become more open in the future and that it is worth being present on this market, despite the small volumes currently imported. It should nevertheless be recalled that Chile is all the more driven to adopt such a strategy as, unlike France and Italy, it exports out of season and does not have a large solvent market nearby.

At the interface between public and private stakeholders, a good information flow and good cooperation between the two types of stakeholders are essential throughout the dossier preparation, selection and negotiation process. In France and Italy, these two conditions are not, as yet, fulfilled in the apple sector, with the exception of certain successful concerted actions implemented in France (to reopen the US market and extend the market in Taiwan). France and Italy realise that these favourable conditions exist elsewhere in the European Union (for example in Belgium and the Netherlands) and call for closer collaboration with the public authorities. In Chile, the action of the SAG is perceived in a very positive light by the companies and a climate of trust has been created, in particular with regard to controls and the issuing of the phytosanitary certificate. This climate of trust is reflected in the definition of constraints, with importing countries more easily accepting the delegation of power with regard to the control of phytosanitary measures. Another difference at the interface level is the nature of the interface mechanism. In the case of France, it is public (France Agrimer) under the control of the French NPPO whereas in Italy it is a cooperative private mechanism with a scope limited to fruit and vegetables (which is not the case in France) and includes all the stakeholders responsible for the operations of the sector (production, logistics, station equipment industry, storage, etc.). The problem nevertheless arises of improved communication with the public negotiation authorities. In the case of Chile, the interface mechanism is the binary SAG/ASOEX pairing without any need for an intermediary as in France and Italy. ASOEX represents all fruit and vegetables and has succeeded in ensuring effective cooperation with the SAG.

Finally, the question remains of the public authorities' involvement in the International Plant Protection Convention which can help promote certain decisive standards with regard to the management of phytosanitary risk (example of the cold treatment standard which was the subject of specific research in the Sustain'Apple project[19]). It should be recalled that, unlike pesticide residue constraints (sanitary constraints) which have long been closely harmonised between countries and cannot be applied in a discriminatory manner between supplier countries, phytosanitary constraints are for the most part scientific, non-universal constraints dictated by the importing country, or at least not in consultation with the importer. While the International Plant Protection Convention (the workings of which were studied in a different Sustain'Apple activity[20]) naturally provides a whole host of standards which contribute to ensuring a certain convergence of constraints, they nonetheless remain essentially bilateral (or even unilateral) in nature in light of the complexity of the problem and the large number of factors influencing the implementation and content of an agreement.

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