



Department of Social Sciences
Management Studies Group
Wageningen University

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Supply Chain Governance: The Costa Rican Pineapple Chain

An explorative study concerning the entering of the Costa Rican export chain for fresh pineapple with an innovative product in crop control



Marten J. van Lieshout
850223-517-130

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Student: Marten J. van Lieshout

Address: Drift 5 bis
3512 BP
Utrecht

Reg. No.: 850223-517-130

Contact: marten.vanlieshout@wur.nl
+31 (0)6-24230414

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Management Studies Group
Wageningen University

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Code: MST-80430 (33 ects)

Supervisors: Dr. J. H. Trienekens
jacques.trienekens@wur.nl

Dr. P. Zuurbier
peter.zuurbier@wur.nl

Dhr. G. Visscher
g.visscher@eco2clean.nl

Foreword

Utrecht, the Netherlands

Herewith, I present my MSc thesis “Supply Chain Governance: The Costa Rican Pineapple Chain”. This thesis concludes my master program “Management, Economics, and Consumer Studies” at Wageningen University.

These last months have provided me with a theoretic and practical view of the Costa Rican pineapple chain. Especially my trip to Fruitlogistica in Berlin has provided me with many business contacts, which contributed to my practical knowledge of global fruit chains, for which I am thankful.

I would like to express my gratitude to all parties that were involved in the realization of this thesis. These parties include all fruit distributors that were willing to contribute to my thesis by answering my questionnaires and follow-up questions. Furthermore, I thank mr. G. Wassink from DLV Plant for providing me with valuable input and various views on the Costa Rican pineapple market, my supervisors Dr. J. H. Trienekens and Dr. P. Zuurbier for their relevant comments on my thesis, and Dhr. G. Visscher for providing me with a current and interesting research subject. I very much appreciated the pleasant cooperation with both my supervisors and dhr. Visscher. Last but not least, I would like to thank my parents for their support and interest during the realization of my research.

Marten J. van Lieshout

July, 2010

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Executive summary

The increasing Western demand for exotic products and the tightened EU policy concerning maximum residue levels are forcing farmers in developing countries to adapt to stringent Western quality standards. However, at the same time the use of pesticides and fungicides in crop growing processes in developing countries such as Costa Rica, is growing (Polidoro et al., 2008; Waichman et al., 2007). Concerns about current agricultural systems in developing countries centre on the need to develop agricultural practices and alternative post-harvest treatment methods that do not have adverse effects on food safety and the environment, are accessible to farmers, are economically feasible and lead to improvements in food productivity (Coates, 1993; Pretty, 2009; Morales et al., 2009). Brannstrom (2005) argues that possible policies to reduce the negative implications for food safety and environmental effects of the modern agricultural expansion of developing countries include the setting of standards for agrochemical use. These changing needs in agricultural processes offer market potential for Eco2clean, the supplier of DES 46, an innovative post-harvest disinfectant for fruit and vegetables.

The export market for Costa Rican pineapple is dominated by Del Monte and Dole, controlling the entire cross boundary supply chain from growth, to distribution. Besides these large corporations, the export chain includes independent growers, exporters, wholesalers, importers and retailers. Produce of Costa Rican fresh pineapples is exported to the EU in two ways. Large Costa Rican pineapple growers export their produce to Dutch distributors from which produce is distributed through the entire EU. The alternative is that produce is exported to European wholesalers which resell produce to Dutch fruit importers which in turn distribute produce across the EU. Based on expert consultation (DLV Plant, 16/02/2010), which emphasizes pineapple importers' central role in the chain and their interests in sustainable agro-chemicals, the potential of maintaining partnerships between disinfectant suppliers and Dutch fruit importers in order to successfully launch DES 46 on grower level, is substantial.

Data from desk research and expert consultation from DLV Plant provided input for qualitative interviews, which were conducted in order to support, complement, or disconfirm the expected potential of relationships between disinfectant suppliers and pineapple importers. Based on pineapple importer-grower/exporter relations, further aims of the questionnaire were to draw conclusions on the dominant governance mechanism, either contracts or relationships, that should be applied in a disinfectant supplier-pineapple importer relationship in the Costa Rican pineapple chain; the influence of chain uncertainty on the way exchange relations between disinfectant suppliers and importers should be governed; and disinfectant suppliers' willingness to invest in the development of sustainable agro-chemicals at grower level.

The questionnaire was distributed among the quality managers of six Dutch pineapple distributors. From the results, several conclusions are drawn. The expected future demand for sustainable agro-chemicals is considered to be great. Whereas the desk research and expert

consultation indicated that developing relationships with importers offers disinfectant companies access to growers, the empirical research supports that pineapple importers are aware that a pro active attitude on their behalf is necessary to facilitate sustainable use of agro-chemicals in the fresh pineapple chain. The empirical research also offers alternative partners for disinfectant suppliers. Relevant alternative partners are large independent growers, and local Costa Rican distributors of agro-chemicals. The literature states that both relational and contractual mechanisms are important in governing exchange relationships between importers and their suppliers. However, empirical evidence strongly emphasizes the importance of relations between pineapple importers and their suppliers. The proposed effect of uncertainty on exchange relationships between importers and growers/exporters is not supported. Investments at grower level are the responsibility of each individual grower. Investments include training of employees, storage facilities and logistic facilities. In order to facilitate and stimulate the use of sustainable agro-chemicals, disinfectant suppliers will have to invest in marketing, logistic facilities and the creation of scientific evidence in support of the working of such agro-chemicals. In this context much information exchange between disinfectant suppliers and possible buyers is needed to convince possible buyers of the innovativeness and working of DES 46 and to persuade them to use it.

The results from this research are of scientific relevance in a sense that the research adds to the empirical evidence that shows that in various contexts, exchange relationships are characterized by relational governance. In the context of managerial relevance, this research concludes that in order for Eco2clean to generate earnings off relational exchanges, Eco2clean must be willing and ready to invest in relationships, information exchange, and the marketing and scientific research regarding DES 46. This requires a focus on the customer (e.g. importers, or local distributors of agro-chemicals) as the source of future profitability, a supportive organizational culture that proliferates that focus across Eco2clean, support for service and sales employees, and compensation for service and sales employees based on their success in creating positive customer evaluations of performance of DES 46.

1. Introduction

1.1 Research context

The growing demand of Western consumers for exotic products from developing countries, as well as the liberalization of the agricultural sector in those areas, have caused developing countries to become an ever growing part of international food chains (Trienekens and Willems, 2006; Trienekens and Zuurbier, 2006). The concern of Western consumers regarding food safety and environmental issues (see Box 1 and 2) creates a new demand for agricultural producers in developing countries. Furthermore, since September 2008, the European Union has tightened the legislation concerning 'maximum residue levels' of pesticides and fungicides on import fruit. This regulation implies that 'pesticide and fungicide residues should not be found in food or feed at levels presenting an unacceptable risk to humans' (Regulation No. 396/2005). Furthermore, US restrictions on post-harvest chemical fumigation in 2001 have increased the need for alternative post-harvest treatment methods, such as heat treatments (Morales et al., 2009).

Box 1: Honduran melons contaminated with Salmonella

In March 2008, the FDA started removing Honduran melons from supermarkets after the fruits were contaminated with Salmonella. As a result of the outbreak, in more than 16 American states and in Canada, 59 people were sickened, and 14 people had to be hospitalized.

Source: Clarislaw, 01-03-2010

Box 2: Violation of environmental laws by Del Monte

In 2007, the Environmental Protection Agency (EPA) fined Fresh Del Monte \$25,000 for violating environmental laws regarding the use and transport of pesticides on their farms in Kenya and Hawaii in 2004 and 2005. According to the EPA, Fresh Del Monte "failed to comply with label directions regarding pesticide application and precautions to protect worker health and the environment.

Source: IRLF, 2008

The increasing Western demand for exotic products and the tightened EU policy concerning maximum residue levels are forcing farmers in developing countries to adapt to stringent Western quality standards, which has an important impact on their competitive position in the global food market. However, at the same time the use of pesticides and fungicides in crop growing processes in developing countries such as Costa Rica, is growing (Polidoro et al., 2008; Waichman et al., 2007). Especially small-scale farmers use high levels of pesticides when treating their fruits. Drivers encouraging pesticides as the dominant form of pest management include increased pest incidents and the lack of advice and knowledge on alternative pest treatment methods (Williamson et al., 2008). Those farmers consider spraying their fruits more frequently as the sole solution against insects, fungi and other plagues threatening their fruits (Dinham, 2003; Waichman et al., 2007). Their

most important argument in favor of using pesticides more frequently is to increase high crop yields and thus to increase economic returns. Besides using pesticides, farmers use fungicides in order to decrease quality deviation in their crop yields (Dasgupta and Laplante, 2001). The increasing use of agro-chemicals in growth stages of fruit crops has a negative effect on food quality.

Food quality is a widely used concept that has been defined in many different ways. According to Zúñiga-Arias (2007), one of the more comprehensive definitions is offered by Luning et al. (2002), who refer to food quality as the ability of food products to meet or exceed customer expectations. The attributes in the concept of quality differ from each other, depending on the actor that is acquiring the product. Major actors that value food quality differently in agri-food chains include growers, packaging companies, exporters, importers, distributors, retailers and consumers. Table 1 shows that these actors each emphasize different aspects of food quality:

Table 1 – Actors in the Costa Rican pineapple chain and their quality preferences

Actor	Quality preferences
Grower	Productivity, homogeneity, disease resistance
Processor	Homogeneity, constant quality
Exporter	Constant quality, reliable supply
Importer	Constant quality, reliable supply
Distributor	Availability, freshness, packaging
Retailer	Good shelf-life, diversity, appearance, delivery
Consumer	Tasty, healthy, appearance, sustainability, convenience, constant quality

Source: Zúñiga-Arias (2007)

Distributors and retailers have consumer preferences in mind, e.g. taste, freshness and food safety, and thus put emphasis on visual attributes of agri-products, such as shape, colour and shelf-life. Preferences of growers and processors are commonly related to maximising production yields by maximising product resistance to pests and diseases, and thus minimising production loss, in order to ultimately maximise profits.

When considering agri-food product quality, a distinction is made between intrinsic and extrinsic quality attributes (Zúñiga-Arias, 2007). Intrinsic quality attributes refer to physical product characteristics, whereas extrinsic quality attributes refer to how the product is produced, e.g. considering the use of agro-chemicals in pre-harvest and post-harvest processes. EU regulations are enforced in order to improve extrinsic quality and thus to ensure health and safety aspects of agri-food products. These regulations, and concerns of consumers and retailers about current use of agro-chemicals in developing countries, centre on the need to develop agricultural practices and alternative crop control methods that do not have adverse effects on food quality, safety and the environment, are accessible to farmers, are economically feasible and lead to improvements in food productivity (Coates, 1993; Pretty, 2009; Morales et al., 2009). Brannstrom (2005) argues that possible policies to reduce the negative food safety and environmental effects of the modern agricultural expansion of developing countries include the setting of standards for agrochemical use.

These changing needs in agricultural processes offer market potential for innovative disinfectant suppliers and their sustainable agro-chemicals.

In order to successfully market sustainable agro-chemicals in fruit chains in developing countries, attention should be paid to supply chain management aspects, such as which chain members to develop exchange relations with, and which type of governance mechanism is most suitable in such exchange relations. Supply chain governance is an important mechanism in aligning the interests of suppliers and their buyers to ensure the effective delivery and distribution of commodities, which in turn has a positive impact on entire chain performance (Gyau and Spiller, 2008).

1.2 Case review

Taking in account the tightened EU legislation concerning maximum residue levels on food and feed as well as the growing demand for exotic fruits from developing countries, Eco2clean, a producer and supplier in disinfectants for e.g. food and surfaces, has developed DES 46. DES 46 is a non-residue disinfectant of fruit. Before fruit products are transported to retail destinations in North-America and Europe, e.g. the Netherlands and England (Barrett et al., 2002), DES 46 is applied on the crops, eliminating residues of micro-organisms as well as making the crops resistant to fungicides that may infect the crops during transport and storage. Whereas traditional disinfectants tend to leave behind residues on the crop surface, DES 46 is supposed to fully resolve in water and oxygen, leaving no residues behind on the crops when it reaches its destination. Although DES 46 is still in its test phase, the fungicide has proven to lower residue levels on crops in several open field tests with Dutch fruit growers.

The active substance in DES 46, hydrogen peroxide, is not included on the European list of permitted substances in disinfectants. As a consequence, Eco2clean intends to introduce DES 46 on the Costa Rican fruit market. Large scale fruit growers in Costa Rica, world's largest pesticide users (Waichman et al., 2007), offer the highest potential for introducing DES 46. In general, large-scale fruit growers are expected to be better able to cope with the expected higher price of DES 46. They often disinfect their produce themselves, which results in efficiency and high quality fruit. Contrary to large growers, small growers ship their untreated fruit yields to large central disinfecting and exporting facilities.

Until now, Eco2clean attempted to supply DES 46 directly to 15 large Costa Rican melon growers, ranging in size from 200 to 2000 ha and to multinational Del Monte. However, a lack of clear strategy for introducing DES 46 in the chain, and motivating growers to use DES 46, still exists. Eco2clean is now in need of a strategy in order to successfully market DES 46 in a high potential Costa Rican fruit chain. This research encompasses an analysis of the expected potential of DES 46 in a large Costa Rican fruit chain and investigates opportunities and challenges for successfully launching DES 46 in a Costa Rican export fruit chain. In this context, the Costa Rican export chain for fresh pineapple offers a high potential and is the focus chain in this research, considering that Costa Rica is one of the world's largest pesticide users and the largest pineapple exporting country in the world (see Table 2).

Furthermore, the export market for fresh pineapples shows opportunities for new markets, for instance, organic pineapple production.

Table 2 – Country-wise export of fresh pineapple in 2005

Exporting country	Quantity of export		Value of export	
	(MT ¹)	% Share	(RS. Crores ²)	% Share
Costa Rica	905,090	41.11	1477.04	27.38
Belgium	255,696	11.61	1139.31	21.12
Philippines	210,762	9.57	194.82	3.61
Côte d'Ivoire	132,077	6.00	212.44	3.94
Netherlands	99,295	4.51	449.85	8.34
USA	80,611	3.66	365.87	6.78
Ecuador	79,737	3.62	134.40	2.49
France	59,529	2.70	240.71	4.46
Ghana	59,034	2.68	318.42	5.90
Honduras	54,930	2.49	92.99	1.72
Guatemala	40,359	1.83	52.88	0.98
Others	224,576	10.20	715.65	13.27
World	2,201,696	100.00	5394.39	100.00

Source: ITC calculations based on COMTRADE statistics

¹ MT = metric tons

² RS. Crores = Indian Rupee currency

1.3 Research objective and research questions

The following research objective captures the essence of the research topic:

“To explore opportunities and challenges concerning the entering of international Costa Rican fruit chains with an innovative product in crop control, by gaining a clear understanding of product flows in Costa Rican fruit chains and supply chain governance mechanisms adopted by Costa Rican fruit chain parties.”

These insights are then combined and processed into clear recommendations for Eco2clean, which the company can take into account when considering ways to market its innovative non-residue disinfectant, DES 46, in international fruit chains.

In order to achieve the objective of this study and to provide Eco2clean with recommendations, three research questions are addressed:

- 1) What are the primary elements describing a supply chain and how can these elements be used to determine suitable partners for marketing a sustainable fungicide in the Costa Rican pineapple chain?
- 2) How does the Costa Rican export chain for fresh pineapple function from a chain governance point of view, and what does this mean for the potential demand for sustainable fungicides?
- 3) What opportunities and challenges exist with regard to the potential demand for sustainable fungicides, and which recommendations related to chain governance can be provided?

1.4 Structure and outline of the thesis

The study is structured into eight main chapters. Chapter 2 starts with an introduction of the Costa Rican pineapple chain by focusing on how fresh pineapples became Costa Rica's main export product as a result of the increasing chain power of large fruit multinationals, such as Del Monte and Dole. Chapter 3 (research question 1) concerns the analysis of the structure of the Costa Rican pineapple chain, based on the supply chain analysis model of Lambert and Cooper (2000). Furthermore, the role of contracts and governance in inter-firm exchange relationships is assessed. In Chapter 4 (research questions 2 and 3), the theoretic framework of Aramyán et. al (2007) is applied to the Costa Rican pineapple chain environment. Based on the literature, the theoretic model and explorative interviews, chapter 5 & 6 discusses respectively the methodology and results regarding the empirical research. Chapter 7 concerns the conclusions and recommendations with regard to the case problem, whereas chapter 8 presents the recommendations and discussion.

2. Agricultural development in Costa Rica

2.1 Introduction

In Costa Rica almost 10% of total land is currently used for crop production. Since the 1950s, the agricultural sector in Costa Rica has declined in importance. However, in 1998, this sector still accounted for 15% of GDP and employed one-fifth of the Costa Rican labour force (Advameg Inc, 08-02-2010). Costa Rica's oldest export product is coffee, which has been exported globally since the 1790s. Coffee used to be Costa Rica's main export product for years. Between 2000 and 1994, coffee exports as part of total exports decreased from 11% to 4% (Advameg Inc, 08-02-2010). In 1992, banana cultivation surpassed coffee as Costa Rica's main agricultural product. Since then, local farmers used to cultivate banana whereas large fruit multinationals such as Del Monte and Dole were responsible for export and sale. Since the 1960s, global pineapple production increased with 400% (IRLF, 2008). Since 2007, Costa Rica is the largest fruit producing and exporting country in Central America (Ideavelop, 2007), with a share of 60% of Central America's total export of fruits. Currently, Costa Rica is regarded as a country that is environmentally aware, however, too little is being done to exploit this image commercially in agriculture (Ideavelop, 2007).

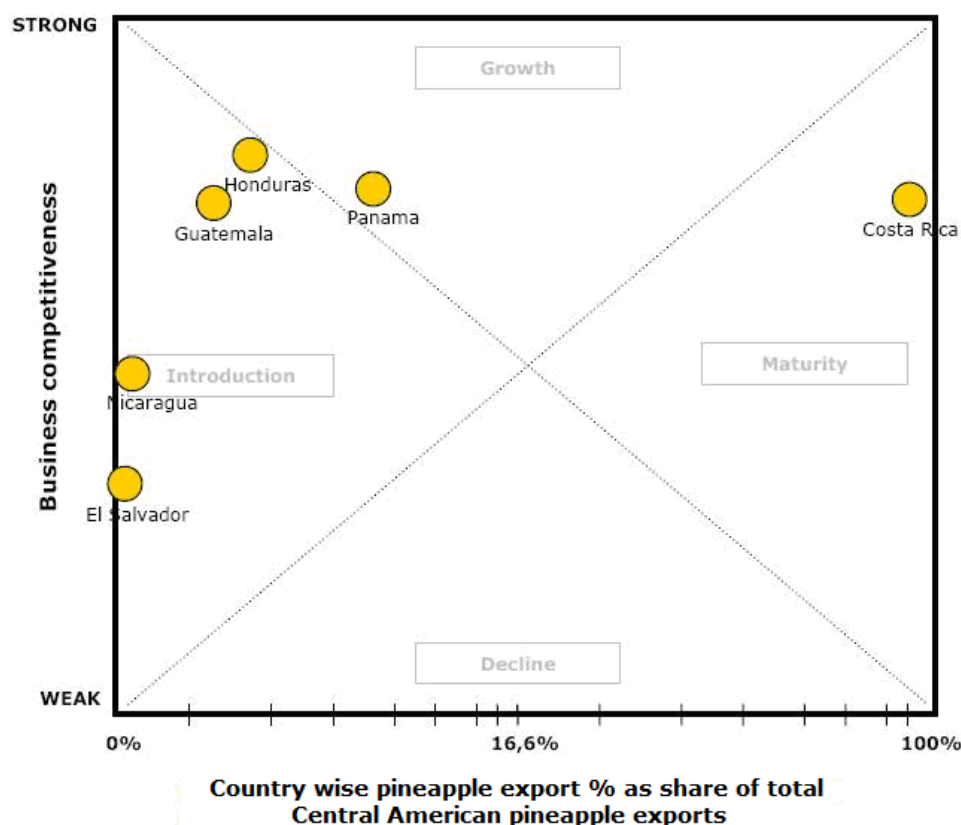


Figure 1: Central American pineapple development (Ideavelop, S. A., 2007)

The last decade, fresh pineapples have been Costa Rica's most successful export product (Ideavelop, 2007). Due to a combination of ever growing consumer demand for fresh pineapples and the knowledge of large fruit multinationals Fresh Del Monte and Dole, the Costa Rican pineapple

sector is still growing. Although, the lifecycle phase of Costa Rican pineapple in Figure 1 shows that Costa Rica's competitive position in supplying fresh pineapples has reached its maturity phase (characterized by e.g. sales volume peaks, low costs, high competition, and high profitability). Although Costa Rica's competitiveness is still high, other countries, including Panama, Honduras and Guatemala, also show indication of growth. In those countries, land is cheaper and labour is available, however no positive global image exists for them as pineapple producers. Costa Rica's proactive attitude towards this future increase in competition includes focusing on niche markets, such as Fair Trade and organic produce. In this context, Costa Rica's pineapple sector will have to continue investing in its positive image concerning social responsibility and environmental issues. Differentiation strategies in various projects of organic pineapple production are realized, offering a potential for more sustainable use of innovative agro-chemicals.

2.2 Costa Rican pineapple chain

In the last 8 years, pineapple production in Costa Rica has witnessed a significant increase in both cultivated hectares and tonnage (Russo, Zuñiga and Tabora, 2006). The main pineapple varieties suitable for export are the 'Smooth Cayenne' and the 'MD2' varieties. In 1973, Costa Rican pineapple cultivation concerned only 738 ha. In thirty years, pineapple production grew to 27000 ha of which 10000 ha is located in the Atlantic Region of Costa Rica, which concerns the provinces of San José, Cartago and Limón (see Figure 2).



Figure 2: Main pineapple producing area in Costa Rica (Zúñiga-Arias, 2007)

The global liberalization of food trade has led to the integration of agricultural supply chains in global food markets. This development has linked agricultural productions with international export markets. One of the innovations during this process is the emergence of the 'contract farming' concept (Zhang and Aramyan, 2009). Benefiting from the global liberalization of food trade, from 2000 to 2005, Del Monte initiated a process of varietal (from smooth cayenne to MD2 pineapple); logistical; and commercial innovation, through:

1. Defining product quality through pineapple product innovation;
2. Securing consistency in volumes and quality through economies of scale;
3. Ensuring a constant control of quality and timeliness of products through innovations in transportation and logistics ensuring

4. Marketing such homogenous and high quality pineapples under a well known brand-name.

These innovations, have caused Costa Rica to become world's largest exporter of fresh pineapples, with exports reaching 1,3 million tons in 2007 (Vagneron, Faure and Loeillet, 2009). As a result, the structure of pineapple chains has changed enormously. Today's fully integrated pineapple chains are tightly driven and monitored by large downstream multinationals (Piana et al., 2005) that create and obtain their power by imposing their definition of quality to the whole chain, and by achieving economies of scale and scope. They often seek coordination in the form of vertical integration, quasi-hierarchies, or by setting up supply networks (Vagneron et al., 2009; Dolan and Humphrey, 2004). They control downstream activities (innovation, standard/quantity/quality setting, logistics, branding, and marketing), while exerting vertical control over pineapple production and preferred large contract farmers. As a result of the tight relationships between retailers, fruit multinationals and a selection of large plantations; and increased standards, and quantity and quality requirements, smallholders fail to access the lucrative pineapple export markets. This is mainly because their lack of financial resources confines them to the production of traditional pineapple products for the domestic fruit market (Vagneron, Faure and Loeillet, 2009; Fold and Gough, 2008). Contract farmers, and a small number of existing smallholders producing for the export, are selected based on their ability to deliver the requested quantity and quality of fresh pineapples (Fold and Gough, 2008; Fulponi, 2006; Henson and Reardon, 2005). Large fruit multinationals and national private producers, processors and exporters represent 90% of the export market (Faure et al., 2006). They operate under different business models, such as medium-sized local companies, cooperatives, joint ventures. Although independent, private producers, processors and exporters strongly rely on the multinationals' facilities for transporting, sorting, cooling, packaging, and bar-coding.

2.3 Trading and export

The majority of the world's fresh pineapple demand comes from the US and the EU. The US dominates most of the fresh pineapple market. In 2005, Costa Rica was world leader in exporting pineapples (see Figure 3).

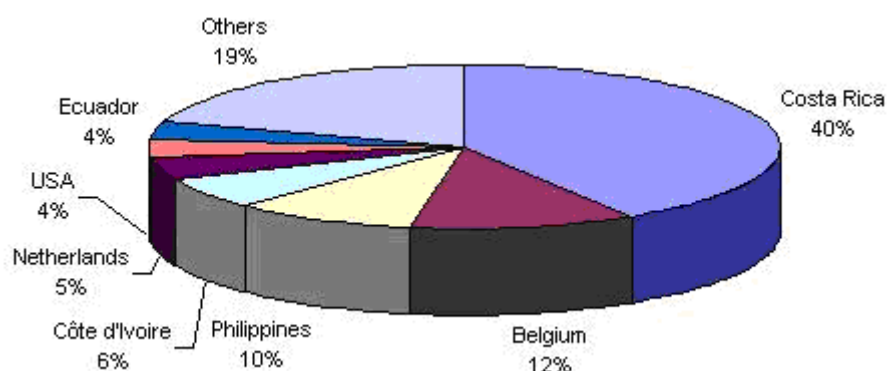


Figure 3: Country-wise export of fresh pineapple in the world in 2005 (VUAT, 2008)

In 2007, Costa Rica supplied near to 90% of all fresh pineapple sales in the United States. In the last decade, Costa Rica obtained a near monopoly on the US market, while also enjoying a comfortable position on the EU market (see Table 3).

Table 3 - Costa Rican exports of fresh pineapples to Europe and the US

Unit: metric tons		2000	2005	2007
Europe	EU imports	318,289	609,484	823,883
	Costa Rican exports	112,740	363,169	565,737
	<i>Market share (%)</i>	<i>35</i>	<i>61</i>	<i>69</i>
US	US imports	318,837	577,792	696,820
	Costa Rican exports	257,783	438,954	574,954
	<i>Market share (%)</i>	<i>81</i>	<i>76</i>	<i>83</i>

Source: Vagneron et al., 2009 (Cirad/FruiTrop, Eurostat, US customs)

Between 2000 and 2005, the innovations led by Del Monte have caused Costa Rican pineapple exports to the US to grow at an average rate of 11% per year, whereas exports to the EU grew with an average rate of 26% per year.

3. Costa Rican pineapple chain

3.1 Introduction

In this study, developing an understanding of the Costa Rican pineapple chain is a fundamental part of gaining insight in chain actors and relations between chain actors. This knowledge is used to segment the pineapple chain into potential partners that may facilitate the marketing of sustainable agro-chemicals. Eventually this knowledge contributes to the input necessary to formulate recommendations with regard to the development of a governance strategy with regard to the introduction, use and acceptance of sustainable agro-chemicals. Therefore, this chapter addresses the question *“What are the primary elements describing a supply chain and how can these elements be used to determine suitable partners for marketing a sustainable fungicide in the Costa Rican pineapple chain?”*

To this extent, the conceptual framework of supply chain management developed by Lambert and Cooper (2000) is used as the basis to identify which chain actors are critical to the Eco2clean’s success.

According to Lambert and Cooper (2000), describing and analyzing a supply chain involves identifying three elements: (1) the members in the supply chain that are critical to the success of the company and the supply chain (network structure); (2) the depth and width of a supply chain and Eco2clean’s position in the chain (structural dimensions); and (3) the supply chain links between chain parties.

3.2 Costa Rican pineapple export chain members

The international export chain for fresh pineapple consists of growers, exporters, importers, wholesalers, a few multinationals dominating the chain, retailers, and the end consumer. Figure 4 shows how both the pineapple export market and the local market are organized. The export market is characterized by straightforward relationships between the traders and producers and is dominated by two large fruit multinationals, Fresh Del Monte (FDM) and Dole, controlling all processes from growing stage to import stage.

In line with the international focus of this study, an analysis is made of chain parties that are involved in the Costa Rican export trade of fresh pineapples. Local smallholders are excluded from this analysis since they merely produce for domestic trade.

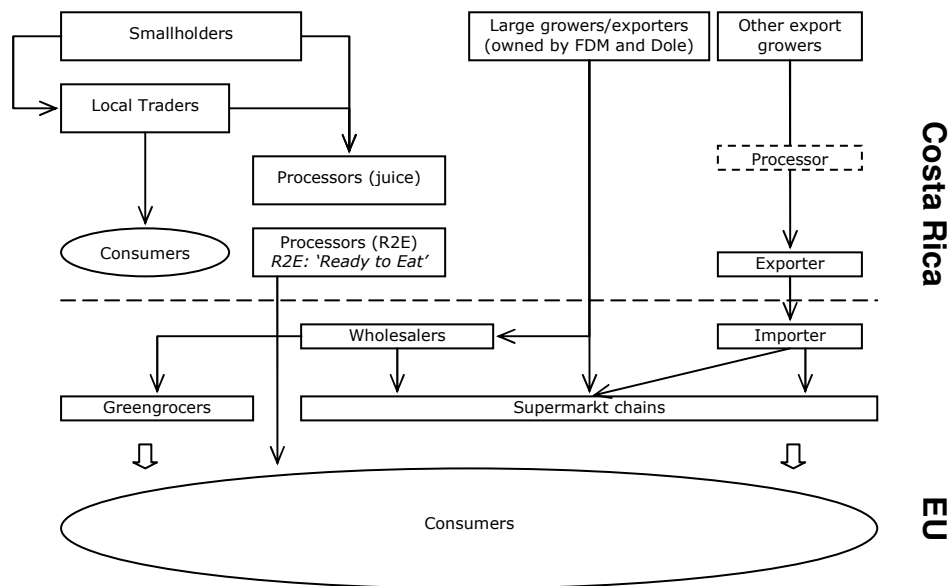


Figure 4: Pineapple flows from Costa Rica to the EU (adapted from Fold and Gough, 2008)

Producers

FDM is the number one global marketer and distributor of the MD2 fresh pineapple variant in Costa Rica. Its governance strategy is aimed at vertically integrating in the global pineapple supply chain, as Figure 4 depicts. *FDM* mainly sources its pineapples from Costa Rica through company-owned firms, joint venture arrangements and contacts with independent growers. Costa Rica's largest pineapple grower is 'The Pineapple Development Company' (PINDECO), which is a subsidiary of *FDM*. It produces at least 50% of Costa Rica's pineapples. In 2008, *FDM* expanded its market share by buying the Costa Rican Group, 'Caribana', which included 'Frutas de Exportacion, S. A. (Frutex)', a major provider of Gold pineapples. Caribana owns one of the two largest plantations in Costa Rica. Recently, *FDM* has been caught violating environmental laws regarding the use of pesticides (IRLF, 2008). The company lacked a certified pesticide applicator, or anyone supervising the application of the pesticide.

Dole Food Company, Inc. is the second largest global producer of fresh pineapples, and the world's largest producer and marketer of fresh fruit (IRLF, 2008). *Dole's* governance strategy is aimed at vertical integrating in the pineapple chain, controlling production packaging, export, shipping, import, and the ripening of its fresh fruits. Company reports show that its pineapples are cultivated on *Dole's* farms, leased land, and independent farms, mostly located in Costa Rica. Over the years, *Dole's* agricultural practices have received extensive criticism concerning e.g. its negative impact on the environment. As a reaction, *Dole* has launched an initiative to become carbon neutral and has plans to stop using paraquat, a toxic herbicide, on its plantations.

The large pineapple plantations in Costa Rica are mostly run by *FDM* and *Dole*, which displays the highly vertical organization structure of *FDM* and *Dole*. *Dole*, *BANACOL*, *Grupo Acon*,

and PINDECO (a subsidiary from Del Monte) are the largest pineapple land owners in the country (IRLF, 2008).

Exporters

FDM and Dole largely control the export of fresh pineapple produce from Costa Rica to many large retailers in EU countries, forcing exporters from Costa Rica to seek segments where they can trade smaller amounts of pineapples. A possible way to achieve this is for exporters to differentiate produce from FDM and Dole to, for instance, fair-trade pineapples (CBI Market Information Database, 2008). Exporters are important mediators through which Dutch pineapple importers obtain their produce. Exporters are regarded as efficient solution to importers' problems with contacting small growers directly, since for importers, exporters function as central contact. Furthermore, exporters have knowledge of both the domestic market as the export market.

Importers

Europe's largest pineapple importers are the Netherlands and Belgium. Both countries act as trade intermediaries between Costa Rica and the EU, considering that their domestic markets are small and the bulk of pineapple imports is exported to other EU countries. Table 4 shows that in 2006, 83% of total Dutch pineapple imports came from developing countries. The table shows that Costa Rica is the Netherlands' main supplier of fresh pineapple. Empirical evidence indicates that roughly 20 Dutch fruit companies exist that import fresh pineapple from Costa Rica. In general, importers strive to have contacts with one central exporter, instead of having many contacts with many small pineapple growers. In turn, importers export these fresh pineapples through the entire EU. An alternative route is that European middleman import fresh pineapples from either Costa Rican growers or exporters and in turn deliver their imports to Dutch fruit importers, after which fresh pineapples are exported through the EU. A substantial portion of the pineapple trade occurs through spot-markets.

Table 4 - Dutch imports of pineapple and leading suppliers to the EU, 2002-2006, in % of import value

Import countries	2002 € mln	2004 € mln	2006 € mln	Leading suppliers of pineapple in 2006, share in % of import value	Total
<i>Total</i>	29	50	149		
EU countries	14	24	25	Germany (9%), Belgium (3.6%), France (2.2%), United Kingdom (1.6%), Spain (0.4%)	17%
Developing countries	15	26	124	Costa Rica (69%), Panama (9%), Ecuador (1.5%), Honduras (1.3%), Ghana (0.7%)	83%

Source: CBI Market Information Database

Retail

Large European retailers have tightly structured supply links with fruit multinationals FDM and Dole. Apart from the large retailers, other outlets for fresh pineapple exist, including supermarkets, greengrocers, street markets and catering outlets (CBI Market Information Database, 2008). These

possible partners include *growers, exporters, importers* and *retailers*. As Hoi et al. (2010) indicate, raw materials such as agro-chemicals are mainly sourced through contracts with growers. However, practice shows that as long as pineapple growers remain marginally committed to product safety and chemical use, and are not forced to switch to more sustainable agro-chemicals; it is difficult to stimulate them to start using such agro-chemicals (Hoi et al., 2010). Next alternative is developing relations with Costa Rican pineapple exporters, which is expected to offer more potential for successfully introducing sustainable agro-chemicals, considering their direct connections with both growers and importers and their possible interest for reselling fresh pineapples with lower residue levels. However, as Hoi et al. (2009) indicate based on relations between Vietnamese exporters and growers, a lack of coordination between exporters and growers prevents the implementation of sustainable agro-chemicals. When exporters force growers to produce according to their norms, farmers are likely to end their contracts with exporters. Furthermore, even though Vietnamese agri-chain exporters acknowledge the importance of coordinating growers in order to control growers' use of chemicals, they are unable to offer farmers higher prices for their products as a result of fierce competition between exporters. Since the literature is in contradiction with the expected importance of exporters' role in marketing DES 46, empirical research should offer more insight in the potential importance of exporters. In the context of introducing and stimulating the use of DES 46, the most promising alternative for disinfectant suppliers may be to develop and manage exchange relationships with fruit importers. Hoi et al. (2010) state that growers and exporters respond to the demand of importers. On the one hand, importers are expected to have some power over pineapple growers and exporters, or are well connected to them, and can thus stimulate them to use sustainable agro-chemicals. On the other hand, the expected market potential for sustainable agro-chemicals may be great, considering importers' connections with pineapple growers (DLV Plant, 16/02/2010). These views lead to the following proposition:

Proposition 1: *The choice of partnerships between Eco2clean and either importers or exporters depends on the degree to which importers and exporters are committed and able to stimulate the use of sustainable agro-chemicals on grower level.*

This testability of this proposition is questionable, since first of all, possible alternative ways to market a sustainable agro-chemical on grower level are neglected. Second of all, in this research, exporters are no empirical research object considering their geographical dispersion. However, the proposition is expected to shed some light on the importance of the role of importers and exporters in facilitating the use of sustainable agro-chemicals on grower level.

In line with the objective of this research, in Figure 3 the tiers for the demand side for disinfectant suppliers are described. From their perspective, the demand side of the Costa Rican pineapple chain represents a short but wide network structure. For disinfectant suppliers, such as Eco2clean, such a network structure offers a large demand potential across all three tiers. Second, since the number of tiers between Eco2clean and its potential customers is small, Eco2clean is expected to be able to efficiently manage the links between chain parties.

3.4 Supply chain links between chain parties

Related to the overview of pineapple chain relations in Figure 5, is the theoretical model of developing supply chain links, adopted from Lambert and Cooper (2000) (Fig. 6). They identify four different types of supply chain links that arise between tiers of chain parties of which three are relevant in this research. According to Lambert and Cooper (2000), *managed process links* occur between any company and its customers in 'Tier 1'. These customers are seen as a company's primary customers. Process links beyond Tier 1 customers are not as critical to the company as managed process links. However, in order to assure successful cooperation between the other member companies, Eco2clean should carefully consider these *monitored process links* with Tier 2 customers in order to assure that process links between members in Tier 1 and beyond Tier 1 are successfully integrated and carried out. Process links that any company is not actively involved in, nor are they critical enough to allocate resources for, are called *not-managed process links*. Finally, *non-member process links* represent contracts between members of a companies' supply chain (customers) and non-members of the company's supply chain (competitors). Although competitors are not part of Eco2clean's supply chain, structure, they may still affect its performance and its supply chain.

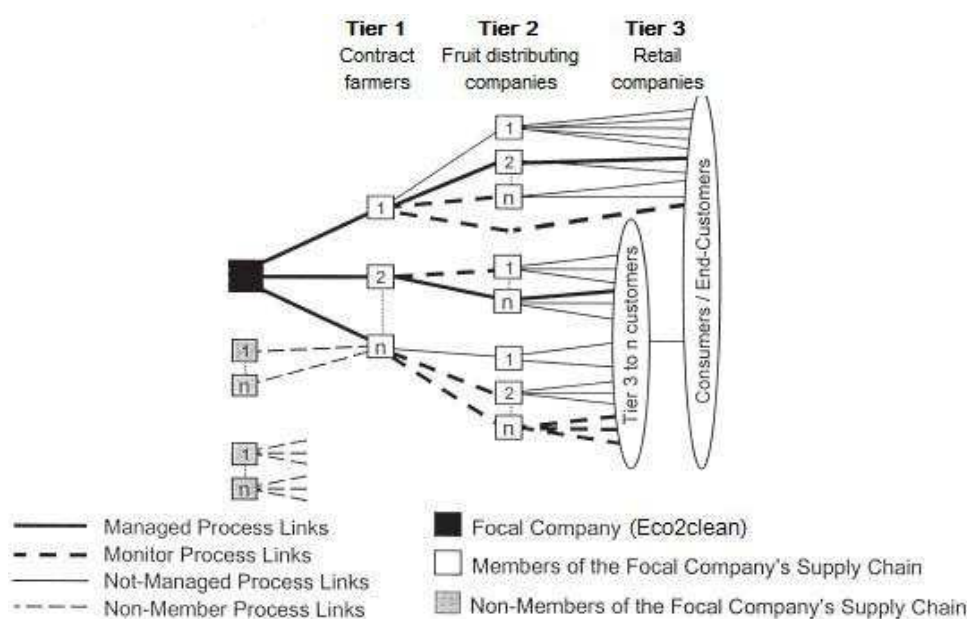


Figure 6: Types of intercompany business process links (Lambert and Cooper, 2000)

From the perspective of Eco2clean, this theory is applied differently. Although Tier 1 customers represent Eco2clean's customers that would actually apply DES 46, both the literature and interviews with fruit importers prove that growers are subject to certain standards in agro-chemical use that are imposed by fruit distributing companies (Fold and Gough, 2008; Fulponi, 2006; Henson and Reardon, 2005). Therefore, Eco2clean should *manage* chain links with fruit importing companies in *Tier 2*, in order to start supply of DES 46 to pineapple growers. At the same time, Eco2clean should *monitor* chain links between importing companies in Tier 2 and fruit growers in *Tier 1* in order to assure relationships with pineapple growers and importers and otherwise to assure the flow and successful application of DES 46. In this context, Eco2clean must consider different governance structures and

both contractual and relational contractual mechanisms in order to adopt a form of governance that is most efficient and suitable when attempting to negotiate and execute transactions with potential customers for DES 46. Eco2clean is most likely not required to allocate resources to manage or monitor process links with either retailers in Tier 3, except in the unlikely case that retailers do indeed have substantial influence in agro-chemical use at the farm level, or non-members of Eco2clean's supply chain.

3.5 Contracts and governance structures

As a result of the innovations in the Costa Rican pineapple chain and the switch of chain power from smallholders to large fruit multinationals, managed process links between such large international fruit distributors and growers have become increasingly important. Transaction related activities between these firms, including production and selling, require investments from all parties involved (Fischer et al., 2009). Protecting compensation for incurred costs is one of decision-maker's greatest concerns. By writing and enforcing contracts, parties involved in inter-firm investments can protect rents from the investments they incur.

Macneil (1978) identifies three types of contract law: *classical contract law*, *neoclassical contract law* and *relational contract law*. Classical contracts govern transactions in which future interactions, information asymmetries or bounded rationality are not seen as influential (Palmer and Mills, 2003). Instead, such contracts typically apply to a market where demand and supply are determined by prices (Zhang and Aramyan, 2009). Macneil (1978) refers to the example of purchasing fuel at a gas station. Whereas, compared to classical contracting, neoclassical contracting acknowledges long-term relationships. In neoclassical contracts, transactions are occasional and include specific investments that are made under written agreement between buyers and sellers. Relational contracts exceed the frequency of occasional transactions. Such contracts are characterized by recurring transactions in a long-term relationship in which specific investments are completed based on trust, and shared norms and values (Zhang and Aramyan, 2009).

Zhang and Aramyan (2009), state that contracts are an important concept in governance structures and TCE. In business relationships, both written and oral contracts provide legal sanctions that influence exchange performance according to the agreed terms (Yli Renko, Sapienza and Hay, 2001). Spiller (2008) identifies various forms of contracts that can be applied in agri-food supply chains between farmers, exporters and importers in food chains. These so called governance structures refer to a set of rules in which transactions between parties in an exchange are initiated, negotiated, monitored, adapted and terminated (Heide, 1994; Spiller, 2008). Rooted in supply chain governance is the theory of transaction cost economics (TCE) (Zhang and Aramyan, 2009). From the TCE perspective, the one polar form of supply chain governance involves spot-markets, where transactions are solely determined by prices, while vertical integration forms the other polar, where all transactions are carried out under the name of one owner (Zhang and Aramyan, 2009). In between, several intermediate governance structures exist:

1. *spot-markets*: the exchange of goods between multiple buyers and sellers at the current time period with price as the main determinant of the final transaction

2. *long-term relationships*: characterized by independent exchange partners that are bonded by long-term non-contractual relationships;
3. *marketing contracts*: represents a buyer's agreement to provide a market for the seller's output. In such agreements, the seller transfers risk and decision making to the buyer concerning when and how the product is to be sold;
4. *joint ventures*: represents a jointly funded entity by two partners in which partners agree to a contract of sharing risks and rewards. Legal issues and coordination complexities tend to cost more than simple contracts (Johnson and Houston, 2000);
5. *production contracts*: the buyer supplies and manages all the inputs on farm level and the farmer usually becomes just a supplier of land and labour
6. *contract farming*: refers to the system of production and supply of products by farmers to buyers under forward contracts. The essence of such arrangements is the commitment to provide a commodity of a type, at a specified time, price and quantity to a known buyer. Contract farming can be seen as in between independent farm production and production contracts;
7. *vertical integration*: refers to situations where products move between various stages of production, processing and distribution as a result of order management of one firm, rather than as a result of prices (e.g. Spiller, 2008; Ferguson, 2004; Kim, 1998).

In the context of TCE, Williamson (1996) suggested that simple governance structures, such as spot-markets, should be used in simple contractual relations; whereas complex contractual relations, such as joint ventures, require complex governance structures.

Since recently, TCE is used in the supply chain management of agri-food markets (Zhang and Aramyan, 2009; Hanf and Dautzenberg, 2006). Although TCE is widely applied in buyer-seller relationships in industrial marketing and management, in existing literature TCE is criticized since it ignores the effect of informal, social relationships in contract making between parties. Zhang and Aramyan (2009) therefore define contractual and relational governance as the two major business relationship forms, which are discussed in the next chapter.

3.6 Summary

The export market for Costa Rican pineapple is dominated by FDM and Dole, controlling the entire cross boundary supply chain from growth to distribution to retailers. Besides growers, the export market includes exporters and importers. Most produce of Costa Rican fresh pineapple intended for the EU market is imported by Dutch distributors and then distributed through the entire EU, or imported by European middlemen and distributed to Dutch fruit importers which in turn distribute the pineapple across the EU. In the context of launching DES 46, it is expected that establishing and managing chain links with Dutch fruit importers (Tier 2 customers for Eco2clean) is considered to be the most suitable solution to Eco2clean's issues regarding the choice of chain partner. Furthermore, it is expected that in the case investments are required to develop such a partnership, managed supply links should also be established between Eco2clean and pineapple growers (Tier 1 customers for Eco2clean). After all, pineapple growers are the end users of Eco2clean's DES 46. In order to govern such exchange relationships, a well designed contract is needed. In the specific case of Eco2clean,

long-term relationships or joint ventures are considered to be the most suitable governance forms in order to govern an exchange relationship in an international fruit chain in which coordination and cooperation are affected by uncertainty and investment specificity between chain parties.

4. Theoretic framework

4.1 Introduction

According to Van der Vorst (2005), recent socio-economic developments have changed the way agri-chains and individual chain parties are required to perform. Consumer demand regarding food products is characterized by an increased emphasis on quality, reliability, integrity and safety. Also, policy changes concerning environmental issues have a strong impact on agri-food supply chains and agricultural practices. For instance, the use of agro-chemicals has a negative impact on consumers' buying behaviour. In this context, based on empirical research, the expected potential of sustainable agro-chemicals in the Costa Rican pineapple chain is great. In this light, empirical research should provide more knowledge on how the Costa Rican export chain for fresh pineapples functions. In turn, this knowledge is used to identify opportunities and challenges for the future of sustainable agro-chemicals and to provide Eco2clean with recommendations regarding future business activities related to DES 46.

In this chapter, the theoretic framework of Aramyan et al. (2007) is used as a basis to formulate the empirical research framework (see Fig. 7) and the propositions that result from this framework. The theoretical model provides input for the empirical research in which main research questions 2 & 3 are addressed:

2. How does the Costa Rican export chain for fresh pineapple function from a chain governance point of view, and what does this mean for the potential demand for sustainable fungicides?
3. What opportunities and challenges exist with regard to the potential demand for sustainable fungicides, and which recommendations related to chain governance can be provided?

4.2 Research framework

The purpose of any form of governance mechanism is to provide the coordination, control and trust that is necessary for chain actors to believe that engaging in an exchange makes them better off (Zhang and Aramyan, 2009; Williamson, 1985). Figure 7 shows the governance framework developed by Zhang and Aramyan, modified to the context of Eco2clean. The model is used as a tool to offer more insight in the Costa Rican export chain for fresh pineapple. From a theoretical perspective, the model states that chain uncertainty may affect the way transactions are governed between disinfectant suppliers and companies facilitating the introduction of sustainable agro-chemicals on grower level, which in turn affects their performance. In the original model of Aramyan et al. (2007), the effect of investments that have to be done specifically for one transaction (TSI) is also considered an affecting factor of transaction governance. However, in the case of Eco2clean, investments are relevant in the relationship between Eco2clean and the end user of DES 46, the grower.

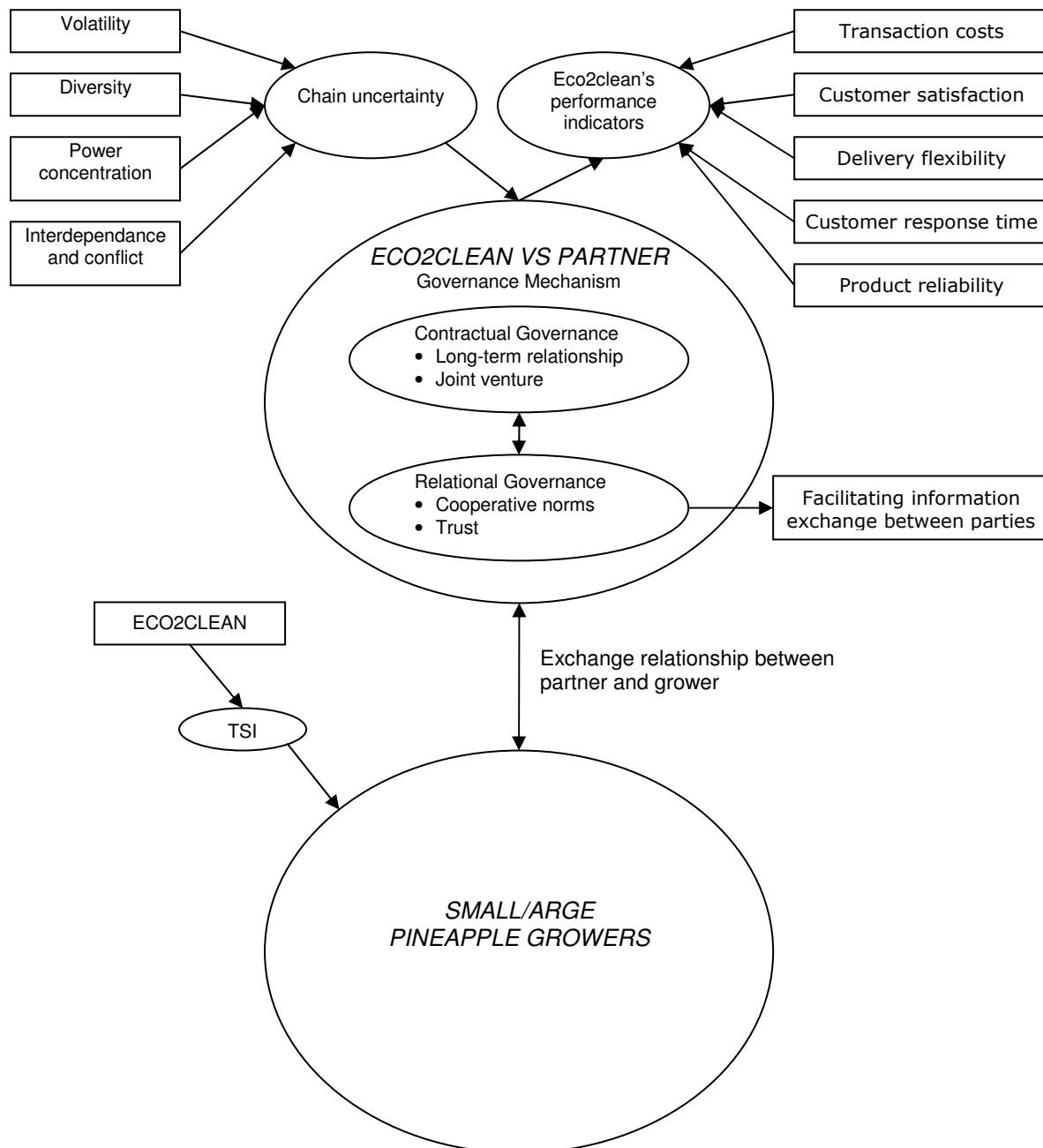


Figure 7: Empirical research framework for governance structures in the agri-food chain (adapted from Aramyan et al., 2007)

4.2.1 Contractual and relational governance

In line with Williamson's approach to categorizing types of contracts (1996), Zhang and Aramyan emphasize both *contractual* and *relational* elements of governance. It is stated that relational governance is the predominant governance mechanism associated with transaction performance (Zhang and Aramyan, 2009; Yu et al, 2006; Ferguson, 2005). Contractual governance refers to *formal inter-organizational agreements including specific transactions; obligations; and promises, wherein exchange terms are defined by price, asset specificity and safeguards, under the assumption that quantity, quality and duration are all specified* (Ferguson and Bergeron, 2005; Williamson, 1996). Lee and Cavusgil (2006) indicate that firms prefer formal contracts that (1) control the type and amount of

information shared, (2) that reduce the risks that are accompanied with knowledge transfer between parties, and (3) lay the foundation for building future inter-company trust. Violating such a contract makes it difficult for parties to take advantage of each other, considering the legal consequences (e.g. law suits) and economic consequences (e.g. on business relations with other chain members) of such a violation. Thus, contractual governance decreases the likelihood of opportunistic behaviour and conflicts, and improves the stability of a partnership, or alliance, between parties.

A contract can be specified and taking the future into account as detailed as possible. However, since companies often ignore the legal implications of contracts that are adapted regularly, exchange performance can still suffer when a well developed social relationship is lacking (Ferguson and Bergeron, 2005; Cannon et al., 2000). *Social norms in a relationship that describe appropriate behaviour and enforce social obligation in an exchange* form the foundation of relational governance. In this context, the 'social' aspect of relationships refers to corporate norms and trust. Cooperative norms represent the shared beliefs and expectations of two parties that must work together to achieve mutual goals, whereas trust is defined as the extent to which a firm believes that its chain partners are reliable (Zhang and Aramyan, 2009). Shared cooperative norms and mutual trust between parties involved in an exchange can stimulate and accelerate intensive information exchange through knowledge-sharing routines, rather than through contracts. Furthermore, these relational governance mechanisms can lower suspicion and can thus reduce the fear of opportunistic behaviour. The literature even states that, the more companies rely on relational governance in a transaction, the more information is exchanged between parties and the less emphasis is put on formal contracts (Zhang and Aramyan, 2009; Ferguson and Bergeron, 2005; Lu et al., 2007).

Although the literature emphasizes the importance of trust in the internationalization of supply chains, Arias (2007) reviewed the Costa Rican mango chain and concluded that trust between mango growers and other chain parties is of less importance, since those relationships still do not have a clear perspective for long-run arrangements. Uncertainty in the mango chain is mostly caused by a lack of information regarding the reputation of chain parties. To overcome this uncertainty, growers are more likely to search for arrangements that safeguard delivery and transaction related investments. Zhang and Aramyan (2009) argue that a positive, complementary relationship exists between contractual and relational governance. Based on these views, the following proposition is formulated:

Proposition 2: A combination of contractual and relational governance mechanisms reduces opportunistic behaviour, increases information exchange, and enhances exchange performance

In this context, Table 5 depicts the strengths and weaknesses of both contractual and relational governance. Furthermore, Lee and Cavusgil (2006) emphasize the complementing effect both governance forms have on each other.

Table 5 – Implications of governance mechanisms on supplier-buyer relationships

Governance mechanism	SUPPLIER – BUYER relationship	
	STRENGTHS	WEAKNESSES
Contractual	<ul style="list-style-type: none"> Enforcing the terms of a transaction Mechanism to control for problems related to adaption, performance and safeguarding caused by uncertainty, bounded rationality and the threat of opportunistic behaviour Reluctance to violate contracts improves stability of a partnership 	<ul style="list-style-type: none"> Difficult to foresee and specify future changes contractually Contractual safeguards are costly Exchange performance can suffer when contracts are used and no social relationship exists
Relational	<ul style="list-style-type: none"> Mutual trust stimulates information exchange Enables firms to reduce dependence on equity to govern a relationship Leads to cooperative behaviour and decreases uncertainty 	<ul style="list-style-type: none"> When benefits from self-interested behaviour are sufficient, performance benefits associated with relational governance decline Asset specificity weakens the positive effect of relational governance on performance Difficult performance measurement creates information asymmetries of which parties' can take advantage

Source: adapted from Poppo, Zhou and Zenger, 2008; Zhang and Aramyan, 2009; Ferguson and Bergeron, 2005; Lee and Cavusgil, 2006; Lee, Yeung and Cheng, 2008

Table 6 shows how formal contracts can complement a trustworthy relationship and how shared norms and trustworthiness can complement formal contracts.

Table 6 – Complementing effect of contractual and relational governance

Governance mechanism	Complementing effect
Contractual + relational	<ul style="list-style-type: none"> When accounting for exchange hazards, e.g. contract breach, contractual safeguards are costly. Instead, relational governance is an effective, self-enforcing, less costly alternative. Future changes, e.g. in prices and demand, cannot be contractually specified. Then, relational governance is necessary to protect continuity of inter-firm relationship through the fostering of mutual values and norms between firms
Relational + contractual	<ul style="list-style-type: none"> The process of crafting long-term contracts itself may promote expectations with regard to relational performance, since this process requires firms to mutually determine and commit to ways for dealing with contingencies in the chain environment.

Source: adapted from Poppo, Zhou and Zenger, 2008; Zhang and Aramyan, 2009; Ferguson and Bergeron, 2005; Lee and Cavusgil, 2006; Lee, Yeung and Cheng, 2008

From a practical perspective, both Table 5 and 6 need to be translated to Eco2clean's business in order to explain the role of contractual and relational governance in transactions between Eco2clean and fruit distributing companies. In transaction literature, Pool et al. (1998) identify three important stages that are often associated with uncertainties and high costs. These stages are: *searching for partners*, *negotiation with parties*, and *monitoring and enforcement*. The role of contractual and relational governance is to minimise costs in all stages. Table 7 explains how contractual and relational governance can possibly be applied in those three stages, in the business environment of the Costa Rican export chain for fresh pineapple, to account for uncertainties that are likely to influence exchange performance in a negative way.

Table 7 – Possible choice of governance in three different stages of transactions

Stage	Source of uncertainty	Choice of governance
Searching	<ul style="list-style-type: none"> Limited information 	Finding partners, e.g. exporters or importers, that share norms and believes regarding sustainable agriculture, or companies that encounter difficulties with infected fruits, may offer disinfectant suppliers with potentially rewarding business relationships.
Negotiation	<ul style="list-style-type: none"> Limited information Opportunism Complexity of contractual terms Size and frequency of transactions 	<p>Fruit distributing companies appear to be somewhat doubtful regarding the working of sustainable agro-chemicals. Therefore, in addition to specifying physical, technical and economic product characteristics, it may be important to contractually specify test phases in which distributors can test the chemical. First of all, through this 'gesture of good faith', end users may view the supplier as a reliable partner. Second of all, specifying terms regarding test phases requires both parties to mutually determine and commit to conditions on the grounds of which the business relationship is formulated. Especially in the negotiation phase, by building such a mutual trustworthy relationship with potential customers, possible uncertainties and conflict related issues may be avoided. These uncertainties include e.g. contractual complexities concerning current and future size and frequencies of transactions.</p> <p>However, in order to avoid investments that are not earned back, e.g. the batches of chemicals intended for testing, it is important to specify the grounds on which is decided to continue the relationship. Specifying services to build a relationship, e.g. inventory management services, may convince them to start a relationship and in time the costs incurred in the test phase are earned back.</p>
Monitoring & enforcement	<ul style="list-style-type: none"> Opportunism: no certainty of payment Non-fulfilment of contractual terms 	Enforcing payment conditions between Eco2clean and its customers may be achieved through contractual safeguards, since violating such agreements can result in both law suits and a negative impact on a companies' reputation. Since contractual enforcement is costly and changes in e.g. demand for pineapples and fungicides cannot easily be incorporated in current contracts, it may be more efficient to invest in developing relationships based on mutual trust and shared norms.

Source: adapted from Pool et al. (1998)

4.2.2 The effect of chain uncertainty on the choice of governance

In supply chains, whether an environment is perceived as either certain or uncertain has a significant effect on decision making uncertainty in contractual and relational relationships. In this research, the following definition of chain uncertainty is used: *“the level of unanticipated changes in the circumstances surrounding companies in agri-food supply chains”*. Duncan (1972) defines decision making uncertainty in three concepts: (1) the adequacy of available information for making key decisions; (2) predictability of the consequences of these decisions; and (3) the degree of confidence expressed by the decision maker when making the decisions. This operational definition of decision making uncertainty can be summarized as *“the difficulty of making decisions about the future”* (Lee, Yeung and Cheng, 2008). In this context, organizational members are reluctant to predict future states of the environment, since those predictions affect current decisions. According to Achrol and Stern (1988), uncertainty is the most important factor affecting decision making in chain conflict, coordination, power balances and, as a consequence, transaction costs.

Zhang and Aramyan (2009) confine the concept of chain uncertainty to a companies' market environment, which concerns *“the rate of change occurring in the product market of the buying firm”* (Lee, Yeung and Cheng, 2008). The macro environment, including social and political factors, is regarded as a given. Furthermore, the market environment plays a far more significant role in decision making uncertainty in buyer-supplier relationships: when market uncertainty is high, frequent changes in customer orders are very likely, as well as changes in e.g. production and delivery schedules.

The literature includes many descriptors of environmental dimensions in markets. However, Achrol and Stern (1988) regard Aldrich's dimensions (1979) as most conclusive (see Figure 7). Table 8 states the dimensions that are most relevant in the context of this research as derived from feedback of experts. The table explains what consequences chain uncertainty may have for the choice of governance in the export chain for Costa Rican fresh pineapple.

Table 8 – Environmental dimensions of uncertainty

Environmental dimensions	Definition	Implications for pineapple chain governance
Volatility	<p>The degree to which uncertainty is perceived as either high or low is influenced by fluctuations in customer demand and volatility of prices.</p> <p>A volatile, and thus uncertain environment is likely to create difficulties in long-range planning, coordination and inventory decisions.</p>	<p>A volatile pineapple chain environment inhibits a chain member's ability to predict future outcomes, which creates incomplete written contracts. When unforeseen contingencies arise, contracts cannot be easily adapted to changing circumstances, since opportunistically inclined parties may try to interpret unspecified clauses to their own advantage. High levels of channel coordination should be encouraged in order to stimulate both cooperative behaviour and information exchange with partners and to reduce transaction costs in transactions with either foreign or domestic partners. Considering fluctuating pineapple prices, formal safeguards are important to guarantee stable prices for supply.</p>

Diversity	<p>The degree to which uncertainty is perceived as either high or low is influenced by the number of tiers in a supply chain, the depth of each tier and the degree to which companies in each tier are similar to each other.</p> <p>The more members in each tier differ in social background, needs and objectives, the more uncertain chain members are when obtaining and assimilating information.</p>	<p>The large amount of growers and heterogeneous exporters and importers in the pineapple chain causes difficulties in obtaining and processing information of the pineapple market. The greater the required amount of information, combined with the need to develop multiple different relationships with heterogeneous exporters and importers and growers, the greater is the need for flexibility in the chain. Highly diverse chains are not by definition highly volatile.</p>
Power concentration	<p>The degree to which uncertainty is perceived as either high or low is influenced by the activities of powerful competitors in the output market that are able to affect markets in major ways.</p> <p>As power concentration of a few large companies increases, decision making uncertainty decreases because of tacit collusion between other companies.</p>	<p>As a result of the increasing power of FDM and Dole, in general, competing exporters and distributors would become more sensitive to each other's actions. As their power increases, approaching oligopolistic market structures, independent chain members have increasing impact on each other, which results in high uncertainty and members may become prone to tacit coordination (e.g. price leadership).</p>
Interdependence and conflict	<p>The degree to which uncertainty is perceived as either high or low is influenced by the degree to which companies depend on each other. Here, conflicts cannot occur without this mutual dependence.</p>	<p>Interdependence is inevitable when engaging in exchange relationships. Formal safeguards can reduce risk that occurs as a consequence of information sharing. In turn this inhibits parties in an exchange to behave opportunistically, which fosters inter-firm future trust, thus stabilizing the partnership.</p>

Source: adapted from Aldrich (1979); Achrol and Stern (1988); Klein et al. (1990); Springer and Kim (2009)

A fundamental problem reasoned in TCE is that in uncertain environments, due to bounded rationality, managers are not able to predict all unexpected events (Lee, Yeung and Cheng, 2008). Therefore, managers are unable to incorporate future unexpected events in contracts and to enforce those contracts. Accordingly, chain uncertainty gives rise to two problems: adaption and evaluation of contracts (Lee, Yeung and Cheng, 2008). Adaption issues arise since future contractual aspects cannot be specified in advance, whereas evaluation issues refer to the difficulty of determining whether a contract has actually been implemented or not. Furthermore, chain uncertainty is inversely related to relationship quality and trust. When uncertain environments arise in Western supply chains,

companies tend to be flexible and develop temporary relationships, thus showing lower trust in one another (Geyskens et al., 1998; Kumar et al., 1995).

Pool et al. (1998) argue that environmental dimensions of uncertainty are well illustrated by the citrus fruit sector: dominated by a few large corporations; products are perishable; quality and quantity are heterogeneous due to seasonality of growth; and products are subject to a degree of differentiation. However, consultation of a Dutch fruit importer shows that since both Costa Rican pineapple production and Western pineapple demand are stable whole year long, the Costa Rican pineapple export environment is fairly stable. Although, the large amount of alternative buyers and suppliers, as well as the high degree of product diversity (e.g. MD 2, Smooth Cayenne and fair trade) does cause pineapple demand and supply, and prices to be volatile.

In a volatile and diverse market environment, such as the Costa Rican pineapple market, chain parties tend to work together by using formal contracts to safeguard their business and minimize the impact of external market uncertainties, bounded rationality and the threat of opportunistic behaviour (Ferguson and Bergeron, 2005). Contrary, Lee, Yeung and Cheng (2008) state that forming alliances between suppliers and buyers may be the best way to govern relationships in uncertain environments. Forming alliances increases continuity expectations of the business relationship. In turn, this could motivate the parties involved to avoid opportunistic behaviour, and instead to consider long-term mutual benefits and to adapt to each other (Lee, Yeung and Cheng, 2008). Furthermore, Kim (2002) provides empirical evidence indicating an inverse relationship between uncertainty and alliances. Kim (2002) argues that since uncertainty is a multidimensional construct, the different dimensions in Table 2 could have opposite effects on the behaviour of parties involved in an alliance. In addition, considering the impact of chain uncertainty on inter-firm business relations, Zhang and Aramyan (2009) expect a positive relationship between chain uncertainty and both contractual and relational governance.

Table 5 shows that the uncertainty dimensions in the Costa Rican pineapple chains may present chain members with both threats (e.g. long-term planning issues, unwanted behaviour, and the choice of governance) and opportunities (e.g. potential customer base and business continuity). In international relationships between Costa Rican growers and Western distributors it is expected that in uncertain environments more trust should be exhibited between parties in order to secure their markets. Thus, in line with Zhang and Aramyan (2009), a positive relationship between chain uncertainty and relational governance is expected. Furthermore, making formal agreements is necessary to avoid unwanted behaviour between cooperating parties. Based on the way dimensions of uncertainty influence decision making in the Costa Rican pineapple chain, long-term alliances including both formal and informal governance mechanisms are necessary in order to avoid unwanted behaviour by the parties involved and in order to enable future adaptation and evaluation of the alliance contract. These different views on the importance of relational and contractual governance have resulted in the following proposition:

Proposition 3: *A high degree of chain uncertainty in the pineapple chain favours a high degree of relational governance in exchange relationships between suppliers and buyers of sustainable agro-chemicals.*

4.2.3 The effect of TSI on the choice of governance

Yu et al. (2006) and Hoetker and Mellewigt (2009) state that contractual and relational governance mechanisms are often used in alliances or partnerships to coordinate resources. The choice of governance mechanism even affects suppliers' tendencies to commit to TSI. TSI is a critical element in buyer-supplier relationships. It refers to the extent to which an investment is made specifically for the transaction with a selected buyer and is thus difficult and costly to shift to other buyers (Zhang and Aramyan, 2009). Highly asset-specific investments represent costs that have little or no value outside a certain exchange relationship between a buyer and a seller. Williamson (1985) identified different types of asset specificity that are relevant to consider in the case of Eco2clean:

1. site specificity: investments in e.g. warehousing in order to have buyer and seller located close to each other to save on transport and inventory costs;
2. physical asset specificity: supplier investments in specific equipment and tools;
3. human asset specificity: investments in particular knowledge (e.g. training of employees).

In many partnerships one or more parties are required to make investments that are specific to that certain partnership and would thus have less or no value in other applications. Both theory and empirical evidence show that when making governance decisions in the presence of specific investments, suppliers select the governance that *mitigates opportunistic behaviour, that best coordinates the optimal combination of resources across parties, and that best safeguards investments* (Zhang and Aramyan, 2009; Claro et al., 2003; Trienekens, 26-02-2010; Hoetker and Mellewigt, 2009). For instance, in the case investments are highly transaction specific for one party, and is thus highly dependent on the other party, the other party may abuse its bargaining power by attempting to extract additional rents. Such opportunistic behaviour can even occur in the absence of specific investments. During negotiation between parties, a firm can misrepresent its capabilities or resources. Also, e.g. due to laziness, during the partnership a firm can fail to live up to its promised contribution of knowledge, effort, or other resources. An other form of opportunistic behaviour includes re-allocating resources, that were gained through the partnership, outside the scope of the partnership. In this context, Hoetker and Mellewigt (2009) argue that the optimal configuration of contractual and relational governance depends on the assets involved in an exchange. Hoetker and Mellewigt (2009) distinguish between two different types of asset: *property-based assets*, which are physical properties owned by firms such as buildings and infrastructure; and *knowledge-based assets*, which represents a firm's intangible know-how and skills (see Attachment II for additional examples). Since property-based assets are easily specified and transmitted, e.g. storage facilities, delivery frequencies and specific behaviour such as 'submit change requests in writing', formal contracting is the preferred mechanism to coordinate the use of such assets. For instance, business plans; service level agreements; and performance indices can specify performance expectations and each party's role in an exchange. By constraining the ability of one party to take advantage of the

other party by failing to perform as agreed, and to enforce monitoring through e.g. profit and loss accounts, contractual governance can mitigate opportunistic behaviour. Recent work has indicated the effect of contractual governance on coordinating the efforts of alliance partners. According to Hoetker and Mellewigt (2009), firms can include clauses containing e.g. delivery dates and shipping frequencies in order to avoid coordination failures and to enhance the predictability of each parties' actions. This results in more structured communication flows between parties.

Knowledge-based assets, e.g. the training of workforce, require relational governance due to the reliance on interaction between individuals from the parties involved, and the inability to specify exact processes and outcomes in advance. For instance, a firm cannot contractually specify in advance what will occur during a face-to-face meeting of top managers (Hoetker and Mellewigt, 2009). In order to maximise exchange performance, resource coordination is concerned with the grouping of resources of all parties, e.g. assets, equipment, and effort, the division of labour across parties, and the integration of dispersed activities. Examples of such labour division include integrating individuals from all parties involved in teams, task forces, and committees; direct managerial contact through trips, meetings, and even the transfer of managers; and developing mechanisms for shared decision making. Repeated interaction between managers in each firm stimulates information exchange and learning through which strong personal ties develop. All these relational governance mechanisms enable parties in an exchange to strive for well coordinated, non-opportunistic, win-win solutions. However, practice shows that is difficult to coordinate knowledge-based assets across firms, since they are often embedded in the routines and culture of the originating firm. As a result, to what extent knowledge-based assets from different firms can and should be integrated is difficult to specify in advance. For Eco2clean, such problems may raise questions such as 'what is the amount of meetings that is necessary to transfer the required knowledge to pineapple growers regarding the application of DES 46?', or 'at what date will the growers have mastered the knowledge?' And 'when will the knowledge be ready to be deployed?'

In agri-food supply chain production processes, especially between Latin American buyers and Western suppliers of agro-chemicals, investments are often case specific, e.g. training of growers in agro-chemical use (Bijman, 2002). From the TCE perspective it is stated that when investments are indeed case specific and uncertainty is high, a combination of both contractual and relational governance is the preferred and most efficient solution to safeguard investments (Zhang and Aramyan, 2009; Williamson, 1985). The increased dependency between the investing partners, creates the need for more formal contracting in order to reduce risk, uncertainty and opportunistic behaviour between partners. Relational governance mechanisms such as trust are regarded as means to safeguard TSI through a decreased need of monitoring and bargaining and an increase of cooperation and coordination between buyer and supplier. In turn this may result in a more constant sales volume for the supplier, more repeat business and a decrease in sales expenses.

From the perspective of Eco2clean, property-based assets and knowledge-based assets may be important for the company to invest in. Possibly relevant tangible asset investment includes the building of storage facilities in the vicinity of Costa Rican growers in order to keep time and costs of transporting DES 46 to its buyers low and to be able to better coordinate inventory levels.

Considering that growers can apply DES 46 in their current disinfecting 'baths' for pineapples, no investments in specialized equipment or machinery is expected. Investments in tangible physical assets may also include the creation of a complex computer system that keeps track of buyers' inventory levels of DES 46. Such a computer system may stimulate information exchange between Eco2clean and its buyers. In order for Eco2clean to coordinate such tangible assets efficiently and to mitigate opportunistic behaviour from buyers, contractual governance mechanisms are the preferred option. For instance, Eco2clean's investments in enabling its buyers to do test runs with DES 46 may promote buyers to abuse its bargaining position by attempting to obtain additional 'free' deliveries of DES 46. Through formal contracts, Eco2clean could specify e.g. the amount of DES 46 intended for test runs, and future agreements regarding the business relationship. Investments in intangible, knowledge-based assets may include the training of employees of growers that start using DES 46 and perhaps even to arrange meetings with growers, with whom business relations exist through fruit distributors, in order to assure the effect of DES 46 on pineapples and on total residue levels.

Finally, expert consultation points out that Eco2clean is required to invest in creating a positive perception towards DES 46 among potential buyers. Eco2clean's willingness to invest is a crucial basis for the company to develop profitable business relationships with potential buyers. This results in the following proposition:

Proposition 4: *The degree to which an exchange relationship between disinfectant suppliers and its buyers is successful strongly depends on the supplier's willingness to invest at grower level.*

In this context, it is crucial for Eco2clean to identify the investments that are required, and use the nature of investments (either property-based or knowledge-based) to determine the most efficient combination of both contractual and relational governance mechanisms to coordinate the flow of resources. It is important to keep in mind that Eco2clean's investments occur on grower level, which means that exporters and importers are merely indirectly involved in the process of investments being made and that building contractual and relational bonds with pineapple growers is an important aspect of Eco2clean's chain governance activities.

4.2.4 Performance objectives

Aramyan et al. (2007) suggest that many performance indicators exist that can be used to measure a companies' performance. However, only a small number of indicators is widely accepted and contributes more than proportionally to success or failure in the market. As a result, research on supply chain performance and selecting relevant performance indicators is a difficult task.

Sufficient scores on chain performance measurement is of vital importance to the continuity of supply chains. To ensure long-term continuity a chain must work efficiently and must minimise costs. In this context, the literature groups a number of indicators that are important in the evaluation of agri-food supply chain performance (Aramyan et al., 2007; Bunte et al., 1998; Van der Vorst, 2000):

1. Efficiency: referring to the ratio between output-input against a certain target, including the following measures: *transaction costs*, *production/distribution costs*, *return on investment* and *inventory*;
2. Flexibility: the degree to which a supply chain, or individual company, can respond to a changing environment, including the following measures: *customer satisfaction*, *volume flexibility (the ability to change the level of total output; Slack, 2007)* and *delivery flexibility (the ability to change planned or assumed delivery dates; Slack, 2007)*, *back orders*, and *lost sales*;
3. Responsiveness: providing the requested products as quickly as possible while incorporating the following measures in the lead-time: *fill rate (inventory's ability to meet demand)*, *customer response time (time from order placement to delivery of the order)*, *lead time*, *customer complaints*, and *shipping errors*;
4. Product quality: to what extent is a product of high quality, based on *appearance*, *taste*, *shelf life (the length of time that passes until a product is unsuitable for sale)*, *product safety (the degree to which products have potentially hazardous consequences for public health)*, *product reliability (the probability that a product will satisfy buyers' expectations toward the product)*, *convenient labelling information concerning the use of the product*, *pesticide use* and *fungicide use*.

These four main performance objectives each consist of more detailed performance indicators (see Appendix I for descriptions of the measures). Communicating the status of such indicators to partners, and obtaining feedback on whether these indicators are performed satisfactory, is crucial for a company to satisfy its main performance objectives. This results in the following proposition:

Proposition 5: *A high degree of information exchange between a disinfectant supplier and potential partners is one of the conditions for maintaining a high performance exchange relationship.*

As suggested by Aramyan et al. (2007), these performance objectives can be used at supply chain level as well as at company level. Results from previous research, concerning performance measurement in the Dutch/German tomato chain by Aramyan et al. (2007), indicate that in agri-food chains many different performance indicators are used across all stages of the chain, considering the differing objectives of e.g. growers, exporters and importers. As a result, harmonization of performance measurement is a complex process. Based on their results, Aramyan et al. (2007) suggested a set of indicators that all supply chain members in agri-food chains find useful to some extent and which can easily be measured by agri-food chain members. Table 9 shows which performance objectives Aramyan et al. (2007) find relevant across different chain members in agri-food chains. Based on input from Eco2clean, the table also includes the objectives that are relevant for Eco2clean. The table can be used as a tool to compare and align Eco2clean's performance indicators with agri-chain performance indicators.

Table 9 – Performance objectives and indicators in the Costa Rican pineapple chain

Performance Objective	Performance indicators		
	<i>Grower</i>	<i>Importer/distributor</i>	<i>Eco2clean</i>
Efficiency	<ul style="list-style-type: none"> • Production costs • Profit • Return on investment 	<ul style="list-style-type: none"> • Distribution costs • Profit • Return on investment 	<ul style="list-style-type: none"> • Transaction costs • Return on investment
Flexibility	<ul style="list-style-type: none"> • Customer satisfaction • Delivery flexibility 	<ul style="list-style-type: none"> • Customer satisfaction • Delivery flexibility • Volume flexibility • Back orders 	<ul style="list-style-type: none"> • Customer satisfaction • Delivery flexibility
Responsiveness	<ul style="list-style-type: none"> • Lead-time (production time + harvesting time + packaging time) • Customer complaints 	<ul style="list-style-type: none"> • Fill rate • Customer response time • Shipping errors • Lead-time • Customer complaints 	<ul style="list-style-type: none"> • Customer response time
Product quality	<ul style="list-style-type: none"> • Appearance • Shelf life • Product safety • Product reliability • Labelling information • Pesticide/fungicide use 	<ul style="list-style-type: none"> • Appearance • Shelf life • Product safety • Product reliability • Labelling information • Pesticide/fungicide use 	<ul style="list-style-type: none"> • Product reliability

Source: adapted from Aramyan et al. (2007)

4.3 Summary

Supply chain governance between agri-firms is characterized by contractual agreements and the development of long-term relationships. Both forms of governance mechanisms are crucial in developing and enforcing exchange relationships between firms. In line with Aramyan et al. (2007), the design and performance of a certain combination of governance mechanisms that is adopted by partnering agri-firms, is influenced by the degree of uncertainty in the supply chain on the one hand, and asset specificity on the other hand. A high degree of uncertainty and asset specificity would to a larger extent require contractual governance mechanisms in order to account for e.g. opportunistic behaviour and to safeguard investments. On the other hand, relational governance could enforce mutual adjustment and cooperation between agri-firms, which ideally would reduce the need for expensive contractual agreements. The eventual goal of a supply chain governance strategy is to design an exchange relationship in such a way that satisfies performance objectives of agri-firms that are involved in an exchange relationship.

For eco2clean, this implies that their chain governance strategy for establishing exchange relationships with pineapple growers through exporters or Dutch fruit importers should include suitable mechanisms, either contractual, relational, or both, in order for Eco2clean to achieve high performance in minimizing transaction costs and customer response time, while maximizing customer satisfaction, delivery flexibility and product reliability. The next chapter explains the methodology that is applied to test the theoretic framework in the setting of the Costa Rican export pineapple chain.

5. Methodology

5.1 Introduction

This chapter discusses in detail the methodology employed to address the issue of formulating a governance strategy that helps Eco2clean to achieve its performance objectives, while considering the possible influencing effect of chain uncertainty and transaction specific investments. The main aim of this report is to provide Eco2clean with: (1) insight in the way exchange relations in the Costa Rican export chain for fresh pineapple are governed; (2) expectations regarding the current and future potential of DES 46 becoming an accepted sustainable agro-chemical in the Costa Rican pineapple chain; and (3) recommendations with regard to Eco2clean's chain governance activities with respect to introducing DES 46.

The first step to complete the aim of this research was to provide a solid theoretical foundation from which to derive variables and to test those variables in an empirical setting. In this context, the model of Aramyan et al. (2007) focuses on the effect of chain uncertainty and TSI on the way transactions are governed in the Costa Rican export chain for fresh pineapple, which in turn affects a company's performance. The first aim of the empirical research is to support or complement the literature on the Costa Rican pineapple chain and whether either exporters or importers are relevant partners for marketing DES 46. The second aim of the empirical research is to formulate recommendations for Eco2clean with regard to its chain governance activities in the Costa Rican export chain for fresh pineapple.

5.2 Approach

The explorative and practical nature of this thesis has implications for the approach applied to conduct the empirical research. In order to empirically test the model, the model was broken down into five propositions:

- ✚ **Proposition 1:** The choice of partnerships between Eco2clean and either importers or exporters depends on the degree to which importers and exporters are committed and able to stimulate the use of sustainable agro-chemicals on grower level.
- ✚ **Proposition 2:** A combination of contractual and relational governance mechanisms reduces opportunistic behaviour, increases information exchange, and enhances exchange performance
- ✚ **Proposition 3:** A high degree of chain uncertainty in the pineapple chain favours a high degree of relational governance in exchange relationships between suppliers and buyers of sustainable agro-chemicals.
- ✚ **Proposition 4:** The degree to which an exchange relationship between disinfectant suppliers and its buyers is successful strongly depends on the supplier's willingness to invest at grower level.
- ✚ **Proposition 5:** A high degree of information exchange between a disinfectant supplier and potential partners is one of the conditions for maintaining a high performance exchange relationship.

Fruit importers and experts were interviewed in order to support or complement the model. Furthermore, an extensive amount of literature was found addressing the concepts of contracts and relations in exchange relations. In general, although contracts are costly and do not promote social contact with partners, they are often used to enforce certain agreements of a transaction, especially in an uncertain business environment. In contrast, long-term relationships stimulate cooperative behaviour and information exchange through the concept of mutual trust. In the literature it is stated that using relational governance has a more positive effect on the performance of an exchange relationship, rather than using contractual governance. Ideally, a combination of both governance forms is needed to govern exchange relations. Especially when investments are case specific and uncertainty is high, a combination of both contractual and relational governance is the preferred and most efficient solution to govern exchange relationships. On the one hand, increased dependency between the investing partners, creates the need for more formal contracting between partners in order to reduce risk, uncertainty and opportunistic behaviour. On the other hand, relational governance mechanisms such as trust are regarded as means to safeguard TSI through a decreased need of monitoring and bargaining and an increase of cooperation and coordination between buyer and supplier. In order to find out to what extent those findings can be generalized to the case of Eco2clean, more empirical research is needed in support of the propositions. Therefore, the following topics are addressed in the empirical research part of this thesis:

1. potential partners for Eco2clean to consider in respect to successfully marketing DES 46;
2. the dominant governance mechanism, either contracts or relationships, applied in importer-grower relationships in the Costa Rican pineapple chain;
3. the effect of chain uncertainty on the choice of governance mechanism in exchange relations between Eco2clean and potential partners;
4. the influence of asset specificity on Ecoclean's need to invest in the development of DES 46 at grower level; and

The empirical testing of theoretical considerations contributes to recommendations for Eco2clean on the one hand, while contributing to the further development of theories on the other hand. By definition, explorative research is characterized as qualitative research, which means that results are interpreted in words, rather than making use of statistical comparisons. The empirical research of this thesis is conducted using questionnaires including both open and closed questions related to the relationship between importers and their pineapple suppliers. In some cases, these questionnaires have resulted in follow-up interviews. Due to certain constraints this was not possible in all cases.

In the data analysis, the data obtained from supplier-to-importer relationships is translated to the relationship between Eco2clean and potential partners.

5.3 Design

The questionnaire consisted of eight distinct parts. Table 10 provides an overview of the main topics in the questionnaire. The actual questionnaire (in Dutch) is depicted in Appendix III.

Table 10 – Questionnaire categories and subjects

Category	Subject	Source (closed questions)
General	Open and closed questions related to: the firm's business; and the firm's knowledge of the sector.	<i>Based on practical relevance</i>
Pineapple diseases	Open and closed questions related to: problems with regard to pineapple illnesses on fungicide level; and the importer's role in growers' use of fungicides.	<i>The American Phytopathological Society, (20/04/10)</i>
Fungicide residues	Open and closed questions related to: pineapple illnesses on fungicide level; fungicide use; and the expected market potential of DES 46.	<i>Based on practical relevance</i>
Chain governance	Closed questions related to the reliance on both contractual and relational forms of governance in exchange relations with pineapple growers.	<i>Kale, Singh and Perlmutter (2000) (7-point Likert scale)</i>
Information exchange	Closed questions related to the frequency and type of information exchange.	<i>Zhou and Benton (2007) (7-point Likert scale)</i>
Transaction specific investments	Closed questions related to the extent to which investments are specific for each exchange relation.	<i>Reuer and Ariño (2002) (adapted from a 5-point Likert scale to a 7-point scale; $\alpha = .74$)</i>
Uncertainty	Closed questions related to the level of unexpected changes in the business environment of importers.	<i>Klein, Frazier, and Roth (1990) (7-point Likert scale); Buvik and Grønhaug (1999) (7-point Likert scale)</i>
Closure	Closed and open questions related to the sharing of the results of this research.	<i>Based on practical relevance</i>

The open questions in the questionnaire are entirely case specific, and were formulated in accordance with Eco2clean and an expert at Wageningen University. The combination of open and closed questions, as well as clarifications for the closed questions, is expected to produce straightforward data, as well as specific opinions and experiences of the interviewees. These data were used to answer the four empirical research questions and to formulate suitable recommendations with regard to a governance strategy for Eco2clean to launch DES 46 in the Costa Rican pineapple chain.

5.4 Data collection

For the empirical research, the import section of the fresh pineapple chain (see Figure 8) was chosen as focus for the case study. As indicated by the arrows, it is proposed that Eco2clean should first establish a relationship with either Costa Rican exporters (A) or Dutch importers (B). It is expected that exporters or importers could use their relationships with growers (C), or their relationships with each other (D), to form a bridge between Eco2clean and Costa Rican pineapple growers. As a result, Eco2clean can establish exchange relationships with the growers (E). On the one hand, the model of Aramyan et al. (2007) is used to determine how Eco2clean should govern exchange relationships with growers, while considering importers as mediators. On the other hand, the model is used to find out to what extent chain uncertainty and asset specificity are important influencing factors of the way Eco2clean should best govern its relationships with pineapple growers and importers.

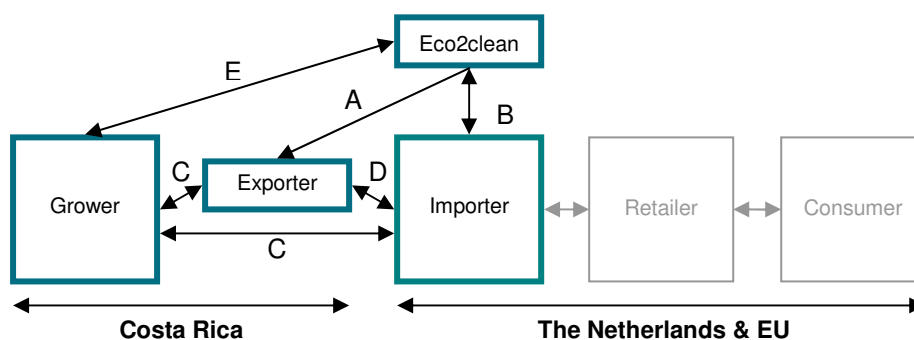


Figure 8: Schematic representation of the international pineapple chain

Exporters are excluded from this case study since they are expected not to be involved in the process of marketing sustainable agro-chemicals to growers. Furthermore they are expected not to have an interest in this matter. Whereas past attempts to establish exchange relationships with Costa Rican fruit growers have resulted in a lack of payment security for Eco2clean, importers are expected to form a bridge between Eco2clean and pineapple growers. Since importers have well established connections with fruit growers, they are expected to be able to exert some power over pineapple growers' use of agro-chemicals and to stimulate them to start using DES 46. The sources of information for this study are:

1. questionnaires filled in by fruit importers that import pineapple;
2. follow-up interviews with some fruit importers; and
3. interviews with an expert in the field of international agricultural consultancy aimed at evaluating the governance model that is to be formulated based on the results of the questionnaires.

For the initial respondent selection a selection of 14 Dutch fruit importers was made based on an attendance list of exhibitors and visitors of the Fruit Logistica 2010 fair in Berlin. Main criterion for participation in the study was that the respondents import fresh pineapple from Costa Rica. From this selection of 14 fruit importers, 11 importers complied to the main criterion. These 11 importers were checked on representativeness (criteria: size and reputation) by an expert from DLV Plant with whom initial contact was made at Fruit Logistica 2010. DLV Plant is an independent research and consultancy agency in the plant sector. The activities of the organization are aimed at both domestic and foreign projects. The final respondent check by the expert from DLV Plant provided 6 importers

that were selected to participate in the study. Through snowball-sampling, as a result of interviews with respondents of the selection of 6 importers, the total respondent population increased to 11 possible respondents. However, due to non-response, the study was conducted among the quality managers of 5 Dutch importers of fresh Costa Rican pineapple and 1 Dutch importer of Latin American mango, ranging in size from 50 to 170 employees. The mango importer did not comply to the main criterion. It is however expected that the data produced from this company are highly relevant and could still be generalized to the fresh pineapple sector. The total population of Dutch pineapple importers is less than 20 of which less than 10 importers obtain a pineapple share of more than 10%. The share of fresh pineapples from Costa Rica among the respondent companies was at least 10% of their total portfolio and in one case around 40%. Pineapple imports included the MD2, Smooth Cayenne, and Royal Sweet variants.

5.5 Data analysis

The goal of explorative data analysis (EDA) is to gain understanding of data through identifying e.g. patterns, trends and relationships in the data. In order to discover patterns in the data, the questionnaires in general are compared to each other as well as the individual questions of each questionnaire. To this end, in *step 1* of the data analysis, the data are formatted into an excel file, which enables the researcher to make comparisons and easily account for missing data. *Step 2* involves comparing the data of all questionnaires per category (see Table 7 for the different categories). These initial comparisons result in the identification of a pattern per category. As indicated, further comparisons can be made between individual questions in order to identify relationships between different categories. In *step 3*, the comparisons are processed into conclusions regarding the market potential of DES 46 on the Costa Rican export pineapple market; opportunities and challenges that Eco2clean may face in attempting to market DES 46, including the influence of chain uncertainty and asset specificity; and the importance of certain contractual elements in guaranteeing the delivery of – and payment for- DES 46.

6. Results

6.1 Introduction

The result section of this research provides information regarding the practical issues that were highlighted in the previous chapter. Through this information, a better view of decision making and perceptions with regard to fungicide use in the import section of the export chain for Costa Rican fresh pineapples is obtained.

6.2 Results questionnaires

The subparagraphs below represent the results from the different sub categories in the questionnaire. The questionnaires and their input from respondent companies are presented in Appendix V.

6.2.1 Pineapple diseases

On fungicide level, common pineapple diseases ranged from Penicillium, Botrytis, Fusarium (in Dutch 'bruinrot'), Botryodiplodia rot, glassy spoilage, Anthrachsoses (mango), and the forming of fungi at the bottom and crown of the pineapple. In spite of the use of pre- and post harvest fungicides, e.g. Fludioxonil, Triadimefon, Trifloxystrobin, and Prochloraz and Thiabendazole (both applied on mango), these common diseases still occur during transport and storage.

Lack of direct relationships between importers and growers

Taking additional counter measures against such diseases that have a negative impact on fresh pineapples during transport and storage are considered by importers as extremely difficult. A lack of direct relationships between the importer and growers exists, as 3 out of 6 respondent companies state that they import via exporters³, instead directly from Costa Rican growers, whereas 1 respondent states to import from large growers directly as well as from exporters. Data from follow-up interviews with 3 of these respondent companies provide several reasons for this lack of direct relationships between importers and growers. First of all, exporters are more capable to gain access to local pineapple growers than importers from other continents. Second of all, if importers would do business with individual small growers, many agreements must be made for each grower, which is a costly and time consuming process. Third of all, the export market for Costa Rican pineapple is constituted by many small growers, producing small amounts of fresh pineapple. In the case those small growers are not organized in grower cooperations, it is not efficient for Dutch pineapple importers to import such small quantities from individual growers. Instead, small growers transport their produce to central exporters where large volumes of fresh pineapple are distributed to importers in destination countries. Also, such exporters are better able to comply with importers' packing needs and they function as contact for both small growers and importers. In general, importers thus prefer exchange relationships with exporters. However, exceptions to this rule include large growers. Large growers are often able to perform activities and packaging services on the same scale as exporters do. In the context of communication, time and costs, developing exchange relationships with large

pineapple growers is far more efficient compared to using an exporter as additional chain link. However, few large growers exist that are organized independently and have direct relationships with importers. In direct relationships between importers and small growers, importers hold growers responsible for delivering high quality fruit by enforcing growers to live up to their arrangements, also regarding chemical use. Growers are required to store produce during transport in a way that small internal damages that the fruit incurred during growth or harvest do not harm the product. Furthermore, correct storage must protect the fruit against external hazards that may threaten the fruit during transport. This includes storing and transporting the fruit under correct temperatures.

Importers' involvement with growers' fungicide use

The 4 respondent companies that do not import from growers directly either had low scores, or stated 'not relevant' on the question whether they are well informed about growers' fungicide use. At the same time, these 4 respondent companies rate their commitment to growers' use of fungicides either as neutral, or as not relevant. They stated practically not to be involved in, nor to determine, the fungicide use of growers. The 3 respondent companies that do have direct relationship with growers, indicated to be well informed about their growers' fungicide use, as well as to be extremely committed in their growers' fungicide use, rating these questions with 'very true' and 'as much as possible'. However, in line with the other respondent companies, these 2 respondent companies also indicated not to be involved in, nor to determine their growers' fungicide use in any way. All respondent companies explain their little involvement and influence on growers' fungicide use through their agreements with either growers or exporters, concerning the active ingredients that are allowed in fungicides in the EU. Importers send supplier statements to either their growers, or exporters, which those parties are requested to sign. In these statements, importers demand that certain fungicides, of which the active ingredient is not allowed in the EU, are either not to be used in the growth and harvest process of fresh pineapple at all, or used 'as low as reasonably achievable'. Depending on whether the active ingredient of the fungicide is allowed in the EU, or when allowed fungicide residue levels are exceeded, the importer and grower can decide to use an alternative fungicide.

The findings related to the respondents' lack of direct relationships with growers and their inability to influence growers' use of agro-chemicals, are in contradiction with the theory. In the most ideal scenario, importers indeed strive to have exchange relationships with growers directly. However, due to the size and organization of growers such direct links are often difficult to realise. Based on follow-up interviews with respondents, these findings are expected to be an accurate representation of the entire population of pineapple importers.

Fungicide residues

In order to avoid pineapple shipments with exceeding residue levels, 2 respondent companies state to test shipments on residue levels more than once a week, whereas 2 companies state to test residue levels from once a week to once a month, 1 company conducts tests less than once a month, and 1 company states that the frequency of testing depends on how often maximum residue levels

³ Exporters purchase fresh pineapple from independent growers with the intention of reselling produce to importers

are exceeded. The company that conducts tests less than once a month was the only respondent to have experienced residue levels that exceeded EU instituted maximum residue levels. Residue tests are generally conducted by Lab Zeeuws Vlaanderen, Groen Agro Control, Food Compass, and the Food and Consumer Product Safety Authority. 3 respondent companies also claim to conduct tests themselves.

Importers' opinion on stimulating sustainable use of fungicides

Regarding the pre- and post fungicide use in the fresh pineapple chain, 5 respondent companies indicate that importers should take initiative in the process of introducing alternative, more sustainable forms of crop control. In the context of chain control, 2 of these companies say that the entire chain should work together in order to stimulate the use of sustainable forms of crop control. However, 5 companies state that current legislation concerning maximum residue levels is easy to comply to, which is why importers currently have no incentive to take initiative in this matter. Moreover, according to importers, suppliers of sustainable fungicides appear less willing to conduct tests in open cultivation projects. Growers, regardless of their size and level of organization, are considered not to act as pioneers unless the entire chain demands more sustainable, residue lowering, fungicides.

Interest in sustainable fungicides

Although currently no incentives exist for either member in the fresh pineapple chain to be pioneer in the field of introducing sustainable agro-chemicals, all respondent companies indicate that, among importers, currently indeed an interest in such agro-chemicals exists. The future expected demand for low residue fungicides among importer is high. This high future demand is expected since importers are searching for ways to continue coping with strict retailer norms regarding residue levels. Applying lower residue fungicides on grower level would enable importers to comply to these strict norms, which in turn lowers importer concerns regarding their product quality. Demand from growers is expected to be less substantial. Respondent companies expect growers to be only interested in the effectiveness and price of alternative fungicides to be equal to current fungicides.

According to the respondent companies, factors threatening the actual introduction and use of DES 46 include doubts regarding their working in the field. Without scientific test results regarding the impact of such fungicides on soil and fruit produce, chain members are not likely to stimulate the use of these alternative fungicides. Moreover, it is not clear to what extent the climate in Costa Rica will affect the working of innovative fungicides such as DES 46 and the working of other agro-chemicals that are used in addition to DES 46.

Marketing sustainable fungicides

In line with the theory, 3 respondent companies stated that the best way to market a new fungicide is to develop a business relationship with pineapple importers. Consensus exists regarding the proactive attitude that importers should develop in order to think about the future of the pineapple chain and the future use of agro-chemicals. 1 respondent favours developing business relationships with large pineapple growers directly, whereas small scale growers are best contacted through exporters.

However, no further support for this statement exists in the data. 1 respondent argues that cooperation with retailers is important, considering that biologic fruit is still a niche product. A relevant alternative is offered by 1 respondent stating that local distributors in Costa Rica should be convinced of the innovative and sustainable nature of new fungicides with the objective of distributing the fungicide through existing distribution channels. Moreover, the respondent stated that a local distributor would be better able to enforce delivery and payment of the fungicide than an importer or exporter.

Proposition 1: The choice of partnerships between a disinfectant supplier and either importers or exporters depends on the degree to which importers and exporters are committed and able to stimulate the use of sustainable agro-chemicals on grower level.

With regard to proposition 1, 4 out of 6 respondents state that although importers in general do not have direct relationships with growers, the best way to market a sustainable fungicide in the pineapple chain is to develop relationships with pineapple importers first. Consensus exists on the issue that importers should take more initiative in the field of sustainable agro-chemical use on grower level. This is supported by the fact that 4 respondents want to be updated on the possibilities of sustainable fungicides and express willingness to cooperate with disinfectant suppliers. Also considering the geographical dispersion of exporters, cooperation with Dutch importers of pineapple would be more efficient. Considering that this questionnaire was conducted among importers and not among exporters, the results regarding exporters' ability and willingness to stimulate the use of sustainable fungicides are not conclusive.

An important alternative for marketing sustainable fungicides is to use local distribution channels in Costa Rica or local cooperatives of several small growers, which often supply their growers with agro-chemicals and the knowledge required to apply the chemicals.

Chain governance

In line with the theory on relational governance, the 3 respondent companies that have direct relationships with growers indicated that contracts with growers are characterized by oral or written agreements. Such agreements are better known as 'gentlemen agreements'. According to the scores of the respondent companies, the essence of such agreements is that they rely upon the mutual dependence of two parties, personal interaction, mutual respect and trust, instead of having to legally enforce such agreements. Although it is difficult to measure the reliability of relationships before importers and their buyers engage in exchange behaviour, relationships are the predominant governance form of transactions in the fresh pineapple chain. However, when conflicts arise between importers and pineapple growers, contracts are used for the importer to rely on. Such contracts generally include agreements on order quantities, delivery schedules, product specifications, and planning information. 1 respondent company indicated to also make agreements on crop control methods. In case growers do not live up to contractual agreements, it is initially attempted to resolve these issues in cooperation with growers. Which measures are to be taken generally depends on the

reason why the grower fails to comply with the contract. These measures also depend on the degree of personal interaction and trust between importer and grower. If problems arise with regard to exceeding residue levels, in general either the grower does not receive the price on which it agreed with the importer, or the produce is destroyed for which the grower is charged.

Proposition 2: A combination of contractual and relational governance mechanisms reduces opportunistic behaviour, increases information exchange, and enhances exchange performance

In the context of proposition 2, the respondent companies support the theoretic notion that long-term relationships between suppliers and buyers in agri-chains are the predominant governance form in exchange relationships between importers and growers or exporters. Culture differences cause inconsistencies in communication between Dutch importers and Costa Rican growers or exporters, whereas enforcing growers through contracts may be seen as a form of disrespect towards growers. In turn, this may inhibit the effectiveness of formal agreements on agricultural practices. These formal agreements are sometimes even seen as a lack of confidence, thus as insult, towards Costa Rican growers or exporters. Therefore, in the pineapple chain, relations are a far more important form of governance than contracts. 1 respondent even states to trade in fresh pineapple without the use of contracts. However, when issues arise, e.g. with regard to exceeding residue levels, importers have to rely on written agreements in order to enforce appropriate action amongst their suppliers.

Uncertainty

The theory indicated four dimensions of uncertainty that the respondent companies may regard as a threat to their exchange relationships with growers or middlemen. These dimensions are *volatility*; *diversity*; *power concentration*; and *interdependence and conflict*. The respondents rate the demand for fresh pineapples as relatively steady. The degree to which retailers and competitors change their order habits and the degree to which consumer demand fluctuates, both direct indicators of volatility, are regarded as low. Diversity in the chain is high, since many growers constitute the Costa Rican export market for fresh pineapples and fresh pineapple prices are regularly subject to change. The pineapple chain is dominated by two large fruit multinationals. However, since the pineapple chain offers many opportunities for competitors, power concentration does not generate uncertainty for the respondents, and thus has no influence on the respondents' way of doing business. Interdependence and conflicts between importers and growers occur regularly and are caused by e.g. culture differences between Western importers and Costa Rican growers, and growers' violation of importers' norms for residue levels on fresh pineapple.

The large cultural differences between Western importers and Costa Rican growers form another dimension of uncertainty. Such differences inhibit a frequent information exchange between the parties. Therefore, importers prefer having an exchange relationship with one middleman that has experience and knowledge in the way both growers and importers do business. Diversity in the market has little effect on the relationship between a middleman and an importer, since most activities are planned, regardless of the complexity of each tier in the chain.

Proposition 3: A high degree of chain uncertainty in the pineapple chain favours a high degree of relational governance in exchange relationships between suppliers and buyers of sustainable agro-chemicals.

One part of the theory states that in uncertain market environments, formal contracts are often used to safeguard business and minimize the impact of external market uncertainties, bounded rationality and the threat of opportunistic behaviour. In general, the effect of uncertainty on exchange relationships between importers and growers or middlemen in the pineapple chain is low. Considering the effect of uncertainty on growers' fungicide use, chain uncertainty is expected to be far less of a determinant of fungicide use than uncertainty in weather and the threat of pests. Thus, no empirical support is provided for proposition 3. However, relations are still extremely important in the pineapple chain, whether chain uncertainty is either high or low.

Transaction specific investments

4 respondent companies agree that Costa Rica is not by definition a developing country. Large Costa Rican growers are considered to be wealthy enough to invest in assets themselves. Besides, large export growers should already have invested in logistic and storage facilities before engaging in transaction with foreign importers. Therefore, these 4 respondent companies currently have no incentives to invest in Costa Rica. Importers do often provide growers with an advance on their payment. However, in the end, growers remain responsible for such investments. A prerequisite for growers to invest in such developments is that undisputed scientific evidence must be provided that shows that the fungicide has no negative effect on both the structure and sensory characteristics of pineapples after application of the fungicide, and the environment. A second condition that must be satisfied in order to stimulate investments for the application of a new fungicide is that Eco2clean should prove that the active ingredients in the fungicide are permitted and applicable in combination with other agro-chemicals. Third, the fungicide should work under extreme climatic circumstances against a large variety of pests.

Proposition 4: The degree to which an exchange relationship between disinfectant suppliers and its buyers is successful strongly depends on the supplier's willingness to invest at grower level.

The theory states that in agri-food supply chain production processes, investments are often case specific, e.g. training of growers in agro-chemical use. The data show that investments done by Costa Rican pineapple growers are aimed at producing training facilities, storage facilities and logistic facilities in order to be able to export their produce to, e.g., the EU. In line with the theory, asset specificity is high, since growers often have multiple customers dispersed over a considerable region. For each of these customers different storage facilities and logistic facilities have to be made, although in specific cases the same facilities may be used for different customers that are located in each others near vicinity.

Regarding proposition 4, growers' facilities may have to be adjusted to the use of new fungicides. For instance, storage conditions for produce will change, and so should the storage facilities. Successful exchange relationships between a disinfectant supplier, a mediator such as an exporter or importer, and grower will indeed depend on the degree to which the disinfectant supplier is willing to invest time and money in marketing activities and the creation of scientific evidence of the working of sustainable fungicides.

Information exchange

The 3 respondent companies that have direct relationships with growers claim to provide their growers with information on a frequent basis. Table 11 is an overview of their average frequency of information exchange on several important aspects of an exchange relationship.

Table 11 – Frequency of information exchange from importer to grower

Information on:	Frequency of information exchange
Changes in orders	On weekly basis
Order planning	On weekly basis
Inventory levels	Never
Product specifications	On yearly basis
Evaluation of reliability of delivery	On quarterly basis
Demand forecasts	On either monthly or weekly basis
Changes in delivery schedule	On either monthly or weekly basis
Evaluation of product quality	On weekly basis (after each shipment comes in)
Order planning	On weekly basis

For the other 3 respondent companies this question was irrelevant considering they do not have direct exchange relationships with growers. Instead they cooperate with exporters or large grower cooperations. The information flow from grower to importer is far less substantial than the information exchange from importer to grower. However, among importers this information is not unambiguous to discover a trend. Therefore, this information is not part of the results.

The 3 respondent companies rate the quality of information exchange with their growers from average to good. Information exchange is still subject to improvement considering the culture differences between Costa Rican growers and Western importers. Whereas Western companies are more straightforward in their communication in exchange relationships, in developing countries such as Costa Rica, this is often regarded as a lack of respect for your partners. 1 respondent company indicates that in case problems arise at grower level, e.g. with regard to a certain threat for product quality, they are not notified by their growers. By the time importers become familiar with such problems, it is often too late to do anything to prevent product quality to decrease. Hence, information exchange in problem situations is regarded by the respondent company as unsatisfactory. The other 2 respondent companies claim not to experience any problems with growers.

Proposition 5: A high degree of information exchange between a disinfectant supplier and potential partners is one of the conditions for maintaining a high performance exchange relationship.

With regard to proposition 5, based on the questionnaires it is difficult to conclude whether a high degree of information exchange between a disinfectant supplier and potential partners is indeed a condition for maintaining a high performance exchange relationship. However, following the theory, when companies can overcome the risk associated with exchanging information (e.g. opportunistic behaviour), a stronger relationship may be created which in turn has a positive effect on exchange performance. Thus, it can be stated that a high degree of information exchange is indeed one of the conditions for high exchange performance.

6.3 Summary

Below, the main conclusions drawn from the empirical research are summarized:

- ✚ In the context of reducing the loss of produce to fungicide diseases, and being able to supply produce to retailers that enforce strict residue norms, Dutch pineapple importers expect the current and future chain demand for sustainable, non residue agro-chemicals to be substantial;
- ✚ The empirical research indicates that importers are indeed willing to cooperate with disinfect suppliers in the development of sustainable agro-chemicals, whereas the willingness and ability of exporters to cooperate with disinfectant suppliers requires more empirical research;
- ✚ Alternative partners for marketing sustainable agro-chemicals include large independent growers, cooperations of growers, and local Costa Rican distributors of agro-chemicals;
- ✚ The empirical research supports that relational governance is predominant in governing exchange relationships between pineapple importers and growers, whereas contractual governance appears to be important when problems between importers and growers arise;
- ✚ The proposed effect of uncertainty on exchange relationships between importers and growers is not supported;
- ✚ Investments at grower level are done by growers themselves. These investments include training of employees, storage facilities and logistic facilities. Asset specificity is regarded as high.
- ✚ A high degree of information exchange in a transaction is indeed one of the conditions for maintaining a high performance exchange relationship.

7. Conclusion

7.1 Research summary

The aim of this research was to explore how chain members in the Costa Rican export chain for fresh pineapple operate and to identify opportunities and challenges concerning the entering of this chain with an innovative product in crop control. By integrating an understanding of the members in the pineapple chain with a theoretic model for chain governance in agri-food supply chains, an empirical research model was formulated that would contribute to the research objective. The framework integrates the two main different governance mechanisms with specific characteristics of agri-food supply chains, chain uncertainty and asset specificity. The aim of the empirical research model was to gather empirical data and to compare these data with theoretical findings. Based on five propositions related to the functioning of the pineapple chain, the conclusions from the empirical research attempted to lay the foundation for recommendations for Eco2clean to consider in respect to DES 46.

7.2 Research questions

The main conclusions of this research are drawn in respect of the research questions formulated in section 1.3.

Answer to research question 1:

Main elements used to describe the Costa Rican export chain for fresh pineapple included: identifying the parties that may be critical to the success of sustainable fungicides; determining the amount of tiers in this export chain and the depth of each tier; as well as explaining important chain links between disinfectant companies, supporting companies, and pineapple growers

The size of growers and the amount of relationships one importer has with different growers plays an important role in whether importers have chain links with either exporters or growers directly. Figure 9 depicts chain links that are expected to be important to successfully launch a sustainable fungicide in the Costa Rican export chain for fresh pineapple.

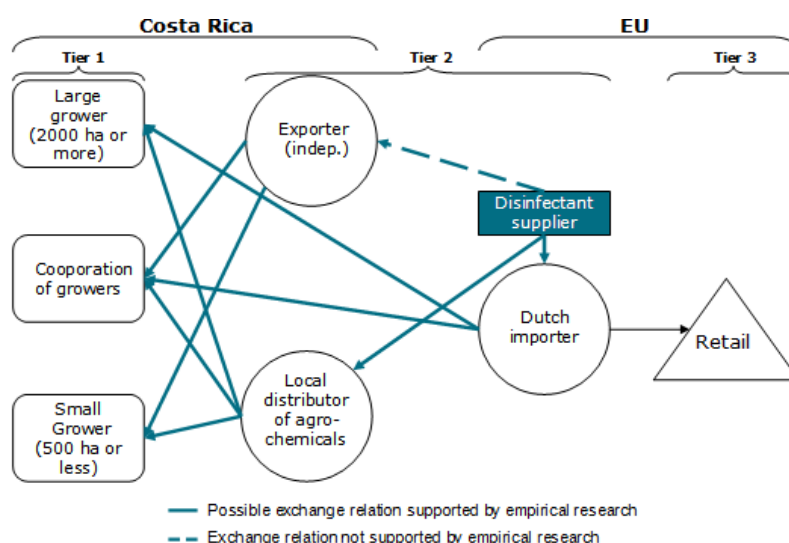


Figure 9: Overview of high potential chain links

As a clarification of Figure 9, the chain links are summarized as follows:

- ✚ Disinfectant supplier Dutch importer large grower;
- ✚ Disinfectant supplier Dutch importer cooperation of growers;
- ✚ Disinfectant supplier local distributor of agro-chemicals large grower/small grower/
cooperation of growers.

Importers are aware of the proactive attitude they should develop in facilitating future use of sustainable agro-chemicals. Furthermore, they are interested in obtaining more information on the possibilities of sustainable agro-chemicals. Empirical evidence in support of the potential of the chain link 'disinfectant supplier exporter small grower', is not sufficient. Although more research is needed on the ability of the potential partners to facilitate the marketing of DES 46 on grower level, the next chapter does discuss some advantages and disadvantages of each partner, including the potential of exporters.

Answer to research question 2:

In the Costa Rican export chain for fresh pineapple, exchange relationships between importers and growers or exporters are characterized by mutual trust and coordination. Contracts are formulated as gentlemen agreements and mainly include agreements on pineapple quality, delivery quantities, agro-chemical use, and the amount of residue levels that are allowed in the import countries for fresh pineapples. Chain uncertainty does not affect relationships between importers and their suppliers, since many transaction related activities are planned in advance. Furthermore, regarding the growers' use of fungicides, chain uncertainty with regard to e.g. the availability of supply is expected to be far less of a determinant of fungicide use than uncertainty in weather and the threat of pests.

Investments done by growers are to a large extent case specific. Growers often have multiple customers dispersed over a considerable region. For each of these customers different storage facilities and logistic facilities have to be made, although in specific cases the same facilities may be used for different customers that are located in each others near vicinity.

When issues arise with regard to e.g. agro-chemical residues on pineapple product, importers rely on formal agreements in order to enforce appropriate action on behalf of the grower or exporter. These agreements often include terms regarding agro-chemical use and the amount of residue levels that are allowed in the import countries for fresh pineapples. Current agricultural practices in the pineapple chain include, but are not limited to, the use of Fludioxonil, Triadimefon, Trifloxystrobin, Prochloraz and Thiabendazole. Although importers are committed to correct agro-chemical use of growers, they are not involved in, nor determine, growers' use of agro-chemicals. Although importers regard the market potential of sustainable agro-chemicals as high, growers must be offered clear incentives to change their activities and facilities to a new method of crop control.

Answer to research question 3:

Research question 3 is addressed in the next chapter of this research, the recommendations section.

8. Recommendations & discussion

Based on the results and conclusions, with respect to main research question 3, this research provides Eco2clean with recommendations regarding the opportunities and challenges that exist with regard to the potential demand for DES 46. Although these recommendations are speculative, they provide Eco2clean with some understanding of future activities related to marketing DES 46 in the Costa Rican export chain for fresh pineapple and the effect of future activities on their performance objectives.

8.1 Eco2clean's performance objectives

Main categories of performance used to evaluate performance in agri-food supply chains are *efficiency, flexibility, responsiveness, and product quality*. Eco2clean's performance objectives include *minimizing transaction costs and customer response time, while maximizing customer satisfaction, delivery flexibility and product reliability*. In the introduction phase of DES 46, Eco2clean will have to spend much time and money to create awareness of the presence of DES 46 amongst its target market. In terms of minimizing transaction costs and maximizing profits, Eco2clean will incur high costs against a low sales volume. In terms of flexibility, demand for DES 46 is still in the introduction phase. Customer satisfaction is thus low and delivery flexibility is not yet relevant, since more attention must first be paid to creating awareness for DES 46. In this context, much effort in creating a substantial flow of information exchange between Eco2clean and its potential buyers is crucial. In this phase, errors in Eco2clean's responsiveness are to be recognized and improved in order to minimize customer response time in DES 46's growth phase. Since DES 46 is still in its development phase, it may be important for Eco2clean to further conduct field tests with DES 46 in cooperation with chain parties that are willing and able to contribute to the further development of DES 46.

In the growth phase, when Eco2clean's investments in scientific research and the development of long-term relationships with potential buyers are effective and DES 46 is accepted by the target market, transaction costs reduce as investments are not as much required in this phase. Eco2clean's efforts in creating a frequent flow of information exchange have resulted in an increase in experience and knowledge in demand and supply for DES 46 in the pineapple chain. As a result, Eco2clean is more flexible and responsive and thus better able to respond to changing and more specific demand, e.g. related to packaging and modes of transport, and to provide requested products as quickly as possible. In the growth phase, DES 46's quality is expected to increase, since Eco2clean can utilize more profit for the further field development of DES 46.

8.2 Recommendations

Table 12 presents possible advantages and disadvantages that Eco2clean may consider when searching for chain parties that may facilitate the distribution of DES among growers:

Table 12 – Advantages and disadvantages of potential partners

Partner	Advantages	Disadvantages
Importer	<ul style="list-style-type: none"> ✚ Consensus exists among importers regarding the pro active attitude that they should develop in thinking about the future of the pineapple chain and the future use of agro-chemicals; ✚ As a consequence of the questionnaires, an interest in the possibilities of DES 46 already exists. ✚ May offer access to large growers. 	<ul style="list-style-type: none"> ✚ No incentive yet to act upon their interest for DES 46, since currently they are able to comply with current MRL standards imposed by retailers and legislative authorities.
Local distributor of agro-chemicals	<ul style="list-style-type: none"> ✚ Making use of already existing distribution channels; ✚ Local distributors are better able to enforce delivery and payment for DES 46. 	<ul style="list-style-type: none"> ✚ Possible reluctance on behalf of the distributor to distribute DES 46 through their own channels; ✚ A certain part of the profit margin will have to be paid to the distributor;
Exporter	<ul style="list-style-type: none"> ✚ Offers access to a large amount of small growers, or grower cooperations. 	<ul style="list-style-type: none"> ✚ Differing interests, whereas exporters main concern is often their profit margin, regardless of what agro-chemicals growers use.

Table 13 provides recommendations for Eco2clean with regard to future investments in marketing activities and scientific evidence in support of DES 46. In addition, the table offers recommendations concerning governance mechanisms to adopt in exchange relationships with potential partners and the important role of information exchange in those exchange relationships.

Table 13 – Recommendations

Topic	Subtopic	Recommendations
Investments	Scientific support	Without scientific test results regarding the impact of DES 46 on soil and fruit produce, chain members are not likely to stimulate the use of DES 46. Moreover, it is not clear to what extent the climate in Costa Rica will affect the working of innovative fungicides such as DES 46 and the working of other agro-chemicals that are used in addition to DES 46. Scientific evidence should also show that DES 46 is safe to crops, and has no negative consequences for public health and the environment. In addition, the active substance in DES 46, hydrogen peroxide, must be allowed to be used in agro-chemicals in Costa Rica and it should dissolve completely during transport. If not, any traces of hydrogen peroxide on fresh pineapple entering the EU may harm Eco2clean's reputation. Also, Eco2clean must prove that DES 46 generates more revenues, costs less than traditional fungicides, and that DES 46 complies with standards from retailers and legislative authorities in the importing countries.
	Marketing	Promotional activities are required for increasing awareness of DES 46 among importers and growers. These promotional activities should be supported by

		experts in the field of crop protection and advisors which supervise the use of DES 46 at grower level.
	Testing	Eco2clean should show willingness to conduct tests in open cultivation projects in cooperation with importers and growers in order to convince them of the working of DES 46.
	Training	Regarding the innovative nature of DES 46, DES 46 should invest in educating growers in using DES 46 to ensure correct use to guarantee that growers experience the advantages of DES 46. In cooperation with, for instance, DLV Plant, Eco2clean can consider arranging monthly training meetings with a selection of growers.
Supply chain governance	Relational	The conclusion chapter has pointed out that relationships are the predominant governance form in the pineapple chain. Developing long-term relationships between Eco2clean and potential partners is thus a good way to successfully maintain transactions. Regarding the scale of investments that need to be done, and the strong doubt that importers and growers have towards the working of DES 46, Eco2clean must develop strong ties with importers and growers in order to enable additional field testing. Eco2clean should also be fully committed to the needs of importers and growers with regard to the purchase and application of DES 46.
	Contractual	When issues between exchange partners arise, e.g. with regard to payment and delivery inconsistencies, it is important for Eco2clean to rely on written contracts to enforce agreements on the issues at hand and to force buyers to act in accordance with the contract. In addition to relational governance mechanisms, Eco2clean must admit to the relevance of contracts, especially in problem situations between itself and buyers.
Information exchange		Eco2clean must recognise the effect of intensive information exchange with potential partners and growers. From a marketing perspective, Eco2clean must inform potential partners about the innovative characteristics of DES 46 and its working, of which the goal is to persuade them to develop field testing with their growers. From a functional perspective, it is critical for Eco2clean to obtain frequent feedback from users of DES 46 concerning e.g. the working of the product, increases in crop yields, and product quality in order to guarantee a correct application of DES 46 and to minimize the degree to which users are unsatisfied. One of the opportunities for Eco2clean is to integrate its USB based information exchange system with buyers of DES 46

Source: answers to main research questions, empirical results, and theory

8.3 Discussion

The findings of this explorative research suggest that in the Costa Rican export chain for fresh pineapple a market potential exists for innovative, sustainable fungicides. Considering the suspicious attitude towards the working and added value of such fungicides across the chain, this potential can only be exploited if fungicide suppliers are able and willing to scientifically prove the working of their products. Moreover, no member in the chain currently has incentive to act as pioneer in applying sustainable changes in current crop control methods. As long as chain members do not regard

sustainable fungicides as an opportunity to gain competitive advantage, such fungicides will remain unable to gain foothold and will remain less than a nice market. It is important to note that these results were consistent across all tested fruit importers.

From the perspective of Eco2clean, this knowledge is important to consider when deciding on e.g. the scale on which the company should continue its business activities regarding DES 46. According to the author, what struck most about the results was the unexpected contradiction between the substantial demand for sustainable fungicides in the pineapple chain and the inability of chain members to act upon this demand. It was expected that importers to a large extent would be able to determine their growers' use of agro-chemicals. As the results indicate, this appears not to be true since first of all, importers are not as often directly connected to growers as was initially assumed. Second of all, importers do not have the expected power to enforce growers to switch to alternative, sustainable agro-chemicals. Instead, importers' power is limited to enforcing growers to live up to their current agreements on the permitted use of agro-chemicals. Alternative explanations for these results may include the reluctance of any chain member to function as pioneer in the field of sustainable fungicides. Current residues on fresh pineapples almost never exceed maximum residue levels instated by the EU. Although residue norms instated by retailers are often stricter than the EU, apparently this is no incentive for importers and growers to stimulate the use of non-residue fungicides. An other possible explanation is that importers and growers are reluctant to switch to innovative fungicides because of the lack of scientific prove regarding the potential hazardous effects on produce and the effect of climatic circumstances on the working of innovative fungicides. Furthermore, especially growers need to be convinced that innovative fungicides are not more expensive than current agro-chemicals, and also generate more profit in the long run. Last, but not least, the culture differences between Western importers and Costa Rican growers may inhibit the success of relationships and contracts. As a result this forms a bottleneck for importers and growers to either individually or jointly initiate a project regarding the switch from current fungicides to innovative fungicides.

8.4 Theoretical considerations

The theoretic framework of supply chain governance in agri-food chains of Aramyan et al. (2007) formed the basis for exploring to what extent contractual and relational governance mechanisms are adopted in exchange relationships between Western pineapple importers and Costa Rican pineapple growers. The results from this research add to the empirical evidence that shows that in various contexts, exchange relationships are characterized by relational governance. Especially in relations with Costa Rican growers, in which enforcing agreements through contractual mechanisms is seen as a form of disrespect towards the growers. Therefore, it is not surprising that in such business-to-business relationships, partnerships and cooperative efforts are considered of key importance to the creation of high performance. Most previous research on relational governance integrates it with the theoretical problems of transaction cost analysis, while ignoring the possible influence of parties in the exchange (Ferguson and Bergeron, 2005). For instance, Ferguson and Bergeron, (2005) show that boundary spanners, service and sales people representing an organization and image externally, can significantly affect exchange performance.

8.5 Managerial implications

Relational exchanges between Eco2clean and its potential customers are important with respect to future revenue generation and the further development of DES 46. In this context, the most relevant parties to achieve this are importers and, as an alternative, local Costa Rican distributors of agro-chemicals, such as Reflex, the Costa Rican distributor of Koppert B.V. To generate earnings off relational exchanges, Eco2clean must be willing and ready to invest in relationships and information exchange. This requires a focus on the customer as the source of future profitability, a supportive organizational culture that proliferates that focus across Eco2clean, empowerment and support for boundary service and sales employees, and compensation for service and sales employees based on their success in creating positive customer evaluations of performance of DES 46 (Ferguson and Bergeron, 2005).

8.6 Future research

The reason behind why this research is conducted is related to the growing concern of Western consumers regarding food safety and environmental issues related to agro-chemical use in Costa Rica and other citrus and vegetable producing countries in Latin America. This research has presented important conclusions indicating that launching innovative, more sustainable, agro-chemicals in Latin American fruit chains requires substantial efforts from disinfectant suppliers to invest time, money and knowledge in order to gain market share in the market of pesticides and fungicides. Furthermore, innovative fungicides, such as DES 46, are currently a niche market. It is questionable whether the potential profitability of DES 46 outweighs the efforts required to gain a foothold in the niche market for innovative fungicides. In order for innovative fungicides to become actual competitors to current fungicides, an important role is granted to fruit and vegetable importers in the process of encouraging the use of e.g. DES 46 among fruit and vegetable growers.

The generalizability of these findings to other fruits and vegetable chains requires further investigation. Therefore, future research to broaden the understanding of this research topic would include the study of exploring the effect of chain uncertainty on relational and contractual governance forms that chain parties employ in other fruit and vegetable chains. Since fresh pineapple is produced all year long, the chain is always assured of supply. Uncertainty is thus low. In other, more season specific fruit or vegetable chains, the effect of chain uncertainty on relational governance may be far more substantial than in the Costa Rican export chain for fresh pineapple. Given the importance of relational governance for Eco2clean, future empirical research should explore whether relational governance is beneficial to the effective negotiation or adaption of agreements. Another interesting research topic is to explore whether Eco2clean should manage current and future new product development in cooperation with other chain parties in order to, e.g. facilitate open field testing. Furthermore, it may offer Eco2clean more experience in establishing long-term business to business relationships with buyers. In this context, 5 respondent companies have shown future interest in the possibilities of DES 46. Further research in cooperation with these companies should provide Eco2clean with additional input on exploring possibilities to market DES 46.

Crucial determinant of DES 46's future success is the extent to which DES 46 is more costly than current traditional agro-chemicals. A cost benefit analysis should generate more knowledge on the social costs of DES 46, including its impact on public health and the environment, and its costs on farm level. Environmental economics literature suggests several techniques for evaluating the effect of pesticides on both the environment and public health in economic turns. Bowles and Webster (1995) define the optimal choice between two different crop control methods as a game with 'gainers' and 'losers'. For instance, replacing traditional disinfectant use with a non-residue disinfectant may benefit most of society since the negative impact on the environment and public health is reduced. However, as a result of decreasing profits, farmers are worse off, whereas consumers will experience higher food prices.

Limitations of this research may be derived from the amount of respondent companies and the size of the questionnaires. A smaller questionnaire may have attracted more respondent companies, which would have made the results more valid. Future research could aim at quantifying the results, rather than adopting a qualitative approach for processing the results. Regarding the relevance of the theoretic model used to explore opportunities and challenges for Eco2clean, one may state that on the one hand the model was relevant, considering its emphasis on the effect of governance mechanisms on firm performance and the recommendations that resulted from this model. On the other hand, for instance, the model of Porter's 5 forces may have provided Eco2clean with more understanding of the industry context in which the company wants to launch DES 46. Furthermore, in this research, no exact data is provided indicating the portion of Costa Rican pineapple exports that FDM and Dole occupy. As a result, no clear indications can be provided for the remaining portion of the Costa Rican export market for fresh pineapple, which may have given Eco2clean some insight in the size of the pineapple export market that is occupied by independent chain companies.

This research ends with the notion that the future potential of DES 46 is far from certain. The market for DES 46 is regarded a niche market in which incentives for the chain to invest in further applications of DES 46 are currently limited and market potential is small. However, as long as the Costa Rican pineapple sector continues to invest in its positive image concerning social responsibility and environmental friendliness, Eco2clean future prospects with regard to exploiting the potential success of DES 46, are still positive. Eco2clean may also compare investing in DES 46 to investing in business activities related to other products from its portfolio in order to set realistic priorities with regard to its businesses. Overall, further research in the effectiveness of DES 46 in cooperation, with chain partners that are willing and able, is needed in order to further develop and market DES 46.

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Appendix I: Definitions of performance measures

Table 1 – Definitions of performance indicators

Categories and indicators	Definitions	Measure
<i>Efficiency</i>		
Production costs	Combined costs of raw materials, labor, distribution, transportation and handling cost in producing goods	The sum of total costs of input used to produce output (fixed and variable costs)
Transaction costs	The costs other than the money price that are incurred in trading goods or services (e.g. searching cost, negotiation costs, and enforcement costs)	The sum of searching, negotiation and enforcement costs
Profit	The positive gain from an investment or business operation after subcontracting all expenses	Total revenue less expenses
<i>Flexibility</i>		
Customer satisfaction	The degree to which the customers are satisfied with the products or services	The percentage of satisfied customers to unsatisfied customers
Volume flexibility	The ability to change the output levels of the products produced	Calculated by demand variance and maximum and minimum profitable output volume during any period of time
Delivery flexibility	The ability to change planned delivery dates	The ratio of the difference between the latest time period during which the delivery can be made and the earliest time period during which the delivery can be made and the difference between the latest time period during which the delivery can be made and the current time period
<i>Responsiveness</i>		
Lead-time	Total amount of time required to produce a particular item or service	Total amount of time required to complete one unit of product or service
Customer complaints	Registered complaints from customers about product or service	Total number of complaints registered
Shipping errors	Wrong product shipments	The percentage of wrong shipments
<i>Product quality</i>		
Product safety and health	Product does not exceed an acceptable level of risk associated with pathogenic organisms or chemical and physical hazards such as microbiological, chemical contaminant in products, micro-organisms	Nutritional value and lab checks and monitoring processes according to certification schemes
Product reliability	Refers to the compliance of the actual product composition with the product description	Number of complaints registered
<i>Process quality</i>		
Environmental aspects	The amount of energy and water used, and the permitted use of substances in the product	The ratio of cubic meters of gas used per square meter of glasshouse, The ratio of liters of water used per square meter of land under the vegetables, The amount and the frequency of pesticide use complying with standard regulations, and the Percentage of materials recycled/reused
Marketing	Activities intended to increase market share for product (e.g. branding, pricing and labelling)	Increase in number of customers and sales


Appendix II: Questionnaire



Wetenschappelijk onderzoek naar het vermarkten van duurzame bestrijdingsmethoden op de internationale fruitmarkt van Costa Rica

Dit afstudeeronderzoek wordt uitgevoerd aan de Management studiegroep aan Wageningen Universiteit & Research Centrum in samenwerking met Eco2clean, een leverancier van innovatieve methoden voor gewasbescherming. Het onderzoek richt zich op het verkennen van de mogelijkheden om duurzame bestrijdingsmiddelen in de Costa Ricaanse ananasketen te vermarkten.

Over het invullen zelf:

- Indien de vragen geen betrekking hebben op uw relatie met ananastelers, dan kunt u de vraag betrekken op uw voornaamste fruittelers. Geef hierbij wel aan om wat voor fruittelers het gaat;
- Leest u de vragen nauwkeurig. Wij waarderen het als u de vragen naar waarheid invult. Uw gegevens zijn anoniem en worden volledig vertrouwelijk behandeld;
- Gezien de omvang van de vragenlijst kunt u het invullen ervan ook in delen splitsen.
- De hokjes kunt u het beste aanvinken door ze van een andere kleur te voorzien via 

De vragenlijst bestaat uit 62 open en gesloten vragen. Graag stellen wij u na afronding van het onderzoek op de hoogte van de resultaten. Hiertoe kunt u aan het einde van de vragenlijst uw gegevens invullen.

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): _____

2. Aandeel van ananas binnen uw organisatie

- 0 – 10%
- 10 – 40%
- 40– 70 %
- 70 – 100%

3. Welke soort ananas verkoopt u?

- MD2
- Smooth Cayenne
- Fair Trade
- Anders, namelijk

4. Ik importeer van:

- Een klein aantal grote ananastelers met een gemiddelde omvang van ha
- Een groot aantal kleine ananastelers met een gemiddelde omvang van ha
- Een tussenhandelaar
- Anders, namelijk

Verklaar uw keuze:

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

- < 50, namelijk rond de
- 50-200, namelijk rond de
- > 200, namelijk rond de
- Weet ik niet

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

- < 50, namelijk rond de
- 50-200, namelijk rond de
- Weet ik niet

 **Ananasziekten:** ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

- Botryodiplodia rot Fusariosis
- Black rot Interfruitlet corking
- Leathery pocket Gisting
- Rhizopus rot Hendersonula fruit rot
- Nigrospora fruit Aspergillus rot
- Glassy spoilage Anders, namelijk

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziekten?

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

- Ja Nee Weet ik niet


11. Bent u bekend met de fungicide DES 46?

- Ja Nee

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

 **Fungicidenresiduen:** Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

> 1x per week, namelijk

1x per week tot 1x per maand.....

< 1x per maand

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja v Nee d Weet ik niet

Zo ja, op welke basis? (Geef een indicatie)

> 1x per week, namelijk

1x per week tot 1x per maand.....

< 1x per maand

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Strengere eisen met betrekking tot residuniveaus vanuit de EU

Strengere eisen met betrekking tot residuniveaus vanuit de retailsector

Allebei

Niet van toepassing

Verklaar uw keuze:

23. *Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)*


- Teler Retailer
 Exporteur Consument
 Importeur

Verklaar uw keuze:

24. *Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?*

- Desinfectiemiddelen producerend bedrijf importeur teler
 Desinfectiemiddelen producerend bedrijf importeur exporteur teler
 Desinfectiemiddelen producerend bedrijf exporteur teler
 Desinfectiemiddelen producerend bedrijf teler
 Anders, namelijk

Verklaar uw keuze:

 **Ketengovernance:** Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. *Welk soort contract heeft u met uw ananastelers?*

26. *Hoe lang duurt zo'n contract gemiddeld?*

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = vrijwel niet; 7 = zoveel als mogelijk):

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
27. Er vindt hechte, persoonlijke interactie plaats tussen ons bedrijf en Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
28. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds respect	<input type="checkbox"/>	1	2	3	4	5	6	7
29. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds vertrouwen	<input type="checkbox"/>	1	2	3	4	5	6	7
30. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door persoonlijke vriendschap	<input type="checkbox"/>	1	2	3	4	5	6	7
31. Formele contracten met Costa Ricaanse fruittelers zijn zo gedetailleerd als mogelijk	<input type="checkbox"/>	1	2	3	4	5	6	7
32. Formele contracten vormen de basis van onze relatie met Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
33. In de relatie met Costa Ricaanse fruittelers zijn formele contracten niet belangrijk	<input type="checkbox"/>	1	2	3	4	5	6	7

34. In de relatie met onze Costa Ricaanse fruittelers zijn informele afspraken minstens zo belangrijk als formele contracten	<input type="checkbox"/>	1	2	3	4	5	6	7
35. Hoe groter de kans op conflicten met onze Costa Ricaanse fruittelers, des te gedetailleerder moeten formele contracten zijn	<input type="checkbox"/>	1	2	3	4	5	6	7


Toelichting:

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)

- Orderhoeveelheid Levertijden
 Prijs Voorwaarden m.b.t. gewasbeschermingmethoden
 Productspecificaties Planninginformatie
 Voorraadniveaus Anders, namelijk
-
-
-

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

 **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders		Evaluatie van leverbetrouwbaarheid	
Orderplanning		Voorspellingen van vraag	
Voorraadniveaus		Veranderingen in leverschema	
Productspecificaties		Evaluatie productkwaliteit	

Toelichting:


40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders		Productspecificaties	
Orderplanning		Veranderingen in leverschema	
Voorraadniveaus		Orderstatus	

Toelichting:

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)

 **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

- Opslagfaciliteiten Gereedschap
 Logistiek Trainingsfaciliteiten
 Machines Anders, namelijk

Verklaar uw keuze:

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

- Opslagfaciliteiten Gereedschap
 Logistiek Trainingsfaciliteiten
 Machines Anders, namelijk

Verklaar uw keuze:

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
		niet	niet	1	2	3	4	5	6	7
45. Wij doen aanzienlijke investeringen om relaties met onze telers te ontwikkelen	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
46. De investeringen die wij doen zijn specifiek voor elke teler	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7

47. Als we van teler veranderen, dan verliezen we een aanzienlijk deel van onze investeringen die we met de aanvankelijk geselecteerde teler hebben gedaan	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
--	--------------------------	--------------------------	---	---	---	---	---	---	---

Toelichting:

Onzekerheid: het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidegebruik van telers?

Toekomstig contract tussen een fungicide leverancier en een importeur

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidegebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen (Wees s.v.p. zo specifiek mogelijk):

Investeringsen

Onzekerheid

Informatie-uitwisseling

Afsluiting

59. Ik wil meer weten over de mogelijkheid om een non-residu fungicide te gebruiken en wil daarover op de hoogte gehouden worden	<input type="checkbox"/> ja	<input type="checkbox"/> nee
60. Ik wil op de hoogte gehouden worden van de resultaten van dit onderzoek	<input type="checkbox"/> ja	<input type="checkbox"/> nee
61. Mijn email adres is:		
62. Mijn telefoonnummer is:		

BEDANKT VOOR UW MEDEWERKING

Appendix III: Questionnaire 1

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): +/- 100 (varieert i.v.m. uitzendkrachten)

2. Aandeel van ananas binnen uw organisatie (op basis van aantal colli of omzet??) Beiden:

0 – 10%

3. Welke soort ananas verkoopt u?

MD2

4. Ik importeer van:

Een klein aantal grote ananastelers met een gemiddelde omvang van 500 ha

Anders, namelijk meerdere tussenhandelaren / telerscoöperaties

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

Weet ik niet

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

Weet ik niet

Ananasziekten: ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen? (meerdere antwoorden zijn mogelijk)

Anders, namelijk niet exact bij ons bekend aangezien geen schimmelpyering wordt uitgevoerd, maar waarschijnlijk meerdere van bovengenoemde

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziekten?

Alleen gekoeld transport en opslag. Verder niets, dat is een taak van de teler. Corrigerende maatregelen zijn nagenoeg onmogelijk. Eventueel is opslag onder ozon een optie, maar dat wordt op dit moment niet toegepast.

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Dat is bij ons niet in alle gevallen bekend, maar onder andere: Fludioxonil, Triadimefon en Trifloxystrobin

10. Komen de ziekten onder vraag 8 (hier wordt denk ik 7 bedoeld) voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee Weet ik niet Is toch ook al bij vraag 7 aangegeven?

11. Bent u bekend met de fungicide DES 46?

Ja Nee

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel Niet					Zoveel als mogelijk	
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Wij versturen leveranciersverklaringen naar de tussenhandelaren met het verzoek om deze te ondertekenen. In deze verklaring wordt verzocht om een aantal middelen niet te gebruiken en om van de middelen die toch gebruikt moeten worden, zo min mogelijk te gebruiken (ALARA principe).

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

Aan de hand van een risk based monitoringssysteem worden door ons monsters genomen. Analyse (LCMS & GCMS) van de monsters wordt gedaan door laboratorium Zeeuws-Vlaanderen.

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

> 1x per week, namelijk meestal 1x per week +/-7 monster, soms meer

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

Ik verwacht dat de vraag hiernaar van handelaren, retailorganisaties, consumenten en maatschappelijke organisaties heel groot is. De vraag vanuit de telers verwacht ik minder groot.

Ik denk dat deze hierin uitsluitend geïnteresseerd als de effectiviteit en prijs van het middel gelijk of beter is dan de huidige fungicides die worden toegepast en of het middel resistentie veroorzaakt. Uiteraard speelt bij de eerstgenoemden ook het effect van het middel op het milieu een grote rol.

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja Nee Weet ik niet In de afgelopen 3 jaar niet voorgekomen

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

In sommige gevallen te streng en in sommige gevallen niet streng genoeg. Hier is niet makkelijk een eenduidig antwoord op te geven. Varieert per middel per product.

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

De EU norm wordt gerespecteerd, maar we streven naar zo laag mogelijke residu-niveaus. We vragen onze leveranciers om in elk geval te voldoen aan 70% van de EU norm.

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Strengere eisen met betrekking tot residu-niveaus vanuit de retailsector

Verklaar uw keuze:

Klanteneisen worden steeds strenger, maar daarnaast vinden wij het ook belangrijk dat telers rekening houden met het milieu en derhalve niet meer gebruiken dan strikt noodzakelijk en nadenken over mogelijke alternatieven.

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

Retailer

Verklaar uw keuze:


Met name de retailers. Niet om voedselveiligheid, maar vooral om imagoschade veroorzaakt door maatschappelijke organisaties te voorkomen. Sommigen uiteraard ook wegens hun duurzaamheidsprogramma. Burger vindt het wel belangrijk, consument minder. Dit blijkt ook uit het feit dat biologisch groente en fruit nog redelijk niche producten zijn.

24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Anders, namelijk de adviseurs en teeltbegeleiders in Costa Rica of rechtstreeks naar de telers

Verklaar uw keuze:

Als de teeltbegeleiders en adviseurs het een goed product vinden kunnen zij dit meenemen in hun advies naar de telers.

 **Ketengovernance:** Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw ananastelers?

Seizoenscontract

26. Hoe lang duurt zo'n contract gemiddeld?

Één seizoen

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = vrijwel niet; 7 = zoveel als mogelijk):

	Helemaal niet	Vrijwel Niet						Zoveel als mogelijk
27. Er vindt hechte, persoonlijke interactie plaats tussen ons bedrijf en Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
28. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds respect	<input type="checkbox"/>	1	2	3	4	5	6	7
29. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds vertrouwen	<input type="checkbox"/>	1	2	3	4	5	6	7
30. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door persoonlijke vriendschap	<input type="checkbox"/>	1	2	3	4	5	6	7
31. Formele contracten met Costa Ricaanse fruittelers zijn zo gedetailleerd als mogelijk	<input type="checkbox"/>	1	2	3	4	5	6	7
32. Formele contracten vormen de basis van onze relatie met Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
33. In de relatie met Costa Ricaanse fruittelers zijn formele contracten niet belangrijk	<input type="checkbox"/>	1	2	3	4	5	6	7
34. In de relatie met onze Costa Ricaanse fruittelers zijn informele afspraken minstens zo belangrijk als formele contracten	<input type="checkbox"/>	1	2	3	4	5	6	7
35. Hoe groter de kans op conflicten met onze Costa Ricaanse fruittelers, des te gedetailleerder moeten formele contracten zijn	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Lastige vragen en niet allemaal te beantwoorden met antwoorden als "zoveel als mogelijk".

Zoveel dingen worden "zo goed als mogelijk" gedaan, maar dat wil niet zeggen dat het ook echt veel is.

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)

- Orderhoeveelheid Levertijden
 Prijs Voorwaarden m.b.t. gewasbeschermingmethoden
 Productspecificaties Planninginformatie
 Voorraadniveaus Anders, namelijk

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

We proberen problemen altijd zo goed mogelijk in samenspraak met de leverancier op te lossen.


Is ook erg afhankelijk van de reden dat het contract niet nageleefd kan worden.

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

Afhankelijk van op welk vlak de ananasteler het contract niet naleeft. Als het product bijvoorbeeld niet

aan de residuenwetgeving voldoet, wordt het product op kosten van de teler vernietigd. Als het

product niet aan de kwaliteitsspecificaties voldoet wordt minder betaald enz. enz.

 **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet

(1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	6	Evaluatie van leverbetrouwbaarheid	3/6
Orderplanning	6	Voorspellingen van vraag	3/5
Voorraadniveaus	1	Veranderingen in leverschema	6
Productspecificaties	3	Evaluatie productkwaliteit	3/7

Toelichting:

Eigenlijk geen van allen, aangezien wij meestal niet rechtstreeks handelen met telers, maar meestal met tussenhandelaren of grote telercoöperaties.

40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien

(1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	6	Productspecificaties	1
Orderplanning	1	Veranderingen in leverschema	5/6
Voorraadniveaus	4/5	Orderstatus	5/6

Toelichting:

Idem als vraag 39.


41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse

situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) 7, op het gebied van kwaliteit en

voedselveiligheid niet proactief genoeg, om het gebied van commercie gaat dit beter.

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in

probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) 5/6

 **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

Anders, namelijk leveranciersbezoeken.

Verklaar uw keuze:

Costa Rica is een van de rijkste landen van Midden-Amerika en dus niet in klassieke zin een

onder ontwikkeld land. Daarnaast zijn er geen problemen met leveranciers, dus is er ook geen

noodzaak tot investering ter ondersteuning van de teelt.

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

Anders, namelijk GlobalGAP certificering.....

Verklaar uw keuze:


We hebben zoals aangegeven niet direct contact met de telers. Dus het is bij ons onbekend waarin deze hebben geïnvesteerd. Ongetwijfeld op alle punten wel wat.

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
		niet	niet	1	2	3	4	5	6	7
45. Wij doen aanzienlijke investeringen om relaties met onze telers te ontwikkelen	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
46. De investeringen die wij doen zijn specifiek voor elke teler	<input type="checkbox"/>	<input checked="" type="checkbox"/>		1	2	3	4	5	6	7
47. Als we van teler veranderen, dan verliezen we een aanzienlijk deel van onze investeringen die we met de aanvankelijk geselecteerde teler hebben gedaan	<input type="checkbox"/>	<input checked="" type="checkbox"/>		1	2	3	4	5	6	7

Toelichting:

Geen directe onderhandelingen met telers en geen aanzienlijke investeringen.

 **Onzekerheid:** het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
		niet	niet	1	2	3	4	5	6	7
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze Klanten ???	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7

Toelichting:

Geen idee wat bedoeld wordt met vraag 51. Klachten?

Prijzen fluctueren niet erg, maar er is wel een daling in de prijs waarneembaar.

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

Afhankelijk wat bedoeld wordt met onzekerheid (afname onbekend, opbrengst veld, prijs, weer etc.)

Weinig verschil met de handel in andere overzeese fruitsoorten.

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidegebruik van telers?

Het weer is in grote mate bepalend voor het fungicidegebruik, daarnaast de plaagdruk voor het gebruik van andere gewasbeschermingsmiddelen

Naar verwachting is het effect van de onzekerheid in afname hierin veel minder bepalend.

Toekomstig contract tussen een fungicide leverancier en een importeur

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidegebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen (Wees s.v.p. zo specifiek mogelijk):

Investerings

Vooralsnog zijn we niet bereid om in een bedrijf te investeren.

Onzekerheid

Moeilijk vast te leggen in een contract.

Informatie-uitwisseling

Check vooraf de kredietwaardigheid van een afnemer of lever pas nadat klant heeft betaald.

Ik denk dat alles valt of staat bij de manier waarop uw product wordt gepromoot door gewasbeschermingsexperts en adviseurs die de telers begeleiden.

BEDANKT VOOR UW MEDEWERKING

Appendix IV: Questionnaire 2

1. Omvang van uw organisatie (in aantal werknemers): _____

2. Aandeel van ananas binnen uw organisatie

X 0 – 10%

3. Welke soort ananas verkoopt u?

X Anders, namelijk diverse in de loop der jaren.

4. Ik importeer van:

X Een tussenhandelaar

Toelichting:

2000 t/m heden Nederlandse tussenhandelaar (Del Monte)

In 2007 Tussenhandelaar/ pakhuis in Costa Rica

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

X Weet ik niet

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

X < 50, namelijk rond de20.....

 **Ananasziekten:** ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungiciden ziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

Anders, namelijk ...Geen tot op heden.....

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziekten?

Geen ervaring mee

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Geen idee is ook afhankelijk van tussenhandelaar of pakstation

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee X Weet ik niet

11. Bent u bekend met de fungicide DES 46?

X Nee, m.b.t. Ananas

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Bij overschrijdingen lichten we de tussenhandelaar in

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

Residu door Langfruit zelf (incidenteel door monitoring Food Compass of VWA)

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

< 1x per maand ...behalve bij poverschrijdingen

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

Hoog, met name Duitse supermarktketens hebben lagere eisen t.o.v. EU richtlijnen

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja v Nee Weet ik niet

Zo ja, op welke basis? (Geef een indicatie)

< 1x per maand ...in 2007 6 containers

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

Prima

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

Volgens EU richtlijnen, VWA en FoodComapss richtlijnen maar kan ook van klanteisen

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Strengere eisen met betrekking tot residuniveaus vanuit de EU

Strengere eisen met betrekking tot residuniveaus vanuit de retailsector

Allebei

Niet van toepassing

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame

gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

Teler Retailer

Importeur

Verklaar uw keuze:

Hogere eisen van de retail

24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Anders, namelijk ...prod. Bedrijf -> teler <-> importeur <-> retail.....

Verklaar uw keuze:

Er moet een samenspel zijn en uiteindelijk bepaalt de retail (nu) wat er wel of niet mag

Ketengovernance: Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw ananastelers?

Zelf opgestelde schriftelijke en/of mondeling

26. Hoe lang duurt zo'n contract gemiddeld?

Een seizoen, mits geen overschrijdingen

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = vrijwel niet; 7 = zoveel als mogelijk):

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
27. Er vindt hechte, persoonlijke interactie plaats tussen ons bedrijf en Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
28. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds respect	<input type="checkbox"/>	1	2	3	4	5	6	7
29. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds vertrouwen	<input type="checkbox"/>	1	2	3	4	5	6	7
30. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door persoonlijke vriendschap	<input type="checkbox"/>	1	2	3	4	5	6	7
31. Formele contracten met Costa Ricaanse fruittelers zijn zo gedetailleerd als mogelijk	<input type="checkbox"/>	1	2	3	4	5	6	7
32. Formele contracten vormen de basis van onze relatie met Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
33. In de relatie met Costa Ricaanse fruittelers zijn formele contracten niet belangrijk	<input type="checkbox"/>	1	2	3	4	5	6	7
34. In de relatie met onze Costa Ricaanse fruittelers zijn informele afspraken minstens zo belangrijk als formele contracten	<input type="checkbox"/>	1	2	3	4	5	6	7
35. Hoe groter de kans op conflicten met onze Costa Ricaanse fruittelers, des te gedetailleerder moeten formele contracten zijn	<input type="checkbox"/>	1	2	3	4	5	6	7

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)

- Orderhoeveelheid Levertijden
 Prijs Voorwaarden m.b.t. gewasbeschermingmethoden
 Productspecificaties Planninginformatie
 Voorraadniveaus Anders, namelijk

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

Per mail en telefonie

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?
Stoppen met afname en/of betalingen

📁 Informatie-uitwisseling: de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	6	Evaluatie van leverbetrouwbaarheid	4
Orderplanning	6	Voorspellingen van vraag	5
Voorraadniveaus	1	Veranderingen in leverschema	5
Productspecificaties	2	Evaluatie productkwaliteit	6

Toelichting:

Wegens tussenhandelaren

40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	1	Productspecificaties	1
Orderplanning	1	Veranderingen in leverschema	1
Voorraadniveaus	1	Orderstatus	1

Toelichting:

Tussenhandelaren

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)NVT..

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) NVT.

✚ **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

Anders, namelijkNVT.....

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

Anders, namelijkNVT.....

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
			niet	niet						
45. Wij doen aanzienlijke investeringen om relaties met onze telers te ontwikkelen	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7	
46. De investeringen die wij doen zijn specifiek voor elke teler	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7	
47. Als we van teler veranderen, dan verliezen we een aanzienlijk deel van onze investeringen die we met de aanvankelijk geselecteerde teler hebben gedaan	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7	

✚ **Onzekerheid:** het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
			niet	niet						
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7	

49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

NVT

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidegebruik van telers?

Vermindering van spuiten

BEDANKT VOOR UW MEDEWERKING

Appendix V: Questionnaire 3

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): _____ 170 _____

2. Aandeel van mango binnen uw organisatie

10 – 40%

4. Ik importeer van:

Een klein aantal grote mangotelers met een gemiddelde omvang van5-25..... ha

Toelichting:

Het komt voor dat we te maken hebben met een cooperatie.

5. Geef een indicatie van het totaal aantal Zuid Amerikaanse:

< 50, namelijk rond de ...15.....

6. Geef een indicatie van het totaal aantal Nederlandse mangosimporteurs:

< 50, namelijk rond de25.....

Ananasziekten: ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

Anders, namelijk anthrachnoses.....

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziektes?

Pre en post harvest treatment zowel preventief als reactief

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Prochloraz en Thiabendazole

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee Weet ik niet

11. Bent u bekend met de fungicide DES 46?

Ja Nee

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel niet					Zoveel als mogelijk	
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Afhankelijk van het active ingredient kan worden voorgesteld om een alternatief te nemen daar het middel niet toegestaan is om te gebruiken door klanten.

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

Lab Zeeuws Vlaanderen en Groen Agro Control

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

> 1x per week, namelijk

18. Hoe groot schat u de vraag in de Zuid Amerikaanse Mangoketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

De wens is aanwezig getwijfeld word aan de werking van diverse middelen. Zonder goede test resultaten zal men niet over gaan. Tevens is het niet inzichtelijk wat de diverse klimatologische omstandigheden voor een effect hebben op product maar ook werking van de diverse alternatieve middelen.

19. Ondervindt u op verse mango niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja Nee Weet ik niet

Zo ja, op welke basis? (Geef een indicatie)

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

Acceptabel

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

Strikte handhaving

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Allebei

Verklaar uw keuze:

Commercieel belang

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

- Teler Retailer
 Exporteur Consument
 Importeur

Verklaar uw keuze:

Geen: Wij zoeken naar alternatieven maar leveranciers van alternatief zijn niet gewillig om in open teelten proeven uit te voeren of hebben de know how en of netwerk niet in. Tevens laten deze, in mijn optiek, grote kansen liggen. Wij willen graag kijken wat de mogelijkheden zijn. Echter hebben wij ook te maken met conservatieve telers die alleen veranderen als dit geëist wordt door de gehele markt. Zij zullen niet gauw als pionier optreden.

24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Desinfectiemiddelen producerend bedrijf importeur teler

Verklaar uw keuze: de importeur zal meer het initiatief moeten nemen en vooruit denken. De toekomst is duidelijk maar niet iedereen ageert.

Ketengovernance: Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw mangotelers?

Kwantiteit en kwaliteit overeenkomst

26. Hoe lang duurt zo'n contract gemiddeld?

Per seizoen wordt dit bekeken. Echter werken wij al jaren met de zelfde leveranciers

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = vrijwel niet; 7 = zoveel als mogelijk):

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
27. Er vindt hechte, persoonlijke interactie plaats tussen ons bedrijf en Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
28. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds respect	<input type="checkbox"/>	1	2	3	4	5	6	7
29. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds vertrouwen	<input type="checkbox"/>	1	2	3	4	5	6	7
30. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door persoonlijke vriendschap	<input type="checkbox"/>	1	2	3	4	5	6	7
31. Formele contracten met Costa Ricaanse fruittelers zijn zo gedetailleerd als mogelijk	<input type="checkbox"/>	1	2	3	4	5	6	7
32. Formele contracten vormen de basis van onze relatie met Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
33. In de relatie met Costa Ricaanse fruittelers zijn formele contracten niet belangrijk	<input type="checkbox"/>	1	2	3	4	5	6	7
34. In de relatie met onze Costa Ricaanse fruittelers zijn informele afspraken minstens zo belangrijk als formele contracten	<input type="checkbox"/>	1	2	3	4	5	6	7
35. Hoe groter de kans op conflicten met onze Costa Ricaanse fruittelers, des te gedetailleerder moeten formele contracten zijn	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

De afspraken die gemaakt zijn worden vaak als Gentlemen agreement opgemaakt.

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)


- Orderhoeveelheid Levertijden
 Prijs
 Productspecificaties

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

Mocht er problemen zich mbt residuen zich aantonen is de teler verantwoordelijk voor alle directe – en indirecte kosten. Leverancier moet leveren volgens specificaties anders zal niet de volledige prijs worden betaald.

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

Dan wordt deze van de lijst van geaccepteerde leveranciers gehaald en zal niet meer van deze worden gekocht.

 **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Orderplanning	2		
Productspecificaties	2	Evaluatie productkwaliteit	8

Toelichting:

Voor aanvang van oogst seizoen


8 per aankomst

40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Orderplanning	2	Productspecificaties	2
---------------	---	----------------------	---

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) ...8.....

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) ...8.....

 **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

Verklaar uw keuze:

De telers zijn vermogend genoeg en behoeve geen liquide middelen te ontvangen

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

Trainingsfaciliteiten

Verklaar uw keuze:

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

	N.V.T.	Helemaal		Vrijwel					Zoveel als mogelijk	
		niet	niet	1	2	3	4	5		6
45. Wij doen aanzienlijke investeringen om relaties met onze telers te ontwikkelen	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
46. De investeringen die wij doen zijn specifiek voor elke teler	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7
47. Als we van teler veranderen, dan verliezen we een aanzienlijk deel van onze investeringen die we met de aanvankelijk geselecteerde teler hebben gedaan	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7

🌱 **Onzekerheid:** het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk					
		niet	niet	1	2	3	4	5	6
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

De mango markt groeit. Door het waarborgen van goede kwaliteit is er nog steeds groei in moeilijke tijden zoals deze

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

Wij hebben een lange termijn relatie en laten elkaar niet gauw zakken. Onzekerheid is alleen van toepassing om te bezien of er voldoende volume beschikbaar is.

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidengebruik van telers?

Geen. Onze telers zijn verzekerd van afname tegen een goede prijs.

🌱 **Toekomstig contract tussen een fungicide leverancier en een importeur**

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidengebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen:

Investerings

Dit hangt geheel af van de (on)mogelijkheden mbt toelating en toepassing van het betreffende middel. Tevens hebben klimatologische omstandigheden en het soort plaag waar tegen betreden moet worden (zowel reactief als pro actief). Tevens zal een onomstreden bewijs moeten aantonen dan alternatieve fungicide geen effect heeft op het product en deze het product niet aantast.

Normaal gesproken zullen wij niet investeren in innovatieve middelen. Dit zal de teler in kwestie zelf moeten willen en doen

Onzekerheid

Zoals hierboven beschreven: een innovatief middel moet onomstreden bewijs leveren dat het middel een geschikt alternatief is wat meer oplevert/ minder kost/ voldoet aan toekomstige eisen van retailers. Dit wetenschappelijke onderzoek zal niet alleen op basis van residuen en plagen dienen te gaan maar ook bijv. naar structuur veranderingen in het product na toepassingen.

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Appendix VI: Questionnaire 4

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): 100

2. Aandeel van ananas binnen uw organisatie

0 – 10%

3. Welke soort ananas verkoopt u?

Smooth Cayenne

4. Ik importeer van:

Toelichting:

Geen rechtstreekse import, alleen met een tussenpersoon (bedrijven)

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

Weet ik niet

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

Weet ik niet

Ananasziekten: ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

Botryodiplodia rot

Glassy spoilage

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziekten?

Bewaren onder juiste opslag temperatuur

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Niet bekend

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee Weet ik niet

11. Bent u bekend met de fungicide DES 46?

Ja Nee

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

Extern onafhankelijk laboratorium

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

1x per week tot 1x per maand.....

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

Niet bekend

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm

overtreden?

Ja Nee Weet ik niet

Zo ja, op welke basis? (Geef een indicatie)

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

Hoog is een regelwetgeving

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

Bij overschrijding wordt de partij uit de handel genomen, bij levensbedreigende overschrijding een recall

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Strengere eisen met betrekking tot residuniveaus vanuit de EU

Verklaar uw keuze:

Firma naam ,klanten, verkoop, bij overschrijding= geen reclame voor de zaak

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame

gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

Importeur

Verklaar uw keuze:

Neemt niet de verantwoording, maar in de regelgeving is de importeur verantwoordelijk

Financiële gevolgen zijn voor de exporteur/teler


24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt

kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Desinfectiemiddelen producerend bedrijf importeur teler

Verklaar uw keuze:

Verantwoording bij de importeur, is voor de wet wel aansprakelijk

 **Ketengovernance:** Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw ananastelers?

nvt

26. Hoe lang duurt zo'n contract gemiddeld?

nvt

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa

Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)


nvt

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

nvt

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

nvt

 **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet

(1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Toelichting:

nvt


40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Toelichting:

nvt

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)nvt....

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) ...nvt.....

 **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

Verklaar uw keuze:

nvt

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)


Verklaar uw keuze:

nvt

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

Toelichting:

nvt

 **Onzekerheid:** het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal		Vrijwel					Zoveel als mogelijk
		niet	niet	1	2	3	4	5	
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

nvt

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidegebruik van telers?

Schoon product wordt steeds belangrijker, winkelketens kunnen slecht te boek komen te staan.

Afgelopen periode in de media gebeurd.

Toekomstig contract tussen een fungicide leverancier en een importeur

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidegebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen (Wees s.v.p. zo specifiek mogelijk):

Investerings

De investering moeten de kostprijs niet enorm overbruggen, dit zou betekenen dat de verkoopprijs van dit product t.o.v. andere ananas het product te duur wordt. Wat kan resulteren in ananas die niet te verkopen zijn.

BEDANKT VOOR UW MEDEWERKING

Appendix VII: Questionnaire 5

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): _____ 50 _____

2. Aandeel van ananas binnen uw organisatie

0 – 10%

3. Welke soort ananas verkoopt u?

Anders, namelijk onbekend (Royal Sweet?).

4. Ik importeer van:

Anders, namelijk exporteurs

Toelichting:

Telers werken vaak samen met exporteurs voor het exporteren van ananas. Grotere telers kunnen Dit zelf oppakken, maar dat geldt niet voor kleine telers.

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

Weet ik niet

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

< 50, namelijk rond deMax 20?

Ananasziekten: ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

Anders, namelijk: Penicillium, botrytis, bruinrot (Fusarium)

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziektes?

Geen, leverancier moet zorgen dat hij een goede kwaliteit producten aflevert en op de juiste temperatuur laat vervoeren.

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Onbekend

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee Weet ik niet

11. Bent u bekend met de fungicide DES 46?

Ja Nee

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Bij vaste programma's moet een leverancier een lijst overhandigen van te gebruiken middelen. Deze lijst wordt dan vergeleken met eisen van klanten en eventueel aangepast.

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

Staa Food Group laat regelmatig producten analyseren door externe laboratoria.

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

> 1x per week, namelijk hangt af van de onderzocht producten

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

Residu vrij is op dit moment geen onderwerp: te weinig onderscheiden van biologische producten.

Voor bepaalde klanten is het maximaal aantal residuen wel van belang.

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja Nee Weet ik niet

Zo ja, op welke basis? (Geef een indicatie)

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

Op zich goed geregeld. Bij bepaalde niet EU producten is wel behoefte aan de aanpassing van Importtoleranties.

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

Op de voet volgen. MRL is de wettelijke basis. Klantnormen zijn vaak strenger.

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Allebei

Verklaar uw keuze:

Telers dienen zich bewust te zijn van hun verantwoordelijkheid. Het streven naar een zo laag mogelijk

residu gehalte is de verantwoordelijkheid van de teler.

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

Teler Retailer

Exporteur

Importeur

Verklaar uw keuze:

Retailer stellen vaak eisen en worden via de importeur en exporteur naar de teler gecommuniceerd. Iedere schakel heeft daarin zijn verantwoordelijkheid.

24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Desinfectiemiddelen producerend bedrijf exporteur teler

Verklaar uw keuze:

Dit hangt af van de organisatiegraad en de schaalgrootte van telers. Grote telers kunnen rechtstreeks benaderd worden, kleinere telers beter indirect.

✚ **Ketengovernance:** Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw ananastelers?

Voor zover mij bekend hebben wij op dit moment geen contracten met ananastelers/exporteurs, maar dat kan zo veranderen als klanten ons om ananas gaan vragen.

26. Hoe lang duurt zo'n contract gemiddeld?

Niet van toepassing.

Toelichting:

Contracten lopen meestal niet via fruittelers, maar via exporteurs.

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)

Voorwaarden m.b.t. gewasbeschermingmethoden

Planninginformatie

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

Hangt van het probleem af.

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

Hangt van het probleem af. Niet nakomen afspraken is meestal einde oefening.

✚ **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet

(1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Toelichting:

Deze informatie loopt voornamelijk via exporteurs.

40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien

(1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Toelichting:

Deze informatie loopt voornamelijk via exporteurs.

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) *.nvt*

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed) *nvt*

✚ **Transactie specifieke investeringen:** investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

Verklaar uw keuze:

Op dit moment is het niet aan de orde dat ons bedrijf investeert in Costa Rica.

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

Verklaar uw keuze:

Telers dienen hun basis in orde te hebben om te kunnen exporteren. Dit betreft met name opslagfaciliteiten en een goed logistiek apparaat.

Onzekerheid: het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal		Vrijwel					Zoveel als mogelijk
		niet	niet	1	2	3	4	5	
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

Een constante kwaliteit is erg belangrijk voor de afzet van het product.

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

Indien telers zich aan hun afspraken houden, komen wij onze afspraken ook na. Helaas is onze ervaring dat sommige bedrijven niet uitgaan van een langdurige relatie, maar meer op de korte termijn werken.

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidengebruik van telers?

Mijns inziens heeft de onzekerheid niet de maken met het fungicidengebruik. Goede afspraken zijn vele malen belangrijker dan het wel of niet inzetten van een bepaalde fungicide.

Toekomstig contract tussen een fungicide leverancier en een importeur

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidengebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen:

Investerings

In contracten wordt vaak gewerkt met een voorschot op het moment dat de producten verscheept gaan worden. Telers zijn zelf verantwoordelijk voor dergelijke investeringen

Onzekerheid

Telers moeten zelf maatregelen nemen om waar mogelijk onzekerheid op te vangen. Bij grote Problemen kunnen importeurs ook overschakelen naar ananassen uit andere landen.

Informatie-uitwisseling

Bij het afsluiten van contracten zal afgesproken moeten worden welke middelen ingezet mogen worden. Ook de informatie uitwisseling zal dan besproken moeten worden.

BEDANKT VOOR UW MEDEWERKING

Appendix VIII: Questionnaire 6

Algemeen

1. Omvang van uw organisatie (in aantal werknemers): _____ 100 _____

2. Aandeel van ananas binnen uw organisatie

10 – 40%

3. Welke soort ananas verkoopt u?

MD2

4. Ik importeer van:

Anders, namelijk

Verklaar uw keuze:

1 grote teler, Agromonte

5. Geef een indicatie van het totaal aantal Costa Ricaanse ananastelers:

> 200, namelijk rond de

6. Geef een indicatie van het totaal aantal Nederlandse ananasimporteurs:

< 50, namelijk rond de10.....

Ananasziekten: ziekten op fungicideniveau die voorkomen op verse ananas

7. Met welke fungicidenziekten op ananas heeft u tijdens transport en opslag te kampen?
(meerdere antwoorden zijn mogelijk)

Anders, namelijkschimmel onder en boven in de vrucht.....

8. Welke maatregelen treft u met betrekking tot het tegengaan van deze plantziekten?

nvt

9. Welke fungiciden gebruiken uw telers na de oogst op hun ananas?

Biologische middelen

10. Komen de ziekten onder vraag 8 voor, ondanks de 'post-harvest' toepassing van fungiciden?

Ja Nee Weet ik niet

11. Bent u bekend met de fungicide DES 46?

Ja Nee

De volgende vier vragen hebben betrekking op uw rol in de toepassing van bestrijdingsmiddelen door Costa Ricaanse ananastelers:

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
12. In hoeverre bent u op de hoogte van het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
13. In hoeverre bent u begaan met het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
14. In hoeverre mengt u zich in het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input type="checkbox"/>	1	2	3	4	5	6	7
15. In hoeverre bepaalt u het gebruik van gewasbestrijdingsmiddelen van uw telers?	<input checked="" type="checkbox"/>	1	2	3	4	5	6	7

Toelichting:

ons doel is 0 residu op fruit. Hoe kunnen wij residuen zoveel mogelijk minimaliseren -> met teler naartoe gewerkt)

Fungicidenresiduen: Het gehalte aan residuen dat, als gevolg van post-harvest behandeling van fruit, na transport en opslag aanwezig is op fruit

16. Door wie worden fungicidenresiduen bij u gemeten?

GroenAgro controle, VWA neemt monsters bij klanten

17. Hoe vaak worden fungicidenresiduen bij u gemeten?

1x per week tot 1x per maand.....

18. Hoe groot schat u de vraag in de Costa Ricaanse ananasketen naar een fungicide die geen residuen achterlaat in zowel het heden als de nabije toekomst (tot de komende 5 jaar)?

groot, je hoeft je simpelweg niet druk te maken tov retailers aangezien product volledig veilig is. Kosten van pesticidengebruik gaan daarnaast omlaag

19. Ondervindt u op verse ananas niveaus van fungicidenresiduen die de wettelijke EU-norm overtreden?

Ja Nee Weet ik niet

20. Hoe streng beschouwt u de regelgeving betreffende 'maximale residuenniveaus'?

Makkelijk haalbaar

21. Hoe gaat uw bedrijf om met de regelgeving betreffende maximale residuenniveaus?

wij hanteren nog strengere norm dan EU, i.v.m. 'Aldi-norm' van Duitse retailers

22. Wat zou voor u de voornaamste reden zijn om fruit te importeren met lagere residugehalten?

Allebei

Verklaar uw keuze:

23. Wie neemt in de keten verantwoordelijkheid voor het toepassen van duurzame gewasbestrijdingsmiddelen in het groeiproces van ananas? (meerdere antwoorden zijn mogelijk)

Teler Retailer

Importeur

Verklaar uw keuze:

Ketenbeheersing

24. Via welke weg denkt u dat innovatieve methoden van gewasbescherming het beste vermarkt kunnen worden in de Costa Ricaanse exportmarkt voor verse ananas?

Anders, namelijk

Verklaar uw keuze:

anders, via sterke lokale distributeur die telers kan overtuigen van het product. DES 46 gefaald, want er waren meer investeringen nodig om baden aan te leggen aangezien DES niet tegelijk met huidige was kan worden toegepast

Ketengovernance: Het maken van afspraken tussen partijen met betrekking tot het opzetten, monitoren en beëindigen van transacties

25. Welk soort contract heeft u met uw ananastelers?

mede-eigenaar, farm opgezet samen met CR partners, geen echte contracten, behalve partnershipcontract

26. Hoe lang duurt zo'n contract gemiddeld?
voor bepaalde periode, daarna prijzen en volumes herzien

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = vrijwel niet; 7 = zoveel als mogelijk):

	Helemaal niet	Vrijwel niet						Zoveel als mogelijk
27. Er vindt hechte, persoonlijke interactie plaats tussen ons bedrijf en Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
28. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds respect	<input type="checkbox"/>	1	2	3	4	5	6	7
29. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door wederzijds vertrouwen	<input type="checkbox"/>	1	2	3	4	5	6	7
30. Het contact met Costa Ricaanse fruittelers wordt gekarakteriseerd door persoonlijke vriendschap	<input type="checkbox"/>	1	2	3	4	5	6	7
31. Formele contracten met Costa Ricaanse fruittelers zijn zo gedetailleerd als mogelijk	<input type="checkbox"/>	1	2	3	4	5	6	7
32. Formele contracten vormen de basis van onze relatie met Costa Ricaanse fruittelers	<input type="checkbox"/>	1	2	3	4	5	6	7
33. In de relatie met Costa Ricaanse fruittelers zijn formele contracten niet belangrijk	<input type="checkbox"/>	1	2	3	4	5	6	7
34. In de relatie met onze Costa Ricaanse fruittelers zijn informele afspraken minstens zo belangrijk als formele contracten	<input type="checkbox"/>	1	2	3	4	5	6	7
35. Hoe groter de kans op conflicten met onze Costa Ricaanse fruittelers, des te gedetailleerder moeten formele contracten zijn	<input type="checkbox"/>	1	2	3	4	5	6	7

36. Geef weer welke van onderstaande elementen voorkomen in de contracten die u met Costa Ricaanse ananastelers heeft: (meerdere antwoorden zijn mogelijk)


nvt

37. Indien problemen m.b.t. het naleven van het contract zich voordoen, hoe gaat u hiermee om?

nvt

38. Welke sancties legt u op wanneer ananastelers het contract niet naleven?

nvt

 **Informatie-uitwisseling:** de hoeveelheid en type informatie die wordt uitgewisseld tussen importeur en teler

39. Geef aan hoe vaak u uw telers over het algemeen van de volgende informatie voorziet (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	6	Evaluatie van leverbetrouwbaarheid	6
Orderplanning	6	Voorspellingen van vraag	6
Voorraadniveaus	6	Veranderingen in leverschema	6
Productspecificaties	6	Evaluatie productkwaliteit	7

Toelichting:

Ook wel per shipment

40. Geef aan hoe vaak uw telers u over het algemeen van de volgende informatie voorzien (1 = nooit, 2 = jaarlijks, 3 = halfjaarlijks, 4 = per kwartaal, 5 = maandelijks, 6 = wekelijks, 7 = dagelijks):

Veranderingen in orders	6	Productspecificaties	6
-------------------------	---	----------------------	---

Orderplanning	6	Veranderingen in leverschema	6
Voorraadniveaus	6	Orderstatus	6

Toelichting:

41. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in dagelijkse situaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)6, inhoud laat te wensen over, oorzaak: cultuurverschillen.....

42. Geef aan hoe u de frequentie van de uitwisseling van informatie met ananastelers in probleemsituaties zou beoordelen: (1 = zeer slecht, 10 = zeer goed)5, ik krijg geen info wanneer problemen nog voorkomen kunnen worden, anders wordt het gezien als gebrek aan respect

Transactie specifieke investeringen: investeringen die gedaan worden voor de samenwerking met één koper en vrijwel niet bij andere kopers kunnen worden ingezet

43. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben wij geïnvesteerd in: (kruis aan wat relevant is)

- Opslagfaciliteiten Gereedschap
 Logistiek Trainingsfaciliteiten
 Machines Anders, namelijk

Verklaar uw keuze:

In samenwerking met grote teler een plantage opgezet

44. Voor de ontwikkeling van onze relaties met Costa Ricaanse fruittelers, hebben telers geïnvesteerd in: (kruis aan wat relevant is)

- Opslagfaciliteiten Gereedschap
 Logistiek Trainingsfaciliteiten
 Machines Anders, namelijk

Verklaar uw keuze:

In samenwerking met grote teler een plantage opgezet

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsmatige omgang met Costa Ricaanse fruittelers (1 = volledig mee oneens; 7 = volledig mee eens):

Toelichting:

Voor elke teler anders, voor kleine telers doen wij geen investeringen

Onzekerheid: het niveau van onverwachte veranderingen in de omgeving van bedrijven in de 'agri-food' sector

Geef weer in hoeverre onderstaande uitspraken van toepassing zijn op uw bedrijfsomgeving (1 = vrijwel niet; 7 = zoveel als mogelijk):

	N.V.T.	Helemaal Vrijwel		Zoveel als mogelijk						
		niet	niet	1	2	3	4	5	6	7
48. De vraag naar onze ananas verandert vaak	<input type="checkbox"/>	<input type="checkbox"/>		1	2	3	4	5	6	7

49. We worden vaak verrast door de acties van retailers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
50. We worden vaak verrast door de acties van onze concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
51. We worden vaak verrast door de reacties van onze klanten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
52. De exportmarkt voor verse ananas vanuit Costa Rica telt veel telers	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
53. De markt voor verse ananas telt op importeurniveau veel concurrenten	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
54. We zien vaak dat prijzen voor verse ananas in deze markt fluctueren	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
55. Conflicten met onze telers komen regelmatig voor	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7

56. Wat betekent onzekerheid in de verse ananassector voor uw relatie met telers?

Weinig, alles is al gepland

57. Wat is het mogelijke effect van onzekerheid in de verse ananassector op het fungicidegebruik van telers?

geen

Toekomstig contract tussen een fungicide leverancier en een importeur

U heeft hierboven antwoorden gegeven die de afnemers van deze vragenlijst helpen een beeld te vormen van fungicidegebruik en contractuele kwesties in de exportmarkt voor verse ananas vanuit Costa Rica.

“Stel, u zou als fruitimporteur een relatie met een leverancier van innovatieve fungiciden opstarten”

58. Geef per categorie aan welke formele aspecten volgens u nu belangrijk zijn om in een contract met ananastelers vast te leggen om enerzijds de levering van de fungicide te waarborgen en anderzijds betaling voor de fungicide te garanderen (*Wees s.v.p. zo specifiek mogelijk*):

Investeringen

Eco2clean moet klanten overtuigen en investeren in geld en tijd,

Onzekerheid

niet zo spannend

Informatie-uitwisseling

INFORMATIEUITWISSELING: frequente feedback, over ontwikkeling van een fungicide

BEDANKT VOOR UW MEDEWERKING

Appendix IX: Follow-up questionnaire 1 (in Dutch)

Vraag 4:

Uit welke landen importeert u voornamelijk mango? Connecties lopen via coöperaties of grote telers, waarom niet via tussenhandelaar?

Peru, Brasil, Burkino Faso, Israel, Dom. Rep

Direcye lijnen geven direct resultaat (is dus sneller en to the point)

Vraag 11:

U bent bekend met DES 46. Welke afspraken had u met Eco2clean en uw telers m.b.t. de levering en het gebruik van DES 46?

Het zou toegepast gaan worden in een pilot te weten mangetout in Peru. Echter heeft de kweker in kwestie dit niet doorgezet. Hij wilde eerste de (on)mogelijkheden uitvoerig bestuderen zodat hij geen kapitale fouten zou maken

U heeft slechte ervaringen met DES 46. Welke?

Geen slechte maar geen duidelijke. Wij hebben een paar testen uitgevoerd op mango's waarin waarschijnlijk antrachnoses in zat. Na behandeling kwam de antrachnose toch te voorschijn. Dit is echter wel logisch te verklaren. Het middel zal als een film het product kunnen desinfecteren tegen buiten afkomstige schimmels. Echter wat al in de vrucht zit zal nooit kunnen worden tegengehouden. Het middel zal du in een eerder stadium toegepast moeten worden.

Twee wetenschappers hebben afgeraden om met een middel die bestaat uit de ingrediënten te gaan werken. Het middel kan de celstructuur van het product dermate aanpassen, dat beschadiging optreedt. Dit houdt in dat de shelflife van het product word verkort.

Hoe denkt u dat Eco2clean dat in de toekomst kan ondervangen (ook met het oog op twijfels t.o.v. het product vanuit andere importeurs)?

Geen idee. De resultaten uit andere teelten zijn mij niet duidelijk. Een wetenschappelijk uitgevoerde praktijktest zal inzicht moeten kunnen geven.

Vraag 14 en 15:

U zegt begaan te zijn met fungicidegebruik van uw telers, maar u mengt zich er niet in en u bepaalt het gebruik van fungiciden ook niet. In hoeverre bepalen telers zelf welke fungiciden ze gebruiken?

Zij mogen alles gebruiken wat in de landen van oorsprong is toegelaten. Wel is er een lijst voor de telers beschikbaar waarop middelen staan die door ons verboden zijn. Tevens is er een lijst met daarop middelen die in de nabij toekomst verboden kunnen gaan worden. Het is dus zaak om nu onderzoek te gaan plegen naar goede alternatieven.

Kunt u hier druk op uitoefenen aangezien de wens voor innovatieve fungiciden wel bestaat?

Uiteraard kan er druk worden uitgeoefend. Wel is het zaak dat er dan eventuele alternatieven voorhanden moeten zijn.

Vraag 18 en 19:

U ondervindt op verse mango geen residuenniveaus die de wettelijke EU-norm overschrijden. Waar komt dan de vraag voor residuvrije fungiciden in de export voor mango's vandaan?

Dit is nadrukkelijk een klant wens. Supermarkten willen geen negatieve imago in de publiciteit als een NGO testen uitvoert. Denk hierbij aan de Greenpeace campagnes, Milieudefensie die met regelmaat de publiciteit zoekt (middels de lijst met daarop de slechtste supermarkten)

Vraag 23:

Leveranciers van alternatieve fungiciden zijn niet gewillig in open teelten proeven uit te voeren. Geldt dit ook voor Eco2clean?

In eerste instantie niet. Echter na het voorstel van mijn kant en de introductie van betreffende kweker heb ik niets meer vernomen.

U zegt dat zulke leveranciers grote kansen laten liggen. Waar?

Door proactief te laten zien dat producten kunnen werken Nu laten ze dit over aan Nederlandse importeurs. Echter is het belang van deze anders ; producten moeten voldoen aan EU wetgeving en zolang dit gebeurd behoeven deze geen acties te ondernemen totdat wetgeving veranderd.

Waarom veranderen telers pas als de hele markt het eist en niet als hun directe klant, de importeur, het eist?

Wie betaald die bepaald. Als wij slechts een klein gedeelte van de oogst afnemen en bijv. China de rest. Effin.....China is het juiste voorbeeld. Zij hebben lak aan MRL's en voedselveiligheid.

Kortom, eigenlijk neemt u als importeur de verantwoordelijkheid voor de toepassing van alternatieven?

Ja. Ik voorzie een toekomst (binnen vijf jaar) dat het MVO ondernemen meer transparant moet/ gaat worden. Mocht een importeur hierin niet kunnen voldoen zal een supermarkt geneigd zijn eerder over te stappen naar een concurrent die dit wel kan.

Vraag 24:

Desinfectiemiddelen producerend bedrijf importeur teler dé manier om als Eco2clean een alternatieve fungicide te vermarkten. Waarom niet via *exporteur teler*?

Een Exporteur heeft in sommige gevallen totaal geen effect bij het promoten van deze middelen. Zij vermarkten slechts de producten tegen een marge en ehbben geen teelt technisch gevoel en belang.

Vraag 25:

Wat verstaat u onder kwantiteit en kwaliteitovereenkomsten? Zijn dit vormen van joint-ventures, lange termijn relaties of spot-markets (waarin hechte relaties n.v.t. zijn en transacties gedaan worden op basis van prijzen)?

Kwantiteit is de hoeveelheid van de oogst die we afnemen in tonnage. Daarover worden prijs afspraken gemaakt. Daartegen over dient een product wel te voldoen aan product specificaties. Bij aankomst worden producten getoetst op deze specificaties.. Met veel van onze leveranciers is een goed samenwerkingsverband gecreëerd . Wij geven deze advies hoe en wat te doen./ tevens zijn wij niet bang om mee te investeren in projecten die op termijn positief resultaat opleveren.

Vraag 34:

Beschouwt u de ontwikkeling van betrouwbare relaties met uw klanten en toeleveranciers als belangrijke voorwaarde voor het overgaan tot transacties? (Hooft daar een stukje goodwill bij van fungicidenleveranciers door open teelt proeven te doen?)

Nee het commercieel belang staat voorop. In sommige gevallen is het snel overgaan tot kopen van producten. Dit heeft alles te maken met het feit dat de AGF handel zeer dynamisch is. Als een klant een order plaats van enkele duizenden colli's moet dit snel worden ingekocht als de voorraad niet voldoende is.

Vraag 35:

Waarom kiest u voornamelijk voor 'gentlemen agreements' met uw telers, in plaats van formele contracten? Welke factoren bepalen de keuze van de soort overeenkomst?

De vraag naar goed producten is bepalend. Wij willen uitsluitend top kwaliteit en betalen daar een degelijke prijs voor.. Mede het tweede zorgt ervoor dat er geen dikke contracten nodig zijn. Tevens maken wij altijd waar wat wij beloven, zowel naar klant als naar leverancier. Dit is bekend bij heel veel telers.. Mensen willen graag met ons zaken doen.

Vraag 36:

Waarom legt u in contracten met telers geen voorwaarden vast m.b.t. gewasbeschermingmethoden?

Contract worden niet afgesloten, wel een zgn supplier agreement met daarin een pakket van eien dient te worden ondertekend door betreffende leverancier.

En onderdeel hiervan is idd gewasbescherming middelen en met name residuen. Wij zijn geen telers en kunnen niet aangeven welke middelen het meest actief zijn in bepaalde situaties. Er is geen sprake van een abctje per situatie.

Vraag 44:

Telers investeren in trainingsfaciliteiten. T.b.v. welke doeleinden vindt training plaats, voor wie?

Het gebruik van nieuwe middelen zoals bemestingstechnieken.

Vraag 47: was nog niet ingevuld op de vragenlijst

Vraag 58:

INVESTERINGEN: stel dat het middel zich heeft bewezen en voldoet aan toelatingseisen. Welke afspraken moeten er dan gemaakt worden m.b.t. het doen van investeringen?

Het MOET aantoonbaar zijn dat het middel in betreffende teelt afdoende werkt en niet duurder is. Tevens moet het in het land beschikbaar zijn.

ONZEKERHEID (m.b.t. volume): hoe zou u veranderingen in volume ondervangen in het maken van afspraken?

Is altijd afhankelijk van klimatologische omstandigheden. Je kan afspreken wat je wil, maar een aardbeving in Chile die de appels van de bomen doet trillen kan je niet voorzien.

Ad. Vraag 58:

Indien een nieuwe fungicide succesvol wordt toegepast, hoe denkt u dat de extra opbrengsten verdeeld moeten worden in de keten (i.v.m. bijvoorbeeld hogere kosten voor telers in investeringen)?

Dit ligt aan hoe het nieuwe middel toegepast moet worden. Per teelt zijn er diverse manieren van het toedienen van GBM. In vele gevallen is apparatuur al aanwezig. Als hiervan gebruikt gemaakt kan worden zijn de investeringskosten laag.

Appendix X: Follow-up questionnaire 2 (in Dutch)

Vraag 4:

Uit welke landen importeert u voornamelijk ananas? Connecties lopen via u naar Costa Ricaanse exporteurs, waarom niet direct naar de teler of een tussenhandelaar?

Ivoorkust, Costa Rica.

Exporteurs zijn actief op zoek naar afzetkanalen én zijn op de hoogte van de papierwinkel die met export samen gaat. (Kleinere) telers of tussenhandelaren leggen meestal geen direct contact met importeurs uit een ander werelddeel.

Vraag 24:

Desinfectiemiddelen producerend bedrijf exporteur teler is via u dé manier om als fungicidenleverancier een alternatieve fungicide te vermarkten. Waarom niet via *importeur* teler?

Telers zijn verantwoordelijk voor de middelen die zij gebruiken. Exporteurs hebben inzicht in de mogelijke landen van bestemming en de beperkingen die deze mogelijk met zich mee brengen.

Voor ons bedrijf kan het interessant zijn om rechtstreeks samen te werken met een grote teler, maar dat is op dit moment niet het geval.

Vraag 25:

U zegt geen contracten te hebben met ananastelers/exporteurs, aangezien daar nog geen vraag naar is. In vraag 2 en 3 zegt u dat Royal Sweet ananas 0-10% van uw totale bedrijf vormt. Kunt u deze tegenstrijdigheid verklaren?

Kopen zonder contract is ook mogelijk.

Vraag 34:

Beschouwt u de ontwikkeling van betrouwbare relaties met uw klanten en toeleveranciers als belangrijke voorwaarde voor het overgaan tot transacties?

Langdurige betrouwbare relaties zijn belangrijk. De praktijk zal uit moeten wijzen of relaties betrouwbaar zijn zodat het praktisch niet mogelijk is om dit te beoordelen vóóordat zaken gedaan gaan worden.

Vraag 44:

Verwacht u dat telers ook moeten investeren in trainingsfaciliteiten i.p.v. enkel hun logistiek apparaat en exportfaciliteiten?

Dit hangt af van de mate waarin de teler zijn zaken reeds op orde heeft. Grote professionele telers zullen doorlopend aandacht besteden aan het actueel houden van de opleidingen van de medewerkers.

Vraag 58:

Indien een nieuwe fungicide succesvol wordt toegepast, hoe denkt u dat de extra opbrengsten verdeeld moeten worden in de keten (i.v.m. bijvoorbeeld hogere kosten voor telers in investeringen)?

Alleen indien een ontwikkeling leidt tot een Unique Selling Point kan geprobeerd worden hiervoor een hogere prijs te vragen. In andere gevallen betreft het een afweging op telersniveau: minder uitval / kwaliteitsverlies tegenover extra kosten van het gewasbeschermingsmiddel. Pas dan is het voor de teler aantrekkelijk.
