Environmental Sustainability Certification Initiatives in the Chinese Tea-Sector

The example of Zhejiang Province

(easytourchina, 2015)

Master Thesis: International Development Studies

By: Lonneke Michiels - Student No 911202570070

Date: 28-01-2016

Supervisor: Hanna Schebesta

Course Code: LAW-80433

Wageningen University

Acknowledgement

This research has been an individual set-up, which partially took place at the office of HIL International Lawyers & Advisers, Shanghai. I would like to thank the following people that gave an invaluable contribution to this thesis report.

First of all, I would like to thank the HIL International Lawyers & Advisers for the opportunity to use its facilities at its office in Shanghai. It would not have been possible to conduct research in China without its collaboration. Moreover, I am grateful to the employees who assisted me with communicating in Mandarin. In particular, I would like to thank Grace, one of the interns during my stay. She went with me to the city of Hangzhou as a translator for one of the interviews.

Second, I would like to thank all interviewees very much for their willingness to spend time on the questions. The interviews definitely have given invaluable insights in the matter of this report and gave the report its value. The enthusiasm of the respondents about Chinese tea and their insights in certification possibilities motivated me to become even more interested in the topic and the possibilities for potential market expansion in Europe.

Third, I would like to thank two Taiwanese friends from Shanghai: Tzu-Wen Liu and Yu-Ting Chen. First, I am grateful for their assistance with the report: translating e-mails and going with me to the city of Nanjing where they translated one of the interviews. Second, I would like to thank them for their help with adjusting to the city of Shanghai and local culture. I am convinced that with their help, quite some things would not have been possible.

Fourth, I would like to thank my friends in the Netherlands who spent time on proof-reading the report. Working together and giving each other advice, has also definitely helped me to stay motivated and focussed.

Fifth, I would like to thank the second reader Bernd van der Meulen, for thinking about possibilities to realise my research plan in China. Moreover, I would like to thank him for giving useful feedback by his proof-reading.

Sixth, I would like to thank my supervisor Hanna Schebesta. As I decided to do an (unrelated) internship of five months during the writing process, she has been my supervisor for over a year with varying intensity. Therefore, I am very grateful for her continuous support during the entire thesis process. She has been very helpful with finding literature, discussing issues, and bringing in new insights and ideas.

Abstract

The main topic of this report is environmental sustainability issues in the production of tea in China. The tea sector's long-term sustainability is at stake. However, little research has focused on the issues for China specifically, despite that it is the world's largest tea producer. Thus, the focus of this research lies on tea destined for export to Europe. This trade is motivating too high Maximum Residue Levels in tea, which are caused by overuse of pesticides.

Three research methods are used: a literature study, a standards analysis and semi-structured interviews with key informants. These methods analyse three main aspects. First, environmental issues in the tea industry. Second, how the policies of the most important certification schemes UTZ, Rainforest Alliance, Fairtrade and IFOAM cover these issues. Finally, which obstacles farmers face in applying for certification schemes

This resulted in four main outcomes. First, agrochemical use is the most important environmental issue. Second, environmental issues in China differ from the issues in other countries, especially with regards to deforestation. Third, organic certification best addresses the most important environmental issue of pesticide use. Fourth, because of little incentive and the cultural value attributed to tea, many small-scale farmers are not reached for certification. This is due to a knowledge gap/level of organisations. In order to incorporate environmental sustainability schemes in the Chinese tea supply chain, especially more incentive should be created for it among farmers. IFOAM might be the best scheme to use but also the others deal with relevant aspects, such as soil quality and biodiversity conservation.

Keywords: certification, environmental sustainability schemes, China, Tea, Zhejiang province

Table of Contents

List of Tables and Figures

List of Abbreviations

CB	Certification Body's
CTIEC	China's Tea Import & Export Corporation
EFSA	European Food Security Authority
EMS	Environmental Management System
EPA	Environmental Protection Agency
ETP	Ethical Tea Partnership
FAO	Food and Agricultural Organisation
GATT	General Agreement on Tariffs and Trade
GFL	General Food Law
Global GAP	Global Good Agricultural Practices
IAF	International Accreditation Forum
IDH	Sustainable Trade Initiative (Dutch: Initiatief Duurzame Handel)
ILO	International Labour Organisation
ILAC	International Labour Accreditation Cooperation
IPM	Integrated Pest Management
ISEAL	International Social and Environmental Accreditation and Labelling Alliance
ISO	International Organisation for Standardisation
MOA	Ministry Of Agriculture
MOU	Memorandum of Understanding
MRL	Maximum Residue Level
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
SAN	Sustainable Agricultural Network
SDO	Standard Development Organisation
SPS	Sanitary and Phytosanitary
TSR	Three-partite Standards Regime
VSS	Voluntary Sustainability Standards
WTO	World Trade Organisation

1. Introduction

1.1 Environmental issues in China and Zhejiang province

This report will focus on environmental sustainability issues in the Chinese tea export to Europe. As a potential means to deal with these environmental issues, four certification schemes will be discussed: UTZ, Rainforest Alliance, Fairtrade and IFOAM.

The structure of the first chapter is as follows. First, it will introduce the topic of tea, the sustainability issues in the sector, the certification schemes that deal with it and explain why Zhejiang province has been chosen for this study. Second, the problem statement will be presented. Third, the research questions will be discussed. Fourth, the approach to address the questions will be discussed. Finally, the outline of the next chapters will be presented.

Basic tea can be divided into six broad categories according to production methodology: green tea, black tea, oolong tea, white tea, yellow tea and dark tea (Chen, 2009). All teas are made from the leaves of the same plant, Camellia Sinensis in Latin. The plant grows in tropical and subtropical regions (Rainforest Alliance, 2015). This accounts for over 50 countries, but just China, India, Kenya and Sri Lanka already account for 74% of the worldwide production(UTZ certified, 2015). China has since long been the biggest producer and consumer of tea in the world (UTZ certified, 2015) and is also the largest producer of green tea in the world (Blackmore & Keeley, 2012; Teavivre, 2013). Tea grows year-round which enables large amounts of workers to gain their income in the industry. Since the sector provides income for so many people, it faces challenges around wages, labour organisations, housing, health care and other rights and benefits(Rainforest Alliance, 2015). Tea grows best in the right climate, with healthy soil, and sufficient water (Chen, 2009). Since tea estates cover large areas, it replaces the ecosystem with a monoculture. This process has for instance led to soil erosion, competition for water and pollution from fertilisers (Rainforest Alliance, 2015). Uncertainties involved with agricultural production can prevent tea growers from producing tea sustainably (Chen, 2009). Globally, there is an oversupply of tea, which can be seen as a threat to the long-term economic health of the tea sector (Groosman, 2011). Low revenues and under-investment threaten the productivity and quality: they act as obstacles to create better working conditions. This in turn, creates the negative tendency which makes it hard for the sector to produce the tea more sustainably (Chen, 2009).Tea production in China differs from other producing countries. First of all, tea has been consumed for 1000 of years and a large cultural value is attributed to it. China also differs from other producing countries because a market for speciality tea has developed which can be compared to the market for speciality coffees. Some of these specialities date back more than 100 years. The domestic market for speciality – and normal tea is much more important for China than markets overseas. Interest from export markets is however rising. Lastly, the excessive agrochemical use in China often results in high level of Maximum Residue levels in tea, which hamper export (Wei, Huang & Yang, 2012) and which cause almost all other aforementioned environmental problems.

Certification initiatives can be seen as a way to deal with environmental issues. Some schemes like UTZ, only recently entered the Chinese market and the certification market is increasing which makes certification schemes an interesting subject to look at. In order to consider environmental sustainability and certification in the tea sector in China, Zhejiang province is used as a case. It can be seen as an interesting and relevant example, as it is one of the larger tea producing areas in the country (Chen, 2009). Whereas China is the largest producer of green tea in the world, Zhejiang has the largest production of green tea within China (Teavivre, 2013). Moreover, the province produces both famous regional tea like Longjing tea in and around 'tea capital' city Hangzhou, as well as regular teas like gunpowder black tea and Anji Ba tea (Ratetea, 2016). The province is highly relevant because it has business relations with nearly 60 countries in the world (Teavivre, 2013).

Zhejiang province is located next to Shanghai in the economic heart of China, see figure 1.1.

Figure 1.2: Location of Zhejiang Province, China (Chinafolio, 2016)

1.2 Problem Statement

Sustainability, in general, is at risk in the Chinese tea industry. Especially the economic and the social sustainability of the global tea sector have been researched so far. From an environmental sustainability perspective, it is known that tea production, which generally takes place in a monoculture, can lead to the mentioned issues like soil erosion, competition for water and pollution caused by fertilisers. This fertiliser use also becomes important in a marketing respect: the too high Maximum Residue Level's in tea caused by abundant pesticide use has led to rejections of much Chinese tea on the European market. This makes the production and its export to European countries interesting to look into. The environmental sustainability problem is conceptualised as a partly unrecognised problem for Chinese tea farmers. The long-term sustainability of the sector is at stake, however not all farmers are aware of this. There are three knowledge gaps underlying this research.

The first knowledge gap looks at the environmental issues in China compared to general tea sector environmental issues. Whereas environmental sustainability has been researched for the global tea sector, it hardly has been researched for Chinese sector in particular. The situation in China is especially relevant as it is the biggest producer and has relatively a large amount of people working in the sector, because of which the long-term employment of them in the sector is at stake as well. Moreover, with so much tea that cannot even enter the European market, it is necessary to investigate which environmental issues are underlying this sustainability problem. Second, a potential way in which the impact of environmental sustainability issues could be mitigated is by producing environmental friendly certified tea. This is knowledge gap itself, as very little is known about the presence of schemes in China (but it will also be used as an approach). Production of certified tea destined for the export market exists on a sizeable scale. However, given the larger domestic market, this is a small percentage of the total tea production. The literature on certification for tea is limited and rather focuses on the production of bulk teas from Africa and other parts of Asia (Blackmore & Keeley, 2012). Lastly, when considering environmental issues and certification schemes, it is not yet known to what extent it actually is possible to integrate certification schemes in the Chinese tea sector, there could be barriers for farmers to engage in these schemes. This is the third knowledge gap that will be dealt with.

1.3 Research Questions

The three main knowledge gaps mentioned in section 1.2, will collectively lead to the main research question stated at the next page. In order to answer the main question, three sub-questions have been formulated as well, which correspond to the three main knowledge gaps, they are presented, below the main question.

What is the potential of sustainability certification schemes to address environmental sustainability issues on the production-side of the Chinese tea supply chain, focused on export to Europe?

1. Which environmental issues are present in the Chinese tea supply chain?

2. Do the standards' requirements of the certification schemes~~,~~ that are active on the Chinese market, address the environmental issues?

3. What barriers exist for tea farmers to participate in the certification schemes?

1.4 Approach

Although not all environmental issues are known, it is assumed that at least some environmental issues are present. Following Chen's report (2009), the issues in other tea producing countries of the IDH report (2011) and the high number of pesticides used, which resulted in the high MRL levels. For the certification schemes, UTZ, IFOAM, Rainforest Alliance and Fairtrade are identified as the largest schemes active in China, based on the IDH sector overview (Groosman, 2011). Therefore these four are taken as a point of departure in this report on China.

In order to answer the above questions, a qualitative research will be conducted. The research is not focusing on measurable matters, but on a description of environmental issues, perspectives, problems but also about obstacles and motivations, which can only be addressed by qualitative methods. The research is both a social sciences research and to a lesser extent a legal research. Used methods are a literature research, semi-structured interviews and a document analysis on the varying certification schemes.

1.5 Structure of the Report

It has become clear that the Chinese tea sector factor faces several environmental sustainability issues as well as food safety issues. For these matters, Zhejiang provides as a suitable case to analyse these issues. All certification schemes have differing focus areas to address environmental sustainability issues and have different activities in the region to effectuate their goals.

The report will continue as follows. In the second chapter, the theoretical framework will be presented. The third chapter will display the methodological framework. From the fourth chapter on, the sub-questions will be answered. The fourth chapter will deal with subquestion 1 on environmental issues. The fifth chapter discusses subquestion 2 on certification initiatives and their requirements. The sixth chapter will deal with subquestion 3 on barriers for farmers to apply for certification schemes. The final chapter applies theories and models from the theoretical framework to the outcomes of these three chapters. Ultimately, in this chapter, an answer will be given to the main question.

2. Theoretical Framework

As the subject of this research is relatively new, there are only a couple of theories that can be applied in this particular research field. This chapter will explain the main concepts used in this report. The aim of this report is to make a contribution to filling the three knowledge gaps with regard to environmental sustainability in the Chinese tea supply chain. The theory in this chapter consists of four main themes, each with related concepts. First, the concept of environmental sustainability, as this conception is fundamental throughout the entire report. Second, governance of value chains and its complexities, which will be applied to the tea supply chain. Third, certification as a strategy to 'upgrade' a product. Fourth, the theory behind voluntary sustainability standards and certification. Fifth, an indication will be given about which theories will be analysed in the analysis & conclusion chapter (chapter 7).

2.1 Environmental Sustainability

There are multiple types of sustainability. The main theme of this research is environmental sustainability, which can be explained well when departing from the perception of sustainable development. Please note that sustainable development is not the same as sustainability. The two terms are however narrowly connected. By explaining sustainable development it will become clear how the definition of environmental sustainability, as one of its pillars emerged.

Sustainable development is generally defined as enabling the present generation to fulfil its needs, without hampering the needs of the future generation, when referring to the reputable Brundtland report in Moldan, Janousková and Hák (2012). During the World Summit of 2002, sustainable development was divided into three pillars: a social, an economic and an environmental one. These were also referred to as people, planet and prosperity, instead of the conventional people, planet and profit thinking (Moldan et all, 2012). Sustainability rational departs from the idea that *"…humans must recognise the worlds' resources as finite, with limited capacities to support life" (*p.6 Moldan et all, 2012). According to this definition, development should take place in an environmentally sustainable way. This means that when improving human welfare, the biophysical sphere should be taken into account (Moldan et all, 2012).

A more elaborate clarification about why development should be sustainable is given by the online platform Environmental Science. It describes sustainability as follows: "*sustainability takes into account how we might live in harmony with the natural world around us, protecting it from damage and destruction" (*Environmentalscience, 2016). Sustainable development tries to balance competing needs: the need to move forward technologically and economically with the need to protect the environment (ibid). Environmental Science also divides it into the three pillars: social, economic and environmental (ibid). The FAO expands the previous definitions by describing the term as: *"ensuring human rights and well-being without depleting or diminishing the capacity of the earth's ecosystems to support life, or at the expense of others well-being. It is a multi-dimensional concept encompassing environmental integrity, social well-being, economic resilience and good governance: each of these sustainability dimensions involves several issues and all dimensions need to be considered. Sustainability is an ambitious objective that can be reached through different pathways"* (FAO, 2016). The FAO´s definition is similar to the previously given definitions to some extent: it also distinguishes, social, environmental and economic dimensions. However, it adds good governance. This will be taken into account in this report by means of the private voluntary governance structures.

It is important to notice that sustainability itself is a contested concept. There is no general agreement on the term as to which goals society should be adhered to, how to contribute to it and how goals should be achieved (p.16 Dryzek 2005; Conelly, 2007). The three –or four- pillars have been adopted by many but also for these there is no general agreement on their exact content (Robert, 2012).

For this report, sustainability is understood as a combination of the mentioned definitions. Humans must see resources as finite (Moldan 2012), that nature should be protected from harmful events (Environmentalscience 2016), and the four pillars of the FAO (2016) including good governance. In order to make the concept relevant, especially the perceptions of farmers will be taken into account, as their perception can predict whether or not the long-term sustainability of the tea sector is considered as a problem for the various stakeholders representing the producers.

2.2 Value Chains

The governance of environmental sustainability standards can be analysed with the global value chains theory: a concept which analyses the structure of a value chain or industry. In this theory, the focus lies on the network of a company rather than on one individual company itself. Governance forms the focus of this approach and refers to the internal coordination of a particular chain. Gereffi (2005) distinguishes different types of global value chains: market, modular, relational, captive and hierarchy. Market-based interaction or hierarchical control takes place in more vertically integrated firms. Coordination can be driven by both the supply side as the demand side of a chain (Vellema & van Wijk, 2014).

Böstrom (2015) expresses that governance of environmental issues in a global supply chain like the one of tea is difficult because of six lines of reasoning. First, geographical gaps: governance is taking place at a distance, so it is hard to take care for it. Second, information and knowledge gaps, often there is no reliable and transparent information available about the origin of a product. Third, communication: even during the third-party inspection of a farm: the audit, communication between different parties does not always take place in an optimal way, which may lead to complications. Four, compliance and information gaps: when a standard or policy is developed, products do not necessarily meet the criteria. Fifth, power gaps in the supply chain: for suppliers, too powerful buyers wanting to impose a standard on their produce. This can cause that the suppliers lack influence on the exact criteria of the standard, meaning that standards may not always fit with the local practice. Sixth, credibility or legitimacy gaps: it is not always the aim of organisations to improve their practices. Governance arrangements like for instance Global Good Agricultural Practices, Global GAP, have not always succeeded in finding solutions for the previous five governance complexities, which diminishes the credibility of such governance initiatives.

2.3 Upgrading of a Product

Value chain governance is closely connected to upgrading: a strategy of a supplier, region or country to improve their position in the chain and the global economy by engaging in higher value adding activities. This can take place either by improving production processes or by engaging in new product lines. However, these practices may for small individual firms or cooperatives end up in a ‘race to the bottom’. Therefore, engaging in fewer activities, and selecting one key production activity can also serve as a successful strategy to improve the competitiveness of these chain actors. This process is also called functional downgrading. The firms could, for example, withdraw from higher value adding activities and concentrate on more upstream activities. A major intended outcome of upgrading is inclusion in the global value chain. Upgrading can also involve that local firms start to serve alternative chains, and enter new markets. An example would be to start producing internationally instead of nationally (Vellema & van Wijk, 2014).

2.4 Voluntary Sustainability Standards & Certification

When evaluating environmental sustainability in value chains, voluntary sustainability standards (VSS) and certification schemes are valuable systems to address it. Many different competing certification schemes exist. However, their development took place in a relatively unorganised way. This has resulted in a fragmented governance system (Derkx & Glasbergen, 2014). However, for instance, ISEAL has stepped in as an overarching initiative with the aim to increase the credibility of governance mechanisms (Loconto & Fouilleux 2014). In order to establish a proper functioning of the VSS, a combination of standards, certification and accreditation are needed. These three together are also known as the 'Tripartite Standards Regime' (p.59, van der Meulen, 2011).

Standards, are developed by standard development organisations (SDO's). During the 20th century, large numbers of these came into being. Examples of this are the Codex Alimentarius and the International Organisation for Standardisation (ISO). When using a standard, a product could become certified. Certification emerged as an answer to the growing complexity of international food trade. Initially, relations between buyers and sellers was based on trust, and legal steps could be taken in case of disagreement. However, global food trade largely increased as well as the number of sellers. Buyers no longer have the means to take legal steps towards suppliers when they do not meet terms of a contract. As a solution, various forms of certification were developed: first, second and third party certification. First-party takes place when a producer certifies its own products. Second-party certification means, that a continuous inspection of the producers takes places by the buyers. Third-party means that inspection takes place by a third party. The latter way is most favoured and therefore, most frequently used. Certification may seem like an all-encompassing solution to guarantee whether certain requirements are met. However, unlike this, certification turned out to be more complex for the reason that firms-to-be-certified also pay the certification organisation to do so, which can create a conflict of interests. The solution for this problem lies in accreditation. Accreditation means that the certifiers meet a certain standard, which shows their trustworthiness. The international Labour Accreditation Cooperation (ILAC) and the International Accreditation Forum (IAF) are the most famous accreditors in the food sector. Together, standard setters, certifiers and accreditors compose the Three partied Standards Regime (TSR) (p.59-62, van der Meulen, 2011)

To conclude, the TSR system, ultimately lies on national governments, whereas its rules reach far beyond the boundaries of a state. Moreover, there are five complexities that may come along with the TSR regime. First, it is not always transparent: among other things because certifiers have an interest in keeping their requirements slightly secret so that competitors cannot certify the same. Second, especially with process standards, innovation can be blocked. Third, it can affect smallholders negatively, since they often do not have the means to make particular investments to meet most standards. Fourth, legitimacy also may come to the fore as a problem since buyers impose measures on their suppliers, producers often have little say in how the measures could be enforced. Finally, developments may reach a point at which states are no longer able to take care of food regulation anymore, which can be dangerous when regarding new food technologies (p. 62-68, van der Meulen, 2011).

This report will predominantly focus on the first two components of the TSR: standards and certification, which are in most cases taken together, as some organisations are both standard setters as well as certifiers, for instance, UTZ. In general, food multinationals together with international NGOs and the certification industry can be considered as standard setters, whereas the primary producers can be seen as standard takers. It is relatively difficult to make the standards, which are made on an international level, fit with the local norms Vellema & van Wijk (2014). One of the biggest limitations of standards, therefore, is that they primarily respond to public pressures and considerations within the consumer markets, which are not necessarily shared by production regions

(Vellema & van Wijk, 2014). To take this problem into account, the position of the tea farmers have been taken as a point of departure for the interviews, as will become clear later in this report.

2.5 Use of Theory in the Report

Concepts and theories have been introduced which will be used in the empirical chapters of this report (chapter 4, 5 and 6). The theoretical framework enables to understanding of the foundations of these chapters. However, as stated: part of the framework will also be used in the conclusion & analysis in chapter 7. This holds for the following four concepts or models: first Gereffi (2005)'s market types and the definition of environmental sustainability (based on definitions of multiple authors). This is followed by, Vellema & van Wijk (2014)'s strategies for the upgrading of a product and Böstrom (2015)'s complexities regarding for governance of global value chains.

3. Methodological Framework

In order to understand the role of certification schemes on environmental sustainability issues, a qualitative research design has been used. The design in this chapter will explain the three different types of research that are applied, which are: a literature research, a standards analysis and the conducting of semi-structured interviews.

3.1 Research Design

In order to answer the main question and sub-questions of this research, three types of methods are applied. The list below indicates in which chapters the methods are used.

- Literature Research – chapter 2, 4, 5 and 6
- Standards Analysis/Comparison – chapter 5
- Semi-structured Interviews – mainly chapter 4 and 6 and to a limited extent in chapter 5

This report entails a qualitative research design. The research focuses on a description of environmental issues, a comparison of requirements certification schemes and barriers for farmers to work with certification schemes. The titles of the chapters indicate that they are all normative and descriptive issues which can only be addressed by qualitative research methods.

3.1.1 Literature Research

The literature research is used for the theoretical framework: chapter 2 and parts of all three empirical chapters of this research: which are chapter 4 on environmental issues, chapter 5 on certification requirements and chapter 6 on modalities for farmers. The list below will explain how this is done for each of these chapters.

Chapter 2, the theoretical framework: entails the background and conceptual framework for the empirical part of this report. It consists of the following theories. The Three Partite Standards Regime (van de Meulen, 2013), which is used to explain the functioning of certification schemes and standards as well as theories on Voluntary Sustainability Standards by Derkx & Glasbergen (2014)'s. The background on the governance of value chains is based on Gereffi et all (2013)'s typology of value chain governance and Böstrom et all, (2015)'s complexities of chain governance. The concepts of value adding and upgrading of a product by Vellema & van Wijk (2014) is used to consider the willingness of farmers to participate in sustainability schemes. Besides background for the empirical chapters, the theoretical framework also entails some models and theories for the analysis of the empirical chapters in chapter 7 Analysis & Conclusion.

Chapter 4 on environmental issues and the market does two things. First, it analyses the Chinese tea export market, which is mainly based on a Chinese tea sustainability by Chen (2009). The environmental issues in the chapter are selected from various global tea sustainability reports such as the IDH sector overview of Groosman, (2011). (In some cases, reflections on the issues given by the respondents were researched further in the literature as well, see also 3.1.3,).

- Chapter 5 on the comparison of standards requirements: mainly consists of an assessment of the various standards policies. The background literature in the chapter for instance on organic in China is based on Egelyng et all 2010 and Blackmore et all, 2012.

- Chapter 6 on modalities for farmers discusses the barriers for farmers to participate in certification schemes. This is predominantly a respondent based chapter, however, the follow-up literature after the conducting of interviews resulted in for instance background about the cultural dimension by Xiusong, 2014. General characteristics of the sector's complexities are based on Chen (2009).

Chapter 7: the analysis and conclusion, examines the previous three chapters. This is done by applying the theories of Gereffi (2005) on market systems, the combined notions of environmental sustainability by for instance Moldan, Janousková and Hák (2012). Böstrom (2015)'s list on complexities of value chains governance and Vellema & van Wijk (2014)'s ideas on upgrading.

3.1.2 Standards Analysis

The second method used for this report is a standards policy analysis. This is entirely worked out in chapter 5: tea certification schemes. The standards of the main four certification schemes active in China and in Zhejiang province: UTZ, Rainforest Alliance, IFOAM and Fairtrade are compared. This is done by analysing the certifiers policy on the different environmental themes, which is presented in chapter 5: comparison of the certification schemes. Indicators used are stringency, determined by factors such as the number of audits and the entire list of compliance criteria. For the comparison, the latest versions of the standards available were used at the time of writing the report. Additionally, the comparison tool Standardsmap is consulted for several purposes such as an overall outline of all standards active in China, additional information on the standards and certification schemes as well as their assessment.

3.1.3 Interviews

Semi-structured interviews are conducted with different stakeholders in the field. The interview questions were particularly focused on the specific environmental issues and the barriers for farmers to apply for certification schemes because information on these subjects is absent in the literature.
A semi-structured design has been chosen to both safeguard answering of the main questions and leaving sufficient space for own ideas, experience and recommendations of the respondents at the same time. Snowball sampling was used for acquiring interviews because it was already clear prior to the conducting process that getting in touch with respondents would not be easy. This technique departs from the idea that a researcher approaches a small group of people that are relevant to the research topic and uses them to establish contact with others (p.184 Bryman, 2008). This was, for instance, applied by approaching key informant respondent 8, who gave contact suggestions for several other respondents.

The respondents have been chosen by their relevance for the research, their willingness to take part in the research as well as their ability to speak English. Therefore, no random selection process could be applied. For instance, China GAP has only scarce information available in English for which it was possible to establish a relevant contact. An overview of the amount and categories of respondents can be found in table 3.1, below.

Table 3.1: Overview of the Respondents

Type of Organisation	General	Private Organisation	Standard Setter	NGO	Umbrella Organisation	Research Institute	Total
Amount of interviews	1	1	1	2	2	2	9

Some of the respondents indicated that their reflections should not be considered as representative for their organisations' visions. Because of this, the content of the interviews will be displayed in an anonymous way in the report. However, to give a little background about the respondents, some general information about them is presented below.

- The first respondent owns a company, focused on China and also focuses on the training of farmers and organises them into cooperatives.
- The second respondent owns a coffee bar with Fairtrade coffee and tea and knows much about problems one may come across when dealing with this relative unknown concept in China.
- The third respondent works for an important standard setter active in the region which especially knows much about environmental issues
- The fourth respondent is one of the two employees consulted for this report from the same NGO active in the region. This NGO has been active in China for a long time and helps farmers to engage in more sustainable agriculture practices. This respondent answered the interview questions by e-mail.
- The fifth respondent is the other employee from this NGO, however, this person has been interviewed in person in a more elaborate interview. It was conducted with the assistance of a spokesperson.
- The sixth respondent is working for an umbrella organisation which helps to increase the credibility of standards.
- The seventh respondent is a member of another umbrella organisation/NGO which focuses on tea in particular.
- The eighth respondent has written a report on tea sustainability and knows much about environmental issues and the complexities for farmers in China.
- The ninth respondent works for a research institute focused on tea. This interview was conducted with the support of a spokesperson.

4. Environmental Sustainability Issues in the Tea Supply Chain

It follows from the introduction, the global tea industry faces some severe environmental sustainability issues. The work of tea growers contains of the farm management, plucking, processing and sale. An average tea farm can last for 50 years, of which the first years are used for tending and after 30 years the farm will degrade in quality (Chen, 2009). For the worldwide tea sector, there are various environmental sustainability issues, which can be derived various tea-sustainability reports. The best suitable and complete overview was found in the IDH sector overview, that uses the categorization of a report called the Tea Barometer (Groosman, 2011; Van Reenen, Panhuysen & Weiligmann, 2010). This overview does not distinguish environmental issues for estate and factory workers or small scale farmers. All studies are general tea overviews of the global tea sector, with no specific section about environmental issues in China. Therefore, the global environmental issues have been presented to the interviewees of this report. It will become clear that for instance, China has large issues with agrochemical use, especially since it has led to European market's rejections of Chinese tea. This chapter will dive further into these environmental issues in China. This will be done by answering the sub-question of this chapter, which is: *which environmental issues are present in the Chinese tea supply chain?* In order to do this, the following steps will be followed. First, the Chinese tea supply chain will be analysed. Second, an overview will be given of the interview outcomes dealing with the topic. Third, the issues found in both interviews and literature will be discussed. Finally, a conclusion will be given which will answer the sub-question.

4.1 Supply Chain of Tea

This subparagraph will deal with the organisation of the market and the supply chain of the Chinese tea sector. This will be done by explaining the supply chain of the domestic and export market, and by identifying ways of value adding to tea. What is meant by 'supply chain' in this chapter is the part of the production taking place within the country, as the report focuses on environmental issues within China. Therefore, just the primary production and, in some cases, processing and refining processes are regarded.

Figure 4.1 Hangzhou Tea Gardens, November 2015

Domestic & Export Tea Markets

In order to fully grasp the supply chain, the needs of the tea market will be explained in detail. First the organisation of the domestic market will be presented. Although the report focuses on the export market, it is important to consider the national market as well, as most tea produced in China is sold locally.

All tea-growing provinces have their own tea import and export companies. Most of these companies are part of China's Tea Import & Export corporation (CTIEC) (Chen, 2009). More than two third of Chinese tea is sold on the domestic market. This market is organised relatively easy, as tea farmers can choose between two options after the harvest. These options depend on the instant of the selling. The first option is to sell the plucked 'fresh leaves' directly. This can be done by selling to a brand tea factory, primary process factory or a brand owner, which can also be seen at figure 4.2. This option often results in relatively low revenues. The second option is only possible at larger farms with processing capacity. In this case, the fresh tea is processed at the tea plantation. After this, the 'self-processed crude tea' is sold to a refiner, dealer or even consumers directly. The process can be seen at the right side of figure 4.2. By this second way, much higher prices can be asked for the tea. However, most the tea farmers do not have the capacity to process tea themselves and due to that, the second option is not often put into practice (Chen, 2009).

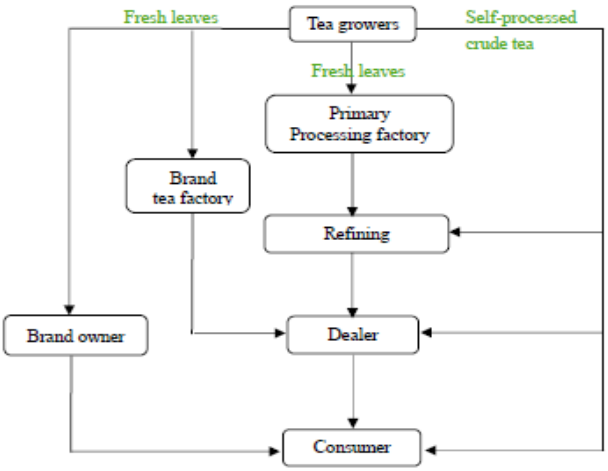

Figure 4.2 Supply Chain of the Domestic Tea Market

Less than a third of the tea produced in China is being exported. Different from the domestic supply chain, the export market is characterised by strong vertical integration: leading companies like Twinings own the majority of the supply chain (Groosman, 2011). Tea destined for the export market is always produced at plantations with processing capacity. After harvesting, the 'crude tea' will be processed and refined at the plantation's premises. Once refined, the tea leaves China. This 'finished tea', will go via a foreign trade company and foreign dealer to a foreign brand owner, then a supermarket or other retailer and eventually to consumers. This process can be seen at the right side of figure 4.3. Sometimes the tea goes directly to the foreign dealer rather than to a trader, this can be seen at the left side of the figure. Either way, the figure shows that the export market's supply chain is more integrated than the domestic one (Chen, 2009). The Chinese system is slightly different from the rest of tea producing countries with regard to traders. Globally, 70% of tea is sold through auctions (p3, ibid). China has no auctions but its tea is being traded at commodity fairs in Guangzhou, also known under the name Canton (p3, ibid).

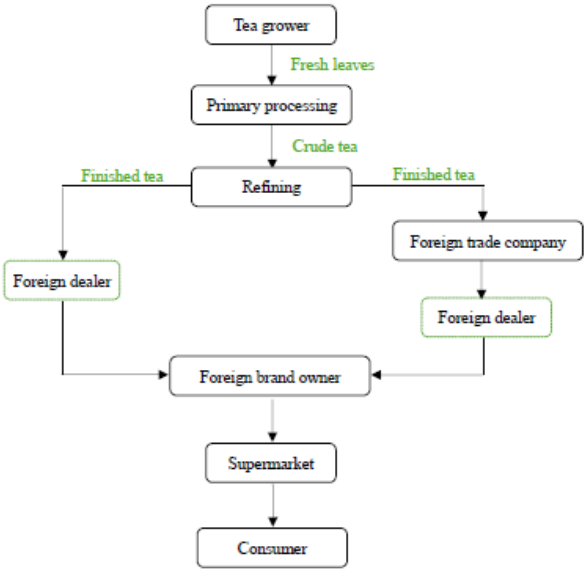

Figure 4.3 : Supply Chain of the Export Market (Social Resources Institute in Chen, 2009).

Value Adding

When considering the tea market, there are two important factors to determine how farmers could add value to tea. Afterwards, in the conclusion, the theory of upgrading of a product by Vellema & van Wijk (2014) can be applied to it.

First, it is important to know that tea leaves can be plucked in throughout the year, but that spring's harvest accounts for half of the total output. It is due to leaves growing very quickly in that season. Especially April is known as a special plucking month, tea plucked during this month is of a higher quality, and therefore, sold at higher prices at the national market. A second important matter is the value of speciality teas. Revenues in the tea industry depend largely on whether tea growers produce famous speciality teas, such as Zhejiang province's Dragon Well or Anji Ba tea or Pu'er tea of the southern province Yunnan. Special value is attributed to these teas as they have been produced for centuries in their regions. It can be compared to the speciality coffee market or the geographical superiority ascribed to wines from certain regions, for instance, France. In Europe, a consumer market for speciality tea is less known, but its popularity is slowly increasing (CBI, 2016). In general, speciality tea producers do not only earn more, but they also use better techniques. Moreover, farmers producing in these areas can also engage in tea-related tourist activities, such as organising visiting tours the tea estates (Chen, 2009).

Concluding, with the majority of the tea farmers producing on small estates for the domestic market rather than for the export market, average income level and value adding capacity remains low.

4.2 Overview of the interviews regarding environmental issues

Interviews were conducted with stakeholders in the tea industry. Questions were asked regarding what they perceive as environmental issues, which of them are considered the most important, and about differences between factories and individual farms. Issues concerning the tea sector, in general, have been used in the interviews, based on the IDH sector overview of Groosman (2011), as following: deforestation/loss of biodiversity, soil erosion/low soil fertility, agrochemical use and pollution/energy inefficiency.

The questions that were used for the interviews can be found at appendix 1: Interview Questions. Not all respondents could contribute equally to the questions that focused on the environmental issues. This is due to several reasons such as the relevant background and the personal vision of the problems. Some respondents did for instance not agree with the assumption that the influence of tea production on the environment is an issue, as is assumed for the report. To avoid creating a bias in the usage of the interviews all visions will be displayed. Moreover, it is interesting to see that perceptions on environmental sustainability differ between the respondents. An overview of all (nine) respondents' main ideas or visions regarding the theme can be found in the box on the next page.

Main Outcomes Interviews on Environmental Issues

- **Respondent 1**'s knowledge on environmental sustainability is limited: issues are not present at the agricultural cooperatives this person works with (South of China). Other agricultural activities affect the tea plantations rather than the other way around. It is self-evidently that a plantation will always have to replace forest. However, the tea farmers try to apply biodiversity measures by planting different types of trees which can complement each other.
- **Respondent 2** mentions two main important environmental aspects. First, pesticides and fertilisers are used at the same time so can count both as the most prominent environmental issue. Second, in many cases farmers must spray pesticides to make profit, because the ecosystem is adapted to the usage of it. They either have to continue that way they are doing it currently or invest in a new system which may cause a financial loss
- **Respondent 3** mentions that there are multiple major problems such as fertiliser use, which directly leads to soil erosion. In addition, also nitrate is an important pollutant, because it influences biodiversity. Water pollution also should not be ignored, as water shortages could become a reality fast because of the decreasing water table. Lastly, Maximum Residue Levels (MRL) can possibly be caused by the air pollution rather than pesticides and by industrial pollution.
- **Respondent 4** highlights agrochemical use and use of fertilisers as most important environmental issues, as well as the loss of biodiversity. These are, at a later stage, followed by: low soil fertility and soil erosion. The least important issue mentioned is the air pollution. Deforestation is not recognised as a problem.
- **Respondent 5** considers agrochemicals and deforestation as the most crucial environmental issues. Most tea is sold domestically, whereas some years ago, more tea was exported. The export reduction is caused by the use of fertiliser.
- **Respondent 6** highlights that there are more ancient tea plantations, because of which deforestation is not an important issue. Pesticide use is the most important one.
- **Respondent 7** emphasises, that labour is the main problem, instead of environmental issues. Work in China's tea chain is different from the same work in other countries. There are too many market players. Zhejiang officers do not go to the estates very often. An important problem for the factories is their waste management and for tea plantations their agrochemical use, we well as fertilisers. Labour costs are high, so to compensate for that, more agrochemicals are used**.** The less favourable weather conditions in China were mentioned as a factor.
- **Respondent 8** highlights that the most important issue is the use of chemical fertilisers, especially with the limited size of most tea gardens, the effect can be even bigger. Deforestation and degrading quality of water and soil are also points of concern. The latter two are less bad in Zhejiang than in other provinces. Factories cause air quality problems
- **Respondent 9** mentions that there are several environmental problems that can bring side effects to tea growth, such as: soil (heavy metal residue), pesticide residue, clean water and air, raw material, machine-plucking and the processing technique used. Tea has been produced for so long that it does bring more benefit than harm to the environment.

Figure 4.4 - Main interview outcomes environmental issues

With the main perceptions on environmental sustainability by the different respondents shown, it becomes clear that visions differ extensively. In line with the literature, most respondents consider agrochemicals as being the most important issue. All other issues are recognised by at least one of the respondents, but it is hard to distillate an order of importance.

4.3 Environmental issues for small-scale farmers

This section will discuss the environmental issues related to tea production. As with the interview questions, the main themes from environmental sustainability issues of the tea sector, in general, are taken as a starting point and have been considered again after the input from the interviews. In some cases, follow-up literature has been added. The issues recognised by the IDH sector overview (deforestation/loss of biodiversity, soil erosion/low soil fertility, agrochemical use and pollution/energy inefficiency) will become categories with sub-topics (Groosman, 2011). They got the following titles: agrochemicals use; natural environment; soil quality and pollution. An overview of them can be found in table 4.5, below. The table shows that based on the interviews environmental issue 2 and 4 have been narrowed down further by, for instance, the specific types of pollution. Please note that the issues are often interrelated. For example, a high amount of nitrate can influence both the soil quality and the biodiversity when it reaches the soil. The right two columns reflect the difference between the individual or estate farmers and the tea factory's pollution. All issues present for small-scale farmers are also present (often even on a larger scale) at the tea-estates which are often part of a factory. The largest part of this paragraph will deal with the issues at the plantation level, as 80% of the tea farmers in China are small-scale farmers. The next paragraph, 4.4 will deal with the issues at factories.

Table 4.5: Overview of environmental Sustainability Issues

Environmental Issues		**Small Scale Farmers**	**Factory Level**
1. Use of Agrochemicals	*Pesticides & fertilisers*	X	X
2. Natural Environment	*Deforestation*	-	X
	Loss of biodiversity	X	-
	Affection of the Ecosystem	X	-
3. Soil Quality	*Soil erosion*	X	-
	Soil fertility	X	-
4. Pollution	*Water pollution*	X	X
	Air pollution	-	X
	Soil Pollution	X	-

4.3.1 Use of Agrochemicals

The first of the four main environmental issues is agrochemical use.

Tea is grown as a monoculture, which leads to the emergence of a number of pests. These pests are often treated with large amounts of pesticides (Groosman, 2011). Agricultural chemicals, often referred to as agrochemicals, are chemicals used all over the world to protect both the livestock and the crops (ILO, 2015). Pesticides are a group of agrochemicals, intended to either destroy or control all kinds of pests. Pesticides are often called after their use such as 'insecticides' or 'herbicides'. Fertilisers to the contrary, are plant nutrients and trace elements applied to the soil in order to get better yields when the crops are treated with pesticides. Substances used can be powders, granules, liquids or gases of which many are poisonous (ILO, 2015). An incentive to use pesticides and fertilisers is that both can help to increase yields and, as a result, can lead to a better income for the farmers. Tea farmers are not always sufficiently aware of the risks that agrochemicals pose, as they can be harmful to the environment as well as to them and their co-workers (Ethical Tea Partnership, 2015). Some agrochemicals can even cause irritation to the skin (ILO, 2015).

Figure 4.6 Pesticide spraying on tea field (Green Tea Guide, 2016)

Agrochemicals

Some respondents indicated that it is hard to mention one single 'most important' issue, as the issues are interrelated. Nevertheless, many respondents did indicate the severe impact of agrochemicals. Seven out of nine of the consulted respondents indicated that they consider agrochemicals as an important issue. Five considered it as the most important environmental issue. Now some specific effects of the use of agrochemicals will be discussed. Firstly, some respondents acknowledged that the issues are not always recognised as problems by farmers. Respondent 8 describes it as follows "*Nowadays there are high standards set by companies on the use of chemical fertilisers, however, those are not always understood by farmers"*. Additionally, the respondent called this a "knowledge gap" among the farmers (interview respondent 8, 2015). Secondly, two respondents mention the reduced exports because of agrochemical usage resulting in too high Maximum Residue Levels (MRL's). Respondent 5 said "*most tea is sold domestically. Some years ago, much more tea was exported. This reduction is caused by the use of fertiliser"* (interview respondent 5, 2015). Respondent 3, however, adds to it that some specific MRL's are not even pesticide-related, but could be caused by pollution from the environment (interview respondent 3, 2016). This statement also reflects the interrelatedness of issues. Thirdly, the agrochemicals also cause two of the other issues.

- Respondent 2 explained that the spraying has a severe effect and can even change the ecosystem (also see section 4.3.2 natural environment).
- Respondent 3 stated that the use of fertilisers can cause soil erosion (also see 4.3.3 soil quality)

Lastly, some respondents were asked whether there are differences for the environmental impact between pesticides and fertilisers. As with, 'the most important' issue, the respondents also consider

it hard to indicate whether fertilisers or pesticides have more influence. As a matter of fact, both can result in high Maximum Residue Levels, MRL's (interview respondent 3, 2016).

In conclusion, it can be stated that according to the respondents, agrochemical use is the most prominent environmental issue. It causes the most severe problems for the environmental sustainability of the production, as it affects or contributes to almost all other environmental issues such as the eco-system and can cause soil erosion.

4.3.2 Natural Environment

The IDH sector overview identifies 'deforestation and loss of biodiversity due to habitat conversion' as one of its four main issues in the global tea chain (2011). In many tea producing countries, areas of forests have to be cut down, before they can be replaced with tea plantations. The IDH report emphasises, that this takes place by large land clearances in areas which often used to have a rich biodiversity. Additionally, it is mentioned that these clearances can alter the flow of water and that it could be a cause of soil erosion.

Deforestation

The sector overview ascribes a large importance to deforestation. However, when this issue was presented to the respondents, they came up with different visions. The majority of the respondents stated that deforestation has not been a very important issue in the recent years. This could be explained by the fact that China has a lot of "historic tea plantations": plantations already exist for thousands of years (interview respondent 6, 2015). Respondent 3 stated that deforestation is "not that much of an issue" because very few new tea gardens are being created (interview respondent 3, 2016). Additionally, also in the literature, an argument can be found for the limited impact of deforestation in China. Most tea plantations are relatively small, as they are family businesses with two to three labourers (p.24 Chen, 2009), this limits the impact of deforestation also in the cases where new plantations are created.

Loss of Biodiversity

In the sector overview, loss of biodiversity is described as occurring, as a direct effect of deforestation. For the interview, biodiversity was understood in a relatively broad way. During the interviews, respondents were asked whether or not, and to what extent tea production could have an impact on the biodiversity. One important example was illustrated, as well as two particular dimensions to the problem. Firstly, one of the causes of decreasing biodiversity is the use of agrochemicals, as it can even change the biodiversity –animal species-. This matter got a separate section, see the next paragraph on ' the impact on the ecosystem'. Secondly, the two dimensions will be explained in this paragraph. The first dimension, to loss of biodiversity, came the fore in the interview with respondent 3: "*Loss of biodiversity in the past can cause new loss of biodiversity. This effect is larger than the effect of direct human changes to the environment*" (interview respondent 3, 2016). This is an interesting statement as it reflects on the notion that China has faced enormous changes on the environment, also in other industries.

The second dimension is that biodiversity can also be influenced by levels of nitrate being too high, which was only mentioned by one respondent. According to the respondent, it has a direct influence on the reduction of biodiversity, even more directly than agrochemical use (interview respondent 3, 2016). It was not further specified which type of or cause of high nitrate levels the respondent was referring to. However, as the respondent indicated that the influence was larger than agrochemical use, fertilisers were not the nitrate source that was referred to. Possibly, too high overall nitrate levels in the environment were mentioned, which could be due to fertiliser use in other industries.

Impact on the ecosystem

In the example given by one of the respondents, biodiversity had changed so much that the food chain was affected, which in turn can change the entire local ecosystem. Together, the spraying of pesticides and the use of fertiliser have impacted the ecosystem in the following example (interview respondent 2, 2015). The city Suzhou, known for its green teas, lies just outside Zhejiang province. On the tea farms of the city, the farmers used to have worms in their fields, which were seen as a real plague, as they used to eat the tea leaves. In order to get rid of the worms, they sprayed agrochemicals expel the worms. On the one hand, this seems to be a good solution as the yields were rising. However, it also resulted in the fact that birds, the natural predators, do no longer visit the plantations as they remember that no worms are to be found. In order to change to an environmentally friendly system again, in which just the birds are eating the worms (potentially accomplished by a more biological exterminator) investment is needed. It will take some time for the birds to find out again that the worms can be found, which could result in larger yield losses at the start: money losses, the often poor farmers cannot afford (interview respondent 2, 2015).

Concluding, the given answers indicate that the importance of deforestation in the tea sector in China differs largely from the importance of the sector as a whole and many other producing countries. Based on the interviews, and the (limited) information on China in the sector overview, deforestation in the tea sector is generally seen as limited. Loss of biodiversity is especially important when the ecosystem is changing, and can also be caused by loss of biodiversity from the past and the use of nitrate. The natural environment in the tea sector has, therefore, many aspects and problems. The problem for this particular category is recognised by the interviewees.

4.3.3 Soil Quality

This section considers the environmental issues regarding the soil quality of tea plantation areas. In order to do this, soil quality has been further narrowed down by dividing it into soil erosion and soil fertility/quality. The IDH sector overview considers soil erosion especially and ascribes it to the loss of the land for the tea plantations. The erosion, in turn, can lead to the loss of wetland habitats and it can cause pollution (Groosman, 2011). A more elaborate description has been given by Chen's report (2009): for the creation of new plantations other vegetation is often burned. During the time of planting and growing of the tea bushes, the soil is exposed to all external influences and misses the original layer to protect it from those influences. This can degrade the quality of the soil (p.34 Chen, 2009). In order to discuss the issue of decreasing soil quality, questions were asked about the topic to the respondents and their answers are elaborated upon below.

Firstly, respondent 3 mentioned that "*soil erosion is a problem but not as large as in other countries. And not the largest problem*" (interview respondent 3, 2016). This statement indicates the relevance of the problem for China. Other respondents did not consider the quality of the soil in the Chinese tea sector as a largely important issue**.** Secondly, as mentioned in the section about agrochemicals, the use of agrochemicals can also influence the quality of the soil (interview respondent 3, 2016). The issue has not been further specified. Thirdly, heavy metal residue was mentioned. This matter was not found in the literature prior to the interview conducting process but came to the fore in the interview with respondent 9 (2015). The respondent mentioned that heavy metal residue can influence the growth of tea. This was an interview conducted with a spokesperson, and due to the limited time and translation problems, it was not possible to follow-up on the question. Therefore, it did not come clear which kind of heavy metal residue was exactly mentioned. When searching on the term afterwards, it could be found that metal residue in tea can harm the tea quality. For instance, Unilever had to recall batches from its Lipton tea brand in 2011 because of too high levels of metal residue (Chinadaily, 2011). Lastly, respondent 3 had some information about Zhejiang province specifically. The respondent stated that "despite the fact that Zhejiang's tea production areas are very hilly, the impact is considered to be limited" (interview respondent 3, 2016). This

statement confirms that both for China as a whole as for Zhejiang/South East China degrading soil quality is not the most important issue.

In conclusion, degrading soil quality is an environmental issue because it threatens predominantly the growth of tea, via heavy metal residue or agrochemical use in the soil. However, it is not seen as the most important issue. To an even lesser extent also soil erosion is an issue, as it only occurs in the few cases where new plantations are created. It could be stated that degradation of soil quality is an issue for the tea industry, however, the effect on the end-product is a bigger area of concern.

4.3.4 Pollution

Pollution is explained by the IDH sector overview mainly as a consequence of soil erosion (Groosman, 2011). For this report pollution is understood in a broad way, it refers to all kinds of pollution that may take place during or as a consequence of tea farming. Problems with agrochemicals can lead to pollution of the environment, especially in combination with an inadequate management of their waste (interview respondent 3, 2016). However, also specific types of pollution can be identified that are created by tea farming. When asking the respondents, the general question of what kind of pollution tea farming may bring, three types of pollution were mentioned: air, soil and water pollution. However, it became clear that air pollution is only an issue for factories and consequently will be explained in the next section 4.4, which discusses environmental issues in factories. Inadequate waste management as a cause of pollution holds for farms as well as factories and will be discussed in this paragraph and in section 4.4 as well (interview respondent 7, 2015). Some aspects, the relevance and causes of the specific cases of soil and water pollution will be discussed now.

Soil and water pollution

Firstly, pollution in the soil and water largely influence crops, therefore, it should be considered an environmental issue. Respondent 3 indicated that non-agricultural related industries can cause pollution of tea as well. A specific example of industrial pollution was given as it sometimes lasts for a long time in the soil and soil water (interview respondent 3, 2016). This pollution is thus not caused by tea farming but does influence the sector and its products. The pollution of soil and water may also contribute to high MRL levels. The levels are often caused by the use of agrochemicals, but as respondent 3 indicated in the interview, it can also be caused by the environmental pollution (interview respondent 3, 2016). Water, as well as soil pollution, were also identified by respondent 8 as a point of concern. The respondent indicated “it is getting worse”. Secondly, respondent 3 mentioned that waste management can be seen as a cause for pollution. This happens when the equipment used for spraying is being thrown away in a negligent way (interview respondent 3, 2016). A final related issue concerning pollution was mentioned by respondent 3: water shortages are becoming an increasingly prominent issue. The shortages are caused by decreasing water tables (interview respondent 3, 2016). These could, in turn, worsen the water pollution problem, as the pollution is absorbed by a reduced amount of water.

In conclusion, it could be stated that pollution has deserved little attention in the tea sector overview, not all respondents recognised pollution as a big problem. However, the respondents that did mention it, describe the problem as quite severe. Therefore, the issue deserves a place in the list of environmental issues in the tea sector.

4.4 Environmental Issues at Factories.

The main environmental issues, caused by factories, differ slightly from the ones caused by small-scale and estate tea farmers. The environmental issues mentioned in the report of Chen (2009) have been taken as a point of departure. The report mentions five issues: air pollution, waste water,

damaged vegetation, noise and dust pollution and soil pollution due to the pesticide use (p.43 Chen, 2009). From these five issues, two are not included as they differ from the focus of this report. Firstly, noise/dust pollution has not been included, as noise pollution is not an environmental issue and dust pollution rather is an issue of food safety and only within China (dust produced during the tea-production is often collected from the factory floor and used for free tea services in China) (ibid). Secondly, also the agrochemical use is not included as an issue for factories, as this report distinguishes work on estate/small scale farmers on the one hand and the work within the factories on the other. Air pollution, waste water and vegetation damage are the issues that remain to be discussed. The latter two were identified by the respondents as well. Afterwards, specific examples concerning the situation in Zhejiang province will be mentioned.

The first issue is air pollution. Most processing factories use coal as their means of energy provision. This generates pollutants like CO2 and SO2 in the air, as well as large quantities of ash. Sometimes factories do not protect their (final) tea product from contamination with the ash, which leads to health risks. Problems with air pollution of factories are recognised by one of the respondents (respondent 8). The respondent mentions air pollution as an environmental issue "Tea factories predominantly influence air quality" (interview respondent 8, 2015). Interesting to note is that the air pollution created by the factories, in turn, may also influence the quality of the tea, as air pollution, in general, can lead to high MRL's (see section 4.3.1 agrochemicals). To sum up, air pollution provides poses risk to both safety and the environment.

The second issue is wastewater or water pollution. According to Chen (p.2009) factories' waste water should be treated before it will be discharged to avoid contamination, However, this does not always take place. In Chen's report, nothing has been mentioned explicitly about effects on humans, nevertheless, as tea plantations are often located next to the factories one can imagine that the contaminants from the wastewater end up in tea. The matter is also recognised by one respondent: respondent 7 mentions inadequate wastewater treatment as an environmental issue for factories (interview respondent 7, 2015). Next to this also respondent 8 indicates that the output of factories may affect the water quality (interview respondent 8, 2015). In summary, based on the literature and the interview results, it is assumed that waste water also poses threat to food safety and the environment.

The third issue is vegetation damage or deforestation. This occurs when factories use wood as fuel. Large amounts of forest have to be cut to provide the factories with sufficient energy. Damage to the forests, in turn, can lead to soil erosion, landslide and mud-rock slides. In contrast with tea farming, which barely affects the forests, the processing of tea in factories does.

When considering Zhejiang province, in particular, it should be taken into consideration that there are many tea processing factories in Zhejiang. Developed provinces, like Zhejiang, have better technology and knowledge in order to have a more efficient production, however, they also often cause more pollution. Sometimes, (larger) plantations are located directly next to a tea processing factory (interview respondent 8, 2015).

In conclusion, it could be said that issues generated by factories differ from the issues present at the farm level. An example of that is deforestation, which is hardly an issue for tea farming but is at stake in the processing industry. A comparison, however, can be found in that just as with some farm-level issues, also the first two factory-caused issues air pollution and water pollution may influence the food safety of the end product.

4.5 Conclusion

The chapter identified various environmental issues, both at farm and factory level, that are present in the Chinese tea supply chain. With this, insight has been given in which issues are recognised so that an answer could be formulated to the sub-question which corresponds with this chapter, being:

which environmental issues are present in the Chinese tea supply chain?

Almost all of the environmental issues and their sub-issues based on the IDH sector overview (Groosman, 2011) are present in China and were recognised by the respondents. These are: first, the use of agrochemicals. Second, the affection of the natural environment, consisting of deforestation, loss of biodiversity and affection of the eco-system. Third, degrading soil quality, consisting of soil erosion and soil fertility. Fourth, pollution: consisting of water pollution air pollution and soil pollution. Only deforestation and air pollution are not recognised at farmer-level, but they are at factory-level. Water pollution is the only issue which is mentioned as taking place both during tea farming as during tea processing in the factories, although in different ways.

For Zhejiang province, in particular, an interesting paradox can be found in the fact that despite the maturity of the sector and the relatively cleaner techniques, the industry is still more polluting compared to other provinces. However, the speciality tea small scale tea farmers have a relatively 'clean' production compared to the 'average' farmers (interview respondent 8, 2015).

5. Tea Certification Schemes

Certification may be a step in the right direction for tea producers to deal with environmental issues. This chapter will answer the sub-question of this chapter: *do the standards' requirements of the certification schemes, that are active on the Chinese market, address the environmental issues?* In order to answer this question, this chapter has been divided into four parts. First, the environmental certification schemes and their standards will be presented: UTZ, Fairtrade, Rainforest Alliance and IFOAM. As the latter scheme is especially big in China, the paragraph will also discuss organic certification in China. Second, the requirements of the different schemes will be presented, for the environmental issues in tea farming: agrochemicals, natural environment, soil quality and pollution. As a fifth component to the environmental issues also food safety standards will be explained, as it is a component of the most prominent environmental issue: agrochemical use. Third, the requirements will be analysed. Fourth the stringency and scope of the certification schemes will be compared.

Figure 5.1 *Tea fields in Zhejiang (Jasetea, 2015)*

5.1 Environmental Certification Schemes

The online platform Standardsmap gives a comprehensive overview of all environmental voluntary sustainability standards. The website is an initiative of the International Trade Centre and aims to provide transparent information on these standards, as well as options to compare them to each other (Standardsmap, 2016). Different factors like products, producing countries, destination markets and specific sustainability focuses can be selected as search terms at the platform. There is no possibility at the website to select particular provinces, because of which no specific focus could be placed on Zhejiang province. For the analysis in this report, the following criteria were selected at the platform: tea as a product, China as the producing country and Europe as destination market This resulted in 28 voluntary sustainability standards, which can be found in Annex 1.

5.1.1 Certification Initiatives.

There are five major organisations active in Zhejiang province: Fairtrade, Rainforest Alliance, UTZ, IFOAM (Potts et all 2014, Groosman, 2011; van der Wal, 2008) and Global GAP. However, the latter is only active at the domestic market and will, therefore, be disregarded in this report. Moreover, there are two other organisations that work in China and help the certification to become certified: ISEAL which is a membership umbrella organisation. This means that its members have to adhere to ISEALs environmental principles next to their own. The other main important organisation is Ethical Tea Partnership, ETP. Apart from the certification schemes and organisations, even more certification organisations are active in the region, however, they are not, or to a lesser extent focussing on Zhejiang province, or only at an even smaller scale than the others. For the full list, see Appendix 2.

Fair Trade

As the name indicates, Fair Trade mainly focuses on labour circumstances, but also on environmental and other issues. Fairtrade itself is a standard setting organisation, the independent certification is being carried out by the organisation Flocert (Fairtrade, 2011). At the website of Fairtrade, there is no direct referring to tea produced in China or Zhejiang province in particular. However, according to Ratetea.com (2015), there are two tea's produced and certified by the fair trade brand in China: Anji Ba green tea and gunpowder tea which is a green tea as well. The first is produced for the Jing Tea brand, a UK based company. There is also a second tea brand, called Shanti tea, however, this one is based in Canada and it is unknown whether its exports to Europe too.

Figure 5.2: Logo Fairtrade (Fairtrade,

Rainforest Alliance

Rainforest Alliance is an NGO and certification organisation. It focuses on the conservation of biodiversity and ensuring of sustainable livelihoods by transforming of land-use practices, business practice, and consumer behaviour (Rainforest Alliance, 2016). The organisation certifies against an external standard: the one of the Sustainable Agriculture Network (SAN). Rainforest Alliance is active in Zhejiang province with two companies: Zhejiang Shanshan tea co.ltd and Hangzhou Qingxin tea co.

Figure 5.3 Logo Rainforest Alliance (Rainforest Alliance. 2015)

UTZ

UTZ, called UTZ Kappe until 2008, and UTZ certified until 2014, is by now is called ´just´ UTZ. Like the previous certification organisations, UTZ is active in Zhejiang province. In 2014, Zhejiang Caiyunjian Tea was the first to work with UTZ certified tea in China (UTZ, 2015). UTZ products, mainly consisting of coffee tea and cocoa, are produced under the UTZ standard. This standard is focused on principles of fairness and transparency. UTZ states that these two can contribute best to realise a difference in the support of people, planet and profit.

Figure 5.4 Logo UTZ (UTZcertified, 2015)

IFOAM

Figure 5.5 Logo IFOAM (PRweb. 2006)

The fourth standard to be compared is the standard of organic agriculture. 'Organic' is identified by various consulted tea sustainability reports as one of the main standards. However, he use of the term organic has become pluralised. There are many different certification initiatives that use the term (Derkx & Glasbergen, 2014). The main private sector organisation is IFOAM. This is an international umbrella organisation regarding organic production. However, it also has its own sustainability standard, and other certification initiatives can use it as well. For the comparison in this report, the IFOAM standard has been used as representative for 'organic'.

Global GAP and China GAP

Global GAP is an abbreviation for Good Agricultural Practices. Global Gap present itself both as a certification scheme as well as a facilitator to help getting certified to other certification bodies. As a certification scheme, the organisation works with a member structure: members are eligible to

Figure 5.6 Logo Global Gap (GlobalGAP, 2016)

use the Global GAP logo and to present their interest they may have as a producer in Global GAP's governance structure. As a facilitator, its role supportive. It has independent 'farm assurers', which are consultants trained and approved by the organisation itself. It provides expertise to help produce the desired good agricultural practices of farmers (GlobalGAP, 2015). China GAP is a government initiated project under the national authority certification and accreditation administration of the people's republic of China (CNCA). It lines out voluntary standards in order to realise certification for agricultural production. The standards focus on improving food safety, environmental protection, workers health and safety as well as animal welfare. The organisation tries to reach this especially by focussing on reducing the use of chemicals. The standard covers the whole of the agricultural production process, which includes crops, livestock and aquaculture. Since 2009, ChinaGAP's standard has been benchmarked against Global GAP (Standardsmap, 2015)

Figure 5.7 Logo China GAP (Standardsmap, 2015)

5.1.2 Other Organisations

ISEAL

The International Social and Environmental Accreditation and Labelling Alliance, or ISEAL is an umbrella organisation for sustainability standards. The organisation was founded in 2002 with the aim of coming to a shared understanding of the best ways to realise sustainability standards. It not a certification or an accreditation organisation itself and therefore does not provide any commercial standard nor does it arrange audits. ISEAL has four key focus areas: to improve the impact of standards, define the credibility aspect of standards, increase the use of standards and to improve the effectiveness of them. The organisation is important because its people work in China, and almost all selected certifiers have complied with ISEALs criteria as well. ISEAL is a non-governmental and not for profit organisation. Its mission is to strengthen sustainability standards systems, it works with a member structure. The members will have to meet codes of good practice with the associated requirements. There are three categories of members: full members, associate members and subscribers. The full members can officially use their ISEAL membership as credibility assurance(UTZ, Rainforest Alliance, Fairtrade International are full members, Global GAP is an associate member, IFOAM is a subscriber; China GAP is not a member).

Figure 5.8 Logo ISEAL Alliance(ISEAL Alliance, 2015)

Ethical Tea Partnership.

The Ethical Tea Partnership (ETP), is not a certification scheme itself**.** However, the organisation does have its own standard with corresponding requirements, not as a goal, but only as a means. This way they help members to become certified by other international standard setters, mainly: Rainforest Alliance, UTZ and Fairtrade, which all work in Zhejiang. Ethical Tea Partnership, called: Tea Sourcing Company until 2004 was founded by a number of large tea companies that decided to work together in order to monitor and assure their supply chains. This is what ETP still does today, moreover, the organisation focuses on protecting the environment as well as labour, social issues and climate change. The cooperation helps producers to become certified by voluntary standards and therefore reach the final goal of greater sustainability in the tea supply chain (Ethicalteapartnership, 2016).

Figure 5.9 Logo Ethical Tea Partnership (Tetley, 2015)

5.1.3 Organic in China

In China production of certified tea exists on a considerable scale, however, this is a small percentage of the total tea production (Blackmore et all, 2012). Most of the organic products are therefore exported, mainly to the EU, Japan and US (Egelyng et all, 2010). However, the IISD report states that China's organic production is only a small share of the total certified tea market, and from the country's production only a fraction is being exported (Potts et all, 2014) There are some examples however the experience of other producers groups and the impacts of certification are limited and there would be scope for a substantial research project investigation in this. In some areas tea farmers are organised to participate in certification schemes, a prerequisite is that local government's support should be there as well as favourable conditions. Sometimes it turned out quite successful for businesses. Benefits for farmers are however limited. The production of organic tea is organised in three main ways. The first is used when companies are owning their own land, operate to organic principles and hire labourers for organic production. The second is when companies rent land from farmers for lengthy periods. Rent out the operation of the land to farmers under organic principles or under control of the companies, all production belongs to the company. The third is organic tea farmer associations or individual small-scale farmers contract with foreign trade companies. Most organic tea is traded by one of the first two models, only 10-20% by the third model. By using one of these two ways it is easier for tea companies to control the quality. Market share can be assured by investing in wage-labour systems and investing in new materials. Strong farmer cooperatives are needed because they can deliver quality negotiate with buyers and other actors. The disadvantage of the lack of awareness of agroecological principles is that certification may not contribute to long-term sustainability. Also, cases of fraud have been reported. This may hamper consumer trust. Differs whether farmers are driven by profit only (Blackmore et all, 2012).

There are two important remarks to make to the developments around organic production in China. The first is that at China's domestic market there is the product standard known as 'Green Food'. This product standard consists of two levels: A, and AA. However, even the highest AA is not recognised internationally and can therefore not be used for export. It could be interesting to think about linking Chinese organic standards to international ones as a first step to let Chinese producers produce internationally sold environmentally sustainable tea. Secondly, in China's marginal areas farmers who do not own much money engage in practices that are actually organic but not certified as being such. These farmers own small plots and are hard to reach. They are poorly educated because of which it would be hard to meet quality safety and packaging requirements that are needed for standards from which the demand comes **(**Egelyng et all, 2010).

Green Food

Green Food is a domestic market product standard. It is initiated by China's ministry of Agriculture. The aim of the organisation is to enhance food quality and safety, to protect the environment of bio-agriculture. China Green Food Development Centre is a specialised department responsible for promoting the products produced under the label. It has various production environment- and quality monitoring stations. Since 1996 the logo was registered as a certification mark, later on, the trademark was also registered in foreign countries, of which France in Europe. The standard aligns itself with China's National Food Safety Standard. It consists of environmental standards, user guidelines, product quality standard packing and storage standard. Third party audits are required. They are held annually and by surprise (Standardsmap, 2015). Green Food is also registered in France but the website does not mention whether Green Food certified tea is being exported to Europe.

5.2 Requirements of the Environmental Standards

The requirements of environmental certification schemes' standards for tea certification will be discussed in this paragraph. For this part, the requirements of the four big standards are used. The first is the one of Sustainable Agricultural Standard, which is the standard Rainforest Alliance uses (Sustainable Agricultural Standard, 2010). The second is Fairtrade's standard, which actually has multiple standards. From these standards, the one for small-scale producer organisations is the most applicable because the standard has most chapters focused on the environment (Fairtrade, 2011). The third is UTZ, it uses a code of conduct: 'the Core code of conduct for individual and multi-site certification' (UTZ Core Code of Conduct, 2015). The fourth is IFOAM´s standard for organic (IFOAM, 2016). In order to compare the standards, a look will be taken at which parts of the standards focus on environmental issues.

- ***SAN*** has the following principles that focus on environmental issues. Principle 1: social and environmental management, Principle 2: ecosystem conservation, principle 3: wildlife protection, principle 4: water conservation, principle 8: integrated crop management, principle 9: soil management and conservation principle 10: integrated waste management (Sustainable Agricultural Standard SAN, 2010).
- ***Fairtrade*** has many issues, mentioned at its small scale farmers standard. They can all be found under chapter 3.2: Environmental Development. The issues are: environmental management, pest management, integrated pest management, use of pesticides, choice of pesticides used, soil and water, soil erosion, handling fertilisers, soil fertility, sustainable water sources, sustainable water use, waste, genetically modified organisms, biodiversity, energy and greenhouse gas emissions (Fairtrade Standard for Small Scale Producer organisations, 2011)
- ***UTZ*** has block A farm management of its Code of Conduct that focuses on the environment and its block B: farming practices and block D: environment. UTZ is the only certifier that has a standard specifically aimed at tea: the code of conduct tea module. The second part of this document focuses on the different stages of production: harvesting, post-harvesting and processing (Code of Conduct Tea Module, 2015). Their overarching standard that also applies to tea, however, is more specific on environmental issues and is therefore used in the comparison.
- ***IFOAM*** also has its own standard, which will be analysed in this report: the organic standard for organic production and processing. Not to be confused with the common objectives and requirements (COROS) it has for third parties which want to certify as organic. From IFOAM's own standard the chapters: 2. organic ecosystems, 3. general requirements for crop production and 7 processing and handling are used, as they apply to the environmentally friendly production of tea (IFOAM, 2016).

It follows from the list above that all standard setters have principles of their standards which could be compared. A quick description of what each standard requires on each of the environmental issues can be found in table 5.10. The same division in four themes as in chapter 4 is used: agrochemicals & residues, natural environment, soil quality and pollution. The issues and their sub-issues can be found in column one and two of the table. The corresponding principles of the four standards can be found in column three, four, five and six. All standards have a policy available on most of the environmental themes. At first sight, they may seem quite alike, however, in the discussion below, it will become clear that there are underlying differences between the standards.

Table 5.10: Environmental Issues Mentioned per Standard

		SAN	Fairtrade	UTZ	IFOAM
1. Use of Agrochemicals	*Pesticide and fertiliser use*	X	X	X	X
2. Natural environment	*Deforestation*	X	-	X	X
	Loss of biodiversity	-	X	X	X
	Affection of the ecosystem	X	X	X	X
3. Soil Quality	*Soil erosion*	X	X	X	X
	Soil fertility	X	X	X	X
4. Pollution	*Water pollution*	X	X	X	X
	Air pollution	-	-	X	X/-
	Soil Pollution	X/-	-	X/-	-

5.2.1 Use of Agrochemicals

The first environmental issue is agrochemicals and residues. This issue includes that workers for instance work with sufficient protective clothing and that awareness should be raised. Fairtrade has many principles focusing on those matters, which could indirectly lead to better dealing with the environment as well. However, this comparison primarily focuses on the way the standard setters try to mitigate the effects of the issues directly on the environment.

SAN mentions under paragraph 8.4 that the following chemical or biological substances cannot be used on certified farms (Sustainable Agricultural Standard SAN, 2010).

- Biological or organic substances that are not legally registered in the country for commercial use
- Agrochemicals that are not officially registered in the country
- List of banned and severely restricted pesticides in the US (Environmental Protection Agency) and the EU
- Stockholm Convention on Persistent Organic Pollutants
- Annex II of the Rotterdam Convention on Prior Informed Consent
- All substances of the Pesticide Action Network Dirty Dozen substances
- The farm must have a plan for eliminating the use of World Health Organization Class IA and IB technical grade active ingredients of pesticides, and for reducing the use of World Health Organization Class II technical grade active ingredients of pesticides

In ***Fairtrade's*** standard, at least pesticides are mentioned, as part of the training that should be provided when producing under the Fairtrade standard. Other agrochemicals are not explicitly

mentioned, nor residues. The following principles deal with the matter of pesticides at Fairtrade's standard:

- ***Pesticides allowed:*** In 3.2.15 states that a list must be compiled of pesticides that are used on Fairtrade crops (the list should be regularly updated). It should be indicated when pesticides are named under Fairtrade's prohibited material list; 3.2.16 these materials must not be used and clearly marked as 'not used on Fairtrade crops'; 3.2.17 The materials may only be used when permission is asked for it; 3.2.18 It must be made clear explicitly that these materials are not be used
- ***Herbicides*** *3.2.19: should be* and replaced by other weed prevention and control strategies.
- ***Responsibility:*** Principle 3.2: one person must specifically be given the task to lead the operational steps required for the organisation to comply with section 3.2 Environmental Development. At 3.2.2 it is mentioned that training should include the following components:
    - The monitoring of pests and diseases
    - Alternative ways to control pests and diseases
    - Preventive measures against pests and diseases
    - Measures to avoid that pests and diseases build up resistance to pesticides
- ***Knowledge:*** Principle 3.2.3: the application of pesticides must be based upon knowledge of pests and diseases
- ***Application:*** 3.2.7 Pesticides and hazardous materials may not be applied within 10 meters from ongoing human activity; the same holds for spraying from the air: it may not be sprayed above or around places with human activity nor around water sources
- ***Storage*** 3.2.9 When you have storage for pesticides and other hazardous chemicals, it must be maintained in a way that minimises risks, see under. 3.2.10; the storage should not be reached by children; should be clearly labelled; 3.2.12 equipment to handle accidents with pesticides should be in place; 3.2.13: pesticides must not be reused; 3.2.14 all containers must be triple rinsed, puncture and stored and cleaned properly. 3.2.9 conditions for storage:
    - be locked and accessible only to trained and authorized personnel
    - be ventilated to avoid a concentration of toxic vapours
    - have equipment, such as absorbent materials, to handle accidents and spills
    - not contain food
    - contain hazardous materials clearly labelled and indicating contents, warnings, and intended uses, preferably in the original container when possible
    - contain information on proper handling (safety sheets)

UTZ mentions the following aspects:

- ***Integrated Pest Management,*** mentioned at I.B.4.*4* should be applied
    - Prevention by implementing good agricultural practices
    - Monitoring of pests and diseases (e.g. insect traps)
    - Application of tolerance levels
    - Use of non-chemical alternatives such as cultural and mechanical practices and/or use of biological control (e.g. natural enemies)
    - Use of natural pesticides (e.g neem extract)
    - Spot application of chemical pesticides which have the lowest possible toxicity for people, flora and fauna
    - Use of other chemical pesticides as last option

- Rotation strategies to avoid that pests become resistant to pesticides (e.g alternating the chemical family of a pesticide)
- Herbicides used are selective

- ***Banned Pesticides*****,** I.B.45 Pesticides listed on the Banned Pesticides List cannot be used at any stage of production, or stored for use on the certified crop. Pesticides listed on the Pesticides Watch List can only be used if: -all IPM measures have been applied, -less hazardous alternatives are not available, and - specific recommendations are followed to mitigate or reduce the risks related to the hazardous nature of the product; I.B. 46 Pesticides are used or stored for use on the certified crop only if officially registered and permitted for use on the crop in the country where the farm is located; I.B.47 An up-to-date and complete list of fertilisers and pesticides that can be used and stored is available; I.B. 48 All applications of inorganic fertilisers and pesticides are recorded.
- ***Application*** I.B.49: Only properly trained persons handle or apply hazardous pesticides; I.B.50: Pesticides and liquid fertilisers are prepared, mixed and applied according to the label and Material Safety Data Sheet instructions, considering the prescribed dosage, period or timing, and intervals of application; I.B 51 Surplus pesticide and liquid fertiliser application mix or tank washings are disposed of in a way that minimizes negative impacts to humans and the environment; I.B 52 Recommended re-entry times for all pesticides used are observed and respected; I.B.53 Recommended pre-harvest intervals for all pesticides used are observed and respected; I.B. 54 All equipment used to apply fertilisers and pesticides is maintained in good condition to ensure correct functioning.
- ***Storage***I.B.57 Pesticides and inorganic fertilisers are stored: - in accordance with the label instructions, - in their original container or packaging, - with indication of the crop they are used for, - in a way to avoid spillage (e.g. liquids are placed on lower shelves or stored separately), - securely in a location not accessible to children (e.g. locked), and - away from harvested product, tools, packing material, and food products; I.B.58 Facilities for handling, diluting and storing inorganic fertilisers and pesticides must be: - dry and clean, - well ventilated and sufficiently lit, - structurally secure, and - equipped with non-absorbent material. In addition, central storage and diluting facilities must have: - a sound roof and impermeable floors, - shelves with non-absorbent and fire-resistant material, - a system to retain spillage, - clear, permanent warning signs close to access doors, - visible safety warnings, explanation of pictograms, symptoms of intoxication, and first aid information for each product stored, - a visible emergency procedure, and - an eye-washing area; I.B. 59 Inorganic fertilisers and pesticides are transported safely to prevent spillage.
- ***Waste*** I.B.55 Empty pesticide containers are rinsed 3 times with water. Rinsing water is disposed of properly, or returned to the application equipment tank for later use in a spray mix, and containers are perforated; I.B. 56 Empty pesticide containers and obsolete pesticides are handled by a collection, return, and/or disposal system (organized by government or a supplier). They are stored, labelled, and handled adequately and securely until they are collected.

IFOAM discusses agrochemicals the following way:

Adversely from the other standard setters, IFOAM does recommend to do not allow agrochemicals at all. This is stated in its 'principle of health':

"Organic agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible. This principle points out that the health of individuals and communities cannot be separated from the health of ecosystems – healthy soils produce healthy crops that foster the health of animals and people. Health is the wholeness and integrity of living systems. It is not simply the absence of illness, but the maintenance of physical, mental, social and ecological well-being. Immunity, resilience and regeneration are key characteristics of health. The role of organic agriculture, whether in farming, processing, distribution or consumption is to sustain and enhance the health of ecosystems and organisms from the smallest in the soil to human beings. In particular, organic agriculture is intended to produce high quality nutritious food that contributes to preventive health care and well-being. In view of this it ***should avoid the use of fertilizers, pesticides, animal drugs and food additives that may have adverse health effect****s."*

Both fertiliser and pesticide use are mentioned at IFOAM's general principle about crop production

- 4.1 general principle ***Species an varieties cultivated in organic agriculture*** systems are selected for adaptability to the local soil and climatic conditions and tolerance to pests and diseases. All seeds and plant materials are organic.

Furthermore, chapter 4: crop production, also mentions two relevant aspects

Soil fertility & fertilization in chapter 4.4 which consists of:

- 4.4.1 ***Soil organic matter, microbial activity and general soil health and fertility*** shall be improved if low and maintained or improved if satisfactory. The operator shall prevent over-accumulation of heavy metals and other pollutants in the soils.
- 4.4.2 ***Material of microbial, plant or animal origin*** shall form the basis of the fertility program. Maintenance of fertility may not rely solely on off-farm inputs
- 4.4.3 ***Nutrients and fertility products*** shall be applied in a way that does not hard soil, water and biodiversity.
- 4.4.4 *Material applied* to the land or crop shall be in accordance with Appendix 2
- 4.4.5 ***Fertility amendments*** in Appendix 2 that are rapidly available to the plants are exceptionally allowed only as a necessary complement when other fertility building techniques have been applied and are insufficient.
- 4.4.6 ***Human excrement*** shall be handled in a way that reduces risk of pathogens and parasites and shall not be applied within six months of the harvest of annual crops for human consumption with edible portions in contact with the soil
- 4.4.7 ***Mineral fertilizer*** shall only be used in a program addressing long-term fertility needs together with other techniques such as organic matter additions, green manures, crop rotations and nitrogen fixations by plants. Their use shall be justified by appropriate soil and leaf analysis or diagnosed by an independent expert.
- 4.4.***8 Mineral fertilizers*** shall be applied in the form in which they are naturally composed and extracted and shall not be rendered more soluble by chemical treatment
- 4.4.9 ***Chilean nitrate and al synthetic fertilizers***, including urea, are prohibited
- 4.4.10 ***the production of terrestrial plants*** shall be soil-based. The production of such crops in hydroponic systems is prohibited. "soil-based" means that apart from the propagation of seedling stages, a plant must spend its life in the soil. For herbs, flowers

and ornamentals in pots that are sold directly to the final consumer, the CB can allow production on permitted growing media.

- 4.4.11 ***The removal of soil from*** the farm is prohibited. Incidental removal of soil when harvesting crops is permitted
- 4.4.12 ***for mushroom production***, substrates shall be made of products of organic agriculture, or other non-chemically treated natural products such as peat, wood, mineral products or soil.

Pest, disease & weed management, under principle 4.5, which consists of

- 4.5.1 ***the organic production system*** shall include biological, cultural and mechanical mechanisms to manage pests, weeds and diseases. These include:
  a. Choice of appropriate species and varieties
  b. Appropriate rotation programs, intercropping and companion planting;
  c. Mechanical cultivation;
  d. Protection of natural enemies of pests through provision of favourable habitat such as hedges, nesting sites and ecological buffer zones that maintain the original vegetation to house pest predators;
  e. Natural enemies including release of predators and parasites
  f. Mulching and mowing
  g. Grazing by animals
  h. Mechanical controls such as traps, barriers, light and sound
  i. On-farm preparations from local plants, animals and micro-organisms
- 4.5.2 when the measures in 4.5.1 are not sufficient, ***pests, disease and weed management substances*** permitted under Appendix 3 may be used.
- 4.5.3 ***substances*** that do not appear on Appendix 3 are prohibited for use in organic production
- 4.5.4 ***Physical methods for pest, disease and weed management*** are permitted, including the application of heat
- 4.5.6 ***thermal sterilization*** of soils is prohibited.
- Regional or other exception: exceptions may be granted to protected cropping structures in instances of severe disease or pest infestation that cannot be otherwise remedies through measures in 4.5.1; 4.5.2 and 4.5.4
- 4.5.6 any formulated input shall have only ***active ingredients*** listed in Appendix 3. All other ingredients shall not be carcinogens, teratogens, mutagens or neurotoxins.

5.2.2 Natural Environment

Before moving to the specific issues, all standard setters mention an environmental management system (SAN principle 1.2; Fairtrade principle 3.2). The other topics that came to the fore in the environmental issues section were: loss of biodiversity, change to the ecosystem and deforestation. In contrast to the previous section, here all issues will now discuss per topic e.g “ecosystem” for all standards together instead of per standard. The difference in ordering is due to the fact that in the previous section the issues were too elaborate to order it in the – preferred- way from now on. Please find all issues are being discussed below.

The first issue is ***biodiversity.***

SAN mentions ***biodiversity*** at its chapter, regarding ecosystem conversation.

- 2.4 The harvesting or other taking of threatened or endangered plant species is not permitted. ***Cutting, extracting or harvesting trees***, plants and other non-timber forest products is only allowed in instances when the farm implements ***a sustainable management plan*** that has been approved by the relevant authorities, and has all the permits required by law. If no applicable laws exist, the plan must have been developed by a competent professional.

Fairtrade mentions ***biodiversity*** in the sections below.

- 3.2.33: members must avoid negative impacts on protected areas and in areas with high conservation value within or outside the farm or production areas from the date of application for certification. The areas that are used or converted to production of the Fairtrade crop must comply with national legislation in relation to agricultural land use.
- 3.2.34 one must report on activities that you or your members carry out to protect and enhance biodiversity.
- 3.2.35 a ***buffer zones*** must be maintained around bodies of water and watershed recharge areas and between production areas and areas of high conservation value, either protected or not. Pesticides, other hazardous chemicals and fertilisers must not be applied in buffer zones.
- 3.2.36 ***Carrying out of wild harvesting*** of Fairtrade products from uncultivated areas must assure the sustainability and survivability of the collected species in its native habitat.

UTZ mentions ***biodiversity*** at:

- I.D.116: Threatened and endangered species in the production area are identified and protected.
- I.D. 117: The producer promotes ecological diversity by protecting and enhancing on-farm and/or neighbouring habitats and ecosystems.

IFOAM mentions ***biodiversity*** under

- 2.1.1 operators shall design and implement measures to ***maintain and improve landscape*** and enhance biodiversity quality, by maintaining on-farm wildlife refuge habitats or establishing them where non exist. Such habitats may include, but are not limited to
  a. extensive grassland such as moorlands, reed land or dry land;
  b. in general all areas which are not under rotation and are not heavily manured: extensive pastures, meadows, extensive grassland, extensive orchards, hedges, hedgerows, edges between agriculture and forest land, groups of trees, and/or bushes, and forest and woodland;
  c. ecologically rich fallow land or arable land;
  d. ecologically diversified (extensive) field margins;
  e. waterways, pools, springs, ditches, floodplains, wetlands, swamps and other water-rich areas which are not used for intensive agriculture or aquaculture production;
  f. areas with ruderal flora
  g. wildlife corridors that provide linkages and connectivity to native habitat

The second issue is (affection of) the ***ecosystem.***

SAN mentions ***ecosystems*** under the following two principles:

- 2.1 Critical Criterion. All existing ***natural ecosystems***, both aquatic and terrestrial, must be ***identified***, protected and restored through a conservation program. The program must include the restoration of natural ecosystems or the reforestation of areas within the farm that are unsuitable for agriculture.
- 2.2 Critical Criterion. From the date of application for certification onwards, the farm must ***not destroy any natural ecosystem*** (…)

- **Fairtrad**e rather describes ***ecosystem*** as a way to reach biodiversity and only mentions 'protected areas' under 3.2.33
- **UTZ** mentions it at 1.17: "The producer promotes ecological diversity by protecting and enhancing on-farm and/or neighbouring habitats and ecosystems".

The third issue that will be discussed is ***deforestation.***

SAN mentions **deforestation** under the following principles

- 2.4 The harvesting or other taking of threatened or endangered plant species is not permitted. ***Cutting, extracting or harvesting trees***, plants and other non-timber forest products is only allowed in instances when the farm implements ***a sustainable management plan*** that has been approved by the relevant authorities, and has all the permits required by law. If no applicable laws exist, the plan must have been developed by a competent professional.

- principle 9.5: New production areas must only be located on land with the climatic, soil and topographic conditions suitable for intensity level of the agricultural production planned. The establishment of new production areas must be based on land use capacity studies that demonstrate long-term production capacity. The cutting of natural forest cover or burning to prepare new production areas is not permitted;

Fairtrade does not explicitly mention ***deforestation***

UTZ mentions ***deforestation*** at

- I.D.113 ***No deforestation or degradation*** of primary forest occurs or has occurred since 2008.
- I.D.114 ***No deforestation or degradation*** of secondary forest occurs unless: -a legal land title and/or landowner permission is available, -government permits are available (if required), and -there is a report produced by an environmental expert confirming that the appropriate clearing techniques are used, and that there is compensation with reforestation activities of at least equal ecological value.
- I.D.115 ***No production or processing*** occurs in or within 2 km of protected areas unless it is allowed under a management plan of the area. The management plan is implemented.

IFOAM mentions ***deforestation*** under

- 2.1.2 ***clearing or destruction*** of High Conservation Value Areas is prohibited. Farming areas installed on land that has been obtained by clearing of High Conservation Value Areas in the preceding 5 years shall not be considered compliant with this standard.

5.2.3 Soil Quality

Soil quality consists of soil erosion and soil fertility. By this, the decrease of soil fertility is meant. These will be discussed here. As both issues are often mentioned in the same principles, in this section no distinction will be made, however, it will in the next sub chapter's analysis. Moreover, all standards mention both environmental issues.

SAN mentions ***soil erosion*** and ***soil fertility*** between at principle 9.1 till 9.5, it focuses on

- 9.1 The farm must execute a ***soil erosion*** prevention and control program that minimizes the risk of erosion and reduces existing erosion. The program activities must be based on the identification of soils affected by or susceptible to erosion, as well as soil properties and characteristics, climatic conditions, topography and agricultural practices for the crop. Special emphasis must be placed on controlling runoff and wind erosion from newly tilled or planted areas, as well as preventing sedimentation of water bodies. The farm must use and expand vegetative ground covers on the banks and bottoms of drainage canals to reduce erosion and agrochemical drift and runoff towards water bodies.
- 9.2 The farm must have ***a soil or crop fertilization program based*** on soil characteristics and properties, periodic soil or foliage sampling and analysis, and advice from a competent and impartial professional or authority. The number of soil or foliage samples must correspond with the size of the production area, types of soil, and variations in its properties, as well as results of previous analyses. The producer must keep the results of these analyses on the farm for a two-year period. Organic and non-organic fertilisers must be applied so as to avoid any potential negative impacts on the environment. The farm must give priority to organic fertilization using residues generated by the farm.
- 9.3 The farm must use and expand its use of ***vegetative ground*** cover to reduce ***erosion and improve soil fertility***; structure and organic material content, as well as minimize the use of herbicides. There must be a vegetative ground cover establishment and expansion plan that indicates the areas with existing cover, as well as areas where cover will be established in the future. The farm must include a timeframe for these activities.
- 9.4 The farm must promote the use of ***fallow areas*** with natural or planted vegetation in order to recover natural fertility and interrupt pest life cycles. The farm must have a plan that indicates the fallow techniques or practices (planting, natural regeneration, etc.) and their timing. These areas must be identified in the fields and on the farm map. Burning is not allowed to prepare land.

Fairtrade *also* mentions ***both issues*** under

- 3.2.20: land at risk of ***soil erosion*** must be identified as well as land that is already eroded in fields where Fairtrade crops are planted
- 3.2.21: training must be provided on practices that ***reduce and/or prevent soil erosion*** to those members of the organisation where risk of soil erosion or already eroded land has been identified.
- 3.2.23 measures that the organization and its members have implemented have to ***improve soil fertility*** should be measured. Its free to choose how you report the activities. It is free to choose how to report. Measures can include 20 practices such as crop rotation, intercropping, agroforestry, the use of ground covers, or intercropping compost or green manures in the soil.

UTZ mentions ***soil erosion*** and ***soil fertility*** at the following principles.

- I.B.36***: Soil erosion*** is prevented by using soil conservation techniques. Soil is covered when clearing and/or replanting land (e.g. cover crops, mulch).
- I.B.37 Soil type and structure are identified***. Soil fertility*** and crop nutrient status are monitored annually.
- I.B 38 ***Soil structure*** is maintained or improved.
- I.B 39 Measures are taken to improve ***soil fertility*** according to the nutritional needs of the crop, including compensation for nutrients lost from harvests. Fertilisers (organic and inorganic) are used efficiently to maximize uptake.
- I.B 40 ***Organic fertilisers*** and by-products available at farm level are used first and supplemented by inorganic fertiliser if nutrients are still lacking.
- I.B 41 Human sewage, sludge, and sewage water are not used for production and/or processing activities.
- I.B 42: ***Animal manure used as fertiliser*** is stored at least 25 meters away from any water body. It is appropriately composted if needed to minimize risks.
- I.B 43: ***An analysis to determine the nutrient content*** (N,P,K) of organic fertiliser is conducted before application.

IFOAM discusses ***soil erosion*** under the following principle.

- 2.2.1 operators shall take defined and appropriate measures to ***prevent erosion*** and minimize loss of topsoil. Such measures may include, but are not limited to: minimal tillage, contour plowing, crop selection, maintenance of soil plant cover and other management practices that conserve soil.

Moreover***,*** ***IFOAM*** discusses ***soil fertility*** at its principle water & soil conservation and one about crop rotation

- 2.2.3 Operators shall ***return nutrients***, organic matter and other resources removed from the soil through harvesting by the recycling, regeneration and addition of organic materials and nutrients.
- 4.3.1 ***Crop rotations*** for annual crops shall be established to manage pressure from pests, weeds and diseases and to ***maintain soil fertility***, unless the operator ensures diversity in plant production by other means. Crop rotations shall be diverse and include soil-improving plants such as green manure, legumes or deep rooting plants.

5.2.4 Pollution

This paragraph on pollution consists of water and air pollution, as those two are the most important sources of pollution in the tea industry. Unfortunately, none of the standards mentions anything on mitigation of air pollution in its standard. Therefore, solely water pollution will be discussed below.

The first issue is **water pollution**

SAN has a section (principle 4) on water conservation of which the most important issues considering ***water pollution*** are:

- 4.1 a ***water conservation program*** should be in place
- 4.2 All surface or underground water exploited by the farm can only be used with ***permission***
- 4.3 When using ***irrigation,*** application may not be excessive or wasteful
- 4.4 Appropriate ***treatment systems*** for all wastewater it generates should be in place

- 4.5 Discharge or deposit of ***industrial or domestic wastewater*** into natural water bodies unless it complies with the respective legal requirements
- 4.6 When this discharging takes place on a regular basis, a ***water quality monitoring system*** should be set up (exact details to be found at SAN agricultural standard)
- 4.7 Organic or inorganic solids; rejected products, construction debris, rubble soil, stones from excavations rubbish from cleaning land or other materials must n***ot be deposit into natural water bodies***
- 4.8 The use of ***septic tanks*** must be restricted
- 4.9 If total or partial compliance with the requirements of this standard that relate directly or indirectly to the contamination of natural water bodies cannot be proven, the farm must conduct ***a surface water quality monitoring and analysis progra***m.

Fairtrade mentions ***water pollution*** under the following three principles

- 3.2.24: sources of water used for irrigating and processing Fairtrade crops **must be listed**
- 3.2.25: applicants should be ***informed about the situation of water sources in the area***. In case local environmental authorities or other entities consider that water sources are being depleted, or are in critical situation, or under excessive pressure you must engage in a dialogue with the authorities or local existing initiatives in order to identify possible ways to be involved in research or solution finding.
- 3.2.26***: training must be provided*** to the members of the organisation on measures to use water efficiently. This training must include
  - Estimating how much water is needed to irrigate and/or process Fairtrade crops
  - Measuring (or estimating) how much water is extracted from the source
  - Measuring how much water is used for irrigation and/or processing
  - Providing maintenance to the water distribution system
  - Adopting as applicable, methods to recirculate, reuse and or recycle water

UTZ mentions ***water pollution*** under one principle

- TE.D 23: ***wastewater from the factory*** is treated in order to prevent contamination of natural ecosystems.

IFOAM mentions ***water pollution*** under 2.2 ***soil & water conservation***

- 2.2.4 stocking densities and grazing shall ***not degrade land or pollute water resources***. This applies to all manure management and applications.
- 2.2.5 operators shall prevent or remedy ***soil and water salinization*** where these pose a problem
- 2.2.6 operators shall ***not deplete nor excessively exploit water resources*** and shall seek to preserve water quality. They shall where possible recycle rainwater and monitor water extraction.

The second issue: ***soil pollution*** is mentioned by the standards, under the following principles

SAN does not explicitly mention that ***soil pollution*** should be prevented. However, it has a chapter (principle 10) on integrated waste management, for instance, principle 10.1

- 10.1 The farm must have an ***integrated waste management program*** for the waste products it generates. This must be based on the concepts of refusing or reducing the use of products that have actual or potential negative impacts on the environment or human

health as well as reusing and recycling waste. As part of this program, the sources and types of waste must be identified and the quantity (weight or volume) must be estimated. The activities of the integrated waste management program must be in accordance with the types and quantities of waste generated.

Fairtrade, UTZ and ***IFOAM*** do not explicitly mention ***soil pollution*** prevention

The third issue, ***air pollution*** is only specifically mentioned by UTZ, it is not literally mentioned three of the standard setters, but it could be said that it is in an indirect way, see below.

UTZ is the only standard user that literally mentions air pollution prevention

- I.D 121 Documented measures are taken to ***reduce air contamination*** from sources identified in the risk assessment.

SAN does not explicitly mention ***air pollution***, but especially its principle 10.6 highlights measures that should be taken to prevent co2 emissions and impact on climate change, these also help to prevent ***air pollution***

- 10.6 The farm must implement ***practices to diminish its emissions of greenhouse gases and increase carbon dioxide sequestration***. Such practices include soil cover management, planting trees and other perennial vegetation, proper sourcing and management of fertilizers and fuels, management of effluent ponds and manure, proper waste management, use of clean technologies, improvement of energy efficiency, reduction in tillage, and participation in local or regional initiatives aimed at greenhouse gas reduction and carbon dioxide sequestration.

The same holds for ***Fairtrade*** under two principles

- **3.2.39** In central processing facilities where non-renewable energy is used you **must keep** records of energy consumption, take measures to use energy more efficiently and replace non-renewable sources by renewable ones as far as possible.
- **3.2.40** You **must report** on practices that you or the members of your organization carry out to reduce GHG emissions and increase carbon sequestration.

However, ***IFOAM*** mentions it indirectly at its general statement about wild harvest.

- 2.4 General Principle: organic management sustains and prevents degradation of common biotic and abiotic resources, including areas used for rangeland, fisheries, forests and forage for bees as well as neighbouring land, air and water.

5.2.5 Other Measures

Other ways to look at this are by means of the formulation of an *ecosystem* and *environmental management systems.* An Environmental Management System (EMS) is described as follows by the EPA: "…is a set of processes and practices that enable an organisation to reduce its environmental impacts and increase its operating efficiency (EPA, 2016).

- ***Environmental Management System***

  SAN states that a system must be in place and should consist of the following elements:
  - Short-, medium- and long-term objectives and goals.
  - A list of activities to be conducted in each program, and a timeline or plan indicating when they will be implemented.
  - Identification of the persons responsible for carrying out the activities.

- Policies and procedures established to guarantee efficient execution of the activities and compliance with the standard.
- Maps identifying the projects, infrastructure and special areas (for conservation and protection) related to the indicated activities or to the requirements of this standard.
- Records to demonstrate the program is functioning adequately

Fairtrade mentions it under 3.2 One person in your organization must be given responsibility to lead the operational steps required for your organization to comply with the requirements in section 3.2 Environmental Development.

5.2.6 Food Safety Standards

An additional incentive for an environmental conscience in China is the fact that concerns with food safety have been rising over the past decade. A large part of Chinese teas cannot enter the Europe because of the strict measures of its market. Potentially, this influence will increase even more in the future. With more pesticides regulated, more severe tea safety standards come into being. A large fall in Chinese exports in the early 2000's was partly due to EU's continuous increase in the number of regulated pesticides (Wei, Huang & Yang, 2012). This paragraph will first explain the institutes regulating these issues and afterwards the MRL regulations themselves.

There are two institutes whose laws should be taken into account. The first is particularly important: the WTO with its SPS measures. The WTO can be seen both a platform for conveying international law as a system of law itself (Eur-lex, 2016). The trade in goods is mainly regulated by the general agreement on Tariffs and Trade, the GATT (ibid). The agreement of the GATT that particularly focuses on food safety is the agreement on the Application of Sanitary and Phytosanitary measures or SPS agreement (p470, ibid). This agreement further specifies the right that parties have to take SPS measures to protect human, animal or plant life or health (ibid.) Especially phytosanitary measures apply to the fertilisers on Chinese tea. A second, institute is the European Food Safety Authority (EFSA) which was established in article 22 of the GFL (p.569, van der Meulen, 2013). EFSA is an independent agency focussing on risk assessment and – communication. It can provide independent information on risks when asked for by the community's regulation (ibid). The WHO established together with the FAO the codex Alimentarius, or Codex (472, ibid).

The first important thing to note is that, based on Article 14, tab 2Aof the General Food Law (GFL), food safety requirements are that "food shall be deemed to be unsafe" when it is injurious to health (p. 565 van der Meulen, 2013). In tab 4B this is specified further, in determining whether any food is injurious to health, regard shall be had: to the probable toxic effects (ibid). In other words: Chinese pesticides in tea could fall under this regulation in case they are (too) toxic. A specific type of contaminants are residues from either veterinary medicines additives in feedingstuffs or crop protection products (p.324 van der Meulen, 2013). The latter is the case for the export of Chinese tea. For this group of products, maximum residue levels (MRL)'s are established by EFSA which may not be exceeded (ibid). The regulatory framework around it consists of both the pre-market approval of pesticides and the determining of maximum residue levels in food commodities (ibid). Since tea is not produced in the European Union, nothing can be said about the pre-market approval of the pesticides, but it can be for imported tea like Chinese tea. The setting of MRL's can be found in regulation 396/2005 (EUR-lex, 2005). In the regulations, especially the pesticides endosulfan, fenvalerate and flucythrinate are strictly regulated because of their toxicity according to Wei, Huang & Yang (2012) as well as that they used to be widely used in tea production (2012). These three were checked in the Codex, as well as methomyl which was mentioned by a research on Chinese tea from Greenpeace (Greenpeace, 2013).

Pesticide	MRL
Endosulfan	10 mg/kg
Fenvalerate	not mentioned at all
Flucythrinate	Not mentioned
Methomyl	Mentioned, but not for tea. In 2015, the existing maximum residue levels for it were revised (EFSA, 2015)

Table 5.11: Maximum residue levels for the mentioned pesticides (FAO, 2016).

For the specific context of this major tea producing province, hardly any English literature exists so follow-up research will be needed to come with a more balanced insight.

5.3 Comparison of the Environmental Standards

This section compares the environmental issues of the four standards: SAN, Fairtrade, UTZ and IFOAM discussed in the previous section (5.2 requirements of the standards). The comparison focuses on the differences and similarities between the standards for each environmental issue and corresponding sub-issues. The same categorization of issues will be used: agrochemicals, natural environment, soil quality and pollution (see table 5.2).

5.3.1 Agrochemicals

The environmental issue agrochemical use, consisting of pesticides and fertilisers, is discussed first. The first environmental issue to be compared is agrochemical use, consisting of pesticides and fertilisers.

UTZ is the only organisation that uses integrated pest management, or IPM, which is defined by the FAO as "an ecosystem approach to crop production and protection that combines different management strategies and practices to grow healthy crops and minimise the use of pesticides" (FAO, 2016). UTZ explains it in a similar way. The standard focuses on avoidance of pesticides by all kinds of measures, and to only use it as a last resort.

Furthermore, ***UTZ*** and ***Fairtrade*** have comparable policies, focusing on allowed and banned pesticides, how to apply them and how to store them. Besides, it is determined that a specific person should be assigned to monitor the amount of pests and diseases and to prevent alternative ways to deal with them. The difference is that UTZ has an additional focus on waste disposal of agrochemicals, which makes its policy a little more extensive. On the other hand, both focus especially on the pesticides-part of agrochemicals. However, it is only UTZ which focuses on fertilisers too.

SAN focuses on several conventions that mention which agrochemicals are forbidden, which is a good starting point to focus on environmental improvement. However, it lacks a policy on the application, storage of the materials like UTZ and Fairtrade have.

IFOAM has a very different approach: it focuses on the avoidance of agrochemicals. This approach demonstrates itself by focusing on pests and disease tolerant crops (principle 4.1). This is even further specified in its principle 4.4 which focuses on soil fertility & fertilisation. For instance, the reference that any fertilisation program should be based on material from microbes, plants or

animals. Materials that could be used as organic fertiliser are further specified in an appendix in which the three types of materials are mentioned. It does not explicitly say that other materials are prohibited. However, 4.4.5 explicates that fertility amendments are only allowed as a necessary complement when other fertilisation techniques prove to be inefficient. For pests, the same idea holds: in general, inorganic pesticides should be avoided. The standard combines pests with weed management and therefore states that it may consist of biological, cultural or mechanical mechanisms. These are further specified in an appendix. As opposed to the other standards, ***IFOAM*** mentions under 4.5.3 that materials which are not included in the list, are forbidden.

Considering these criteria, ***IFOAM*** clearly has the most far-reaching policy when it comes to agrochemical use reduction. UTZ's policy is most specified regarding tea. This focus is important as not all of the mentioned restricted agrochemicals and conditions of the other standards are relevant for tea.

5.3.2 Natural environment:

This section discusses the sub-topics classified as 'natural environment': loss of biodiversity, the affection of the eco-system and deforestation.

Regarding ***loss of biodiversity,*** an overview is given of how the different standards consider biodiversity in their policies. ***SAN*** has the least extensive policy on the matter. It is limited to its principle 2.1 stating that eco-systems should be explicitly identified. ***UTZ*** focuses on the identification of threatened and endangered species. ***Fairtrade*** focuses on activities that enhance biodiversity (principle 3.2.34) and for instance highlights that buffer zones should be put in place between production areas and high conservation areas in its principle 3.2.35. Like ***Fairtrade***, ***UTZ*** and ***IFOAM*** focus on the enhancing of ecosystems as well, respectively under ID 117 for UTZ and 2.1.1 for IFOAM.

The second issue is largely related to the first one: ***affection of the eco-systems***. As mentioned: ***SAN*** and ***Fairtrade*** focus on standard takers to explicitly mention ecosystems, whereas **UTZ** and ***IFOAM*** focus on the enhancement of these systems.

In chapter 4 it became apparent that the third sub topic, ***deforestation,*** is hardly an issue for plantations, but it can be for factories. ***Fairtrade*** does not mention deforestation explicitly. ***SAN*** focuses on the fact that new production areas must be suitable for the planned intensity of farming under principle 9.5. ***UTZ*** completely forbids deforestation of primary forests, and only allows it for secondary forests when a land title and permission is available (I.D 113 & 114). Moreover, no production or processing may take place close to protected areas. ***IFOAM*** solely focuses on the principle high conservation areas may not be cut.

To conclude, the standards focus on the identification of ecosystems as such. For instance, that the use of too much pesticide can change the eco-system, is not explicitly or implicitly mentioned under any principles regarding these issues or agrochemicals at the previous section. For deforestation the focus lies on distinction of the types of forests and conservation areas. SAN is the only standard setter that has policy on the usage of wood for fuel or outdated factory-techniques.

5.3.3 Soil Quality

This paragraph discusses the two sub topics classified as 'soil quality': soil erosion and soil fertility. As mentioned in the previous section soil erosion and fertility are often mentioned as being the same principles. Therefore, no distinction has been made between the different principles. However, in this paragraph the distinction is made to indicate in order to diversify for each of the two issues.

The first issue: ***soil erosion,*** is included in ***SAN's*** policy because it focuses on preventing of soil erosion by imposing a control program (principle 9.1). More specifically, the standard highlights that vegetative ground should be expanded in order to reduce (existing) erosion and improve fertility (principle 9.3). ***Fairtrade*** has a similar policy in which it focuses on identification of risk areas

(3.2.20), giving training (3.2.21) and reducing or preventing soil erosion. ***UTZ*** focuses on prevention of soil erosion by using conservation techniques and identification of type and structure (I.B 36 and I.B 37). ***IFOAM*** *also* emphasises the prevention of soil erosion by minimising the loss of top soil (principle 2.2.1).

The second part: ***soil fertility***, is discussed by ***SAN***, which highlights the matter under its principle 9.2. It states that farms must have soil or crop fertilisation programs based on the characteristics of the soil. Moreover, it mentions that it should be promoted to cover fallow areas with vegetation in order to recover fertility in principle 9.4. Last, as was also mentioned in the previous paragraph, the expansion of vegetative ground does not only take care of erosion prevention but can also increase soil fertility (principle 9.3). ***Fairtrade's principle 3.2.23*** does not state how soil fertility should be reached, but it does have some measures in place at the farm level to increase soil fertility. ***UTZ*** highlights that measures should be taken to improve soil fertility, according to the nutritional needs of the crop (IB37). Moreover, its policy bridges the gap regarding fertilisers by stating that fertilisers are used efficiently in the same principle (I.B 39). ***IFOAM*** focuses on soil fertility under its principle 4.3.1 which states that crop rotation could be used as a means to maintain soil fertility.

To conclude, the issues of soil erosion and soil fertility are often mentioned together in policy. The emphasis regarding soil erosion lies on prevention for all four standards. However, ways to reach this differ between them. The ways to reach soil fertility seem a little less specified. Fairtrade does not mention the matter explicitly, the other standards state things like 'fertility should be adjusted to the crop' which leaves some room for interpretation.

5.3.4 Pollution

This paragraph discusses the three types of pollution: water-, soil- and air pollution. However, as mentioned in the previous section, none of the standards mentions something about air pollution caused by factories or as a contributing factor to pollution of tea.

The first issue is ***water pollution. SAN*** focuses on installing a water conservation program, which none of the other standards does (4.1). Moreover, a water quality monitoring system (4.6) should be set up. **Fairtrad*e***, focuses on training, however, this training also focuses on estimation of the water quality, which makes its focus comparable to SAN's. ***For industrial pollution***, ***SAN*** mentions that multiple types of debris cannot end up in the water (4.7). ***IFOAM*** also states that "water extraction should be monitored" (2.2.6) and that "water should not be polluted in general" (2.2.4). ***UTZ*** mentions this under its principle, but only for factories TE.D 23. ***Fairtrade,*** does not explicitly mention waste prevention. The policy of the fourth standard setter ***IFOAM*** differs from the others as it merely emphasises the principle that sources should not be depleted or excessively used. Moreover, it also states that salinization should be prevented or remedied (2.2.6), (the latter is also mentioned by ***Fairtrade*** under its principle 3.2.25).

The second issue is ***soil pollution. SAN*** does not explicitly mention ***soil pollution.*** However, as it has a separate chapter on soil management and conservation (chapter 9, under this, reports paragraph 5.2.3 5.2.3 Soil Quality), at which among other things 'that fertilisation programs should be adjusted for a crop and should be monitored'. So at least pollution from fertilisers is taken into account, it does not focus on factories' waste. ***UTZ*** does not explicitly mention ***soil pollution*** prevention, however as the standards policy on pesticide is very elaborate and aimed at for instance prevention from pesticide waste and contamination also this standard has at least some attention to the matter. ***Fairtrade*** and ***IFOAM*** do not specifically focus on it.

The third issue ***air pollution*** is only specifically mentioned by UTZ at principle ID121 stating that air pollution should be reduced when identified in its risk assessment. IFOAM mentions it more indirectly by emphasising at 2.4 general principles that organic management should sustain and

prevent degradation of common biotic and abiotic resources, including water. SAN and Fairtrade have a more climate change preventive focus.

To conclude, regarding water pollution ***SAN and Fairtrade*** are the two standards which mention that water quality should be monitored. ***UTZ*** is the only standard setter which specifically focuses on factories, which is very important as they pollute more than the plantations and ***IFOAM*** the only one to state that water resources should not be depleted. This is also important, especially regarding the decreasing water tables mentioned in chapter 4.3.4. Soil pollution attracts little attention from all standard setters. None of them specifically focus on the matter. However, at least three of them have chapters focusing on soil conservation or preservation.

5.4 Comparison of the Certification Schemes

As the environmental standard comparison showed so far, organic has the most severe environmental standard, followed by UTZ and Rainforest Alliance with comparable policies and finally Fairtrade. However, it is also important to consider the effect and scope of the certification schemes itself. In order to do so, two factors are discussed. First, stringency, meaning to what extent the standards are binding. This is important as it determines to which extent certified tea actually lives up to the requirements. Second, the scope is discussed, which analyses the very limited scale at which certification schemes operate on the Chinese market. The scope is important because it says something about the scope of the standards and whether their ambitions and policies have the potential to reach farmers working in the industry. The details can also be found in table 5.12.

Table 5.12: Effects of the Criteria

Standard		**SAN**	**Fairtrade**	**UTZ**	**Organic**
Stringency	*% compliance criteria*	Compliance with 50% of all applicable criteria/80% of all criteria	Core requirements should be met; minimum of development criteria should be met (minimum determined by CB)	Mandatory and additional control points Annual audits announced and unannounced	All requirements should be met (based on the standard)
	Audit frequency	Minimum of once a year (SANstandard) reassessed once every three years (standardsmap) Surprise and non-surprise	Once every 3 years (Standardsmap) Surprise and non-surprice	Annual audits announced and unannounced	Minimum of once a year Surprise audits as well
	Audited by	*ISO*	*Independent CB's*	*UTZ approved CB's*	Third-party auditor
Scope/market		*Global tea 8%*	*Global tea 4%*	*Global tea 1%*	Global tea 1%

5.4.1 Stringency

The first standard, SAN has a structure of “general compliance” and “critical criteria”. Farms must comply with at least half of all applicable criteria of each principle and 80% of all applicable criteria of the SAN standard. Additionally, all criteria that are marked as “critical criteria” should be complied with by all means. Audits are conducted by SAN authorised CB’s which have to measure the farm’s compliance with the practices indicated in the criteria. The second standard, Fairtrade has a similar structure regarding core requirements that must be met and additional “development requirements” which consist of improvements that should be made. In order to comply with the standard, all core requirements should be met and the development minima are set by the CB’s. The audits are held once every three years and consist of surprise and non-surprise visits. However, every criterion has a different rule regarding when it should be met. The third standard, UTZ has a structure with mandatory and additional control points every year. From the latter, an increasing amount per year must be met. Audits are held annually. The fourth standard, IFOAM also uses critical criteria which are not obligatory. Audits are held at least once a year.

When comparing the standards, it is apparent that Fairtrade is the only certification scheme with a divergent audit frequency. This makes the scheme look less stringent. On the other hand, the certifier grants the farmers more time to comply with the standards when they are not met instantly. All standards have a comparable criteria structure with core ones and a certain amount of additional criteria from which a minimum amount should be met.

5.4.2 Scope

The second element of the comparison between certification schemes is their scope, which will be discussed in this paragraph. Exact numbers on the division of certified tea from the Chinese market are not available. However, there are numbers about the global market. 12% of all tea is certified, this number is adjusted for multiple certifications. From this 12%, Rainforest Alliance certifies most with 8%, followed by Fairtrade with 4%, and organic and UTZ with 1% in 2012 (Potts et all, 2014). Moreover, it should also be noted that markets are expanding quickly. Regarding the division for tea per country in the IISD report (ibid). China is not seen as a sourcing country for UTZ yet. This is also due to the relatively recent entrance of the certification scheme in China. Rainforest Alliance and Fairtrade mention it under “other” with respectively 1% and 5%. A relatively large number, however, can be attributed to organic, of which China takes care of 79% of the global organic tea production. However, it should be noted that global organic production accounts for only 2% of global export, as most organic tea is consumed on the Chinese domestic market. Moreover, ‘organic’ in China is not the same as organic in Europe and its requirements are much less far-reaching.

To conclude, all standards have an adequate and stringent system with independent third party auditors. Especially the fact that all of them use unannounced audits as well increases the credibility. The scope at which they operate in China is still very limited.

5.5 Conclusion

This paragraph will answer the sub-question which corresponds with this chapter: *do the standards' requirements of the certification schemes, that are active on the Chinese market, address the environmental issues?*

In general, when comparing the standards, it came to the fore that for various issues and the sub-issues different standard has the most far-reaching policy. Moreover, it came clear that on a limited amount of issues none of the standards had an explicit policy. This means that a large majority of issues are recognised.

For agrochemicals, IFOAM has the most far-reaching criteria on fertiliser and pesticide usage reduction. Different from the other standard setters is that IFOAMs point of departure is avoidance of fertilisers. They can be used as a last resort, but only from organic matters at a very restricted list. This means that the problems with the agrochemicals are recognised by all standards, of which most by IFOAM.

For the natural environment aspects, SAN is the only standard focusing on wood usage for factories. Especially given that deforestation is a (much) larger issue for factories than it is for plantations it would be great if the other standards would focus on this aspect as well. Fairtrade does not recognise it as it does not mention deforestation.

The issues of soil erosion and soil fertility are often taken together in policy. The emphasis for soil erosion lies on prevention at all four standards. However, ways to reach this differ from each other. For soil fertility, the way to reach it seems a little less specified. Fairtrade does not mention the matter explicitly, the other standards state things along the lines that fertility should be adjusted to the crop' which leaves space for interpretation. It is, therefore, a little harder to state whether or not soil quality issues are specifically recognised by the standards.

For water pollution it might be possible that IFOAM does not consider this necessary with its full organic production, however, as air pollution from other sources is not taken into account it may be worthwhile to do this anyway.

For food safety aspects, except for explicit mentioning of air pollution's contribution to MRL's, IFOAM has most principles and focus on reaching acceptable MRL levels. However, UTZ is the only standard setter which published its standard adjusted for tea farming. Something the other standards are missing out on.

Concluding it could be said that no single sustainability standard does generally address all issues significantly better than the others. However, when considering that agrochemical use is the most important issue for environmental sustainability it could be said that IFOAM might best address the issues according to their weight on the environment.

6. Barriers for tea farmers to apply for certification schemes

It has become clear that the standards generally address most of the environmental issues present in China. However: what is possible in theory does not necessarily have to fit the case in practice. Therefore, this chapter will answer the question: *what barriers exist for tea farmers to participate in the certification schemes?* This question has been approached by the interviews as well as follow-literature research. Four possible barrier issues are present, which form the structure for this chapter. Therefore, first, the availability of certification schemes in China will be discussed. Second, the extent to which farmers do recognise benefits in applying for schemes will be discussed. Third, the means they have available for application will be presented. Fourth, difficulties with the application of standards will be discussed. After discussing these issues a conclusion will be drawn which answers the sub-question of this chapter.

6.1 The Four Barriers & Interview Outcomes

In order to obtain the input for this chapter, the respondents were presented a list of potential barriers for farmers and were asked whether they recognised the issues. The full list can be found in Appendix 1. Most obstacles were recognised by the respondents, and some new issues and aspects were added. The reflections also have been taken as a point of departure for some further literature research. As with the reflections of interviewees in chapter 4, some respondents could give more input to the issues than others. To make sure that all visions will be included in this research, an overview of all main points is presented below in table 6.2 at the next page. The four issues that were posed as potential problems during the interviews are: availability of schemes, benefits recognised, available means and application of the schemes' procedures, which can be found in table 6.1 below.

Issue Category	**Related Issues**
1. Availability of Schemes	Schemes Available
	Multi-certification
2. Benefits Recognised	Determining of Quality
	Cultural Dimension
3. Available Means	Costs
	Level of Organisation
	Administrative Burden
4. Application of Standards Requirements	Knowledge Gap
	Change to a New System

Table 6.1 Overview of Obstacles for Certification

6.2: Main Outcomes Interview Questions Modalities for Farmers

- **Respondent 1** highlights that farmers in the South of China that are part of a federation, have a large interest in profiling themselves as organic producers. However, when dealing with federations, the main issue would be that certification should be guaranteed for all cooperatives and that a good control system on the products should be in place.
- **Respondent 2** points out the differences between Chinese and international standards. Chinese ones are not seen as trustworthy. Most farmers do care about the environment, and there are sufficient means to apply for certification, however, most farmers do not know that international certification exists. Managers of larger farms are familiar with certification and could be approached for it. The most important thing when focusing on certification is trust. The best solution lies in more use of technology.
- **Respondent 3** highlights state's ownership of land as a problem, as private parties can only rent land. This results in that certified companies are never small ones owned by scale farmers but large estates of large companies. The tea market in China is growing at a high pace. Quality differences between different producers are big, MRL levels are important and much trade is built on expanding existing relationships. For the specialty tea market to develop, it would be great if people in Europe would familiarise with higher quality tea loose leaf tea.
- **Respondent 4** states that there are also sufficient means in the value chain to apply for certification schemes, which could potentially deal with environmental issues. Obstacles are, in order of importance: no benefits recognised, lack of money available/ administrative burden, knowledge about application of certification schemes. No availability of the schemes or other obstacles are not recognised as issues.
- **Respondent 5** highlights that companies are not always reliable. Supply chains cannot be improved since there is a lack of incentive among farmers.
- **Respondent 6** stresses that China has less history with independent auditing, compared to other producing countries. The most important obstacles are: the lack of awareness, the lack of information in China, not much certifying organisations and failing local staff. In addition it is also important to take in mind the large cultural dynamic of tea in China.
- **Respondent 7** highlights that the approach of most certifiers has a too limited impact. Moreover, the cooperation between NGOs and certification schemes is not always optimal.
- **Respondent 8** indicates that local NGO's do not have the same capacity as certification schemes. International standards are more easily understood and easier translated to local practices than standard sets by production companies. There are two important driving forces of change: one is the government together with international NGO's, the other is the focus on big foreign brands. As prices for the domestic market are higher than the export market, the main obstacle is **t**o find ways to promote the use of more sustainable methods.
- **Respondent 9** states that in general only a very limited amount of tea is certified because the importance is not recognised. Non-certified tea is not 'bad' tea per se. However, certification does bring some benefits to the environment. In order to apply for it, the importance would need to become valued higher.

Figure 6.2: Main interview outcomes questions modalities for farmers

6.1.1 Availability of Schemes

The first issue is the availability of schemes. This focuses on the presence of certification schemes in the market where farmers operate. Additionally, the respondents were asked, whether or not farmers do know about the existence of the schemes. This question is relevant since many certification schemes only started to operate on the Chinese market since a couple of years and therefore might not be known that well.

Availability

When conducting interviews, it became clear that opinions derived from the interviews vary on the matters. Since focusing on 'whole China' could be seen as a too broad understanding, for this question the emphasis was placed on the case of Zhejiang province. For this, two reflections exemplify the differing positions. Respondent 6 (interview, 2015) states that there are not much schemes present, which can be seen as a rational obstacle for participation. However, respondent 4 states that there certainly are sufficient schemes available as well as means to apply for them in the value chain in the region (interview respondent 4, 2015).

Multi-certification

Remarkably, once a certification scheme is being adopted, there are also a few cases where multi-certification appears. Different standard setters have their own customers. For instance, Rainforest Alliance customers are predominantly from the USA whereas UTZ customers are more often European (interview respondent 3, 2016). This can result in tea products with two or more labels on it or a different label according to the country where it is sold. Additionally, as came clear in chapter 5, different certification schemes often have much overlapping focus points, which facilitates the presence of multi-certification as well. One particular farm that produces tea for the UTZ label in Zhejiang province even has different gardens: one for organic, one for a certification scheme and one for the domestic market (interview respondent 3, 2016). It could be said that reflections on the availability of certification schemes vary largely. The appearance of multi-certification suggests that certification schemes are present, but that they seem to be centred around larger farms. Especially when taking into account to take in mind that 80% of farmers are small scale farmers it could be stated that certification is not easily accessible for the large majority of farmers.

6.1.2 Benefits Recognised

The second potential barrier is recognition of benefits with regards to certification by farmers. This consists of the way quality of tea is determined and the cultural aspects of tea in China.

Quality of tea

An important price-determining factor, is the quality of the tea exported to Europe. Since in Europe, people generally are not willing to pay the same amount for tea as in China. Europeans are drinking what Chinese see as poor-quality processed tea. As came clear in chapter 4.1, the tea picked in the spring has the highest quality and is sold domestically, whereas tea being exported to Europe is always made from the last lowest-quality plucks. Chinese farmers make the lowest profits on the latter tea. In order to make oversee tea export more interesting, a willingness to pay more for higher quality tea should be effectuated according to respondent 3 (interview respondent 3, 2016). Another important factor to bear in mind is that in China, tea tasting determines the quality of the tea, a custom specific to Chinese tea trade (Groosman, 2011). Respondent 2 recognises this as a problem for tea producers "only this taste and attributed quality is recognised in the selling price, not whether the tea is organic or not". (interview respondent 2, 2015)

Cultural dimension

An even more important aspect, highlighted by many of the interviewees, is the great cultural value that is being attributed to tea in the Chinese culture. For instance, in the interview with respondent 6, the advice was given to bear in mind this "large cultural dynamic. Tea has been produced in China since thousands of years. For some Chinese farmers, it is odd to think of foreign companies or traders who claim that the practice they have been doing for such a long time might potentially not be sustainable or environmentally friendly (interview respondent 6, 2015). Much Chinese consumers and farmers cannot imagine that "*something could possibly be wrong*" with tea. For instance because they have been drinking it for their entire life already without any noticeable problems (interview respondent 2, 2015). These reflections on the cultural value, are also supported by literature.

Figure 6.3: Tea ceremony pottery (Kaleidoscope Cultural China, 2014)

In China, tea is much more widely consumed than coffee. It is the number one beverage in the country. Moreover, in China, tea is not just for drinking but can also be part of a tea ceremony, see figure 6.3. This custom and the total embeddedness of tea and the value attached to it in daily life dates back to the earliest dynasties. Health benefits are being attributed to it, as well as even medicinal use. It is a custom to offer it to guests (Xiusong, 2014). Tea is generally seen as a 'good' and healthy beverage. For quite some Chinese tea consumers, it is unimaginable that their 'healthy' tea could be unhealthy because of the fact that it contains too high pesticide residues.

6.1.3 Available Means

When certification schemes are present and benefits are recognised, a third barrier may arise as well: available means. The costs for the audit and other expenses for the certified production have to be taken into account. Moreover, also an administrative burden may be in place.

Costs

Average tea farmers have about 2 to 3 hectares of land, but generate the income of just 50% of an average Chinese farming household (Ho, 2010). In that respect, Chinese tea farmers have a competitive disadvantage. Additionally, respondent 3 stated that "certification is expensive for farmers, given these high auditing costs" (interview respondent 3, 2016). Since the majority of Chinese farmers are small scale farmers, it is impossible for them to apply for certification for just their own farm. In order to realise certification, the solution would be to organise farmers in cooperatives, that could cover the costs together. Therefore, application for certification schemes does not only depend on the costs for it but also on the level of organisation.

Level of Organisation

Respondent 1 mentions that "there are large differences between cooperatives, farmers companies and federations. Cooperatives have managers or business man who can take care of things" (interview respondent 1, 2015). Additionally, also respondent 2 underlines the difference between managers and farmers "(…) daily farmers might not know about it, but managers do. They are the ones able. Farmers are really simple persons. They are not sophisticated enough. They do know it

exists, but they don't have the knowledge. Only the manager. They just follow the instructor" (interview respondent 2, 2015).

Administrative Burden

Some respondents indicated administrative as an issue, however, none of them specified how it would be that much of an issue. The literature rather focused on the taxes and subsidies in the sector which can be seen as a disadvantageous and limiting the means for farmers.

Especially in state-owned factories and trade companies, the government has a strong say in the supply chain (Chen, 2009). The tea industry involves growing, processing, distribution and marketing, which are controlled by different government departments, such as the Ministry of Agriculture (MOA). As indicated in chapter four, the tea industry consists of growing, processing, distribution and market, being led by different departments (p.53, ibid). China has a special Certification Accreditation Administration Committee (p.57, ibid). It consists of Quality Safety Certification, Safe Food standards and Green Food standards. Taxes are generally high in the tea industry. From 2006 on, the agricultural tax was abolished for self-processed tea, which can be seen as a positive stimulant. However, tea companies still have to pay tax, with rates between 35-40%. Compared to other sectors within China, the subsidy for tea is limited. When tax is given this can be direct: by giving money to tea growers for developing new areas in proportion to the areas. The indirect subsidy can be given either to tea companies, for instance, to promote better tea varieties. When seedlings are bought, only half of the price has to be paid. An alternative is being organised by direct company subsidies. A practice that is also more common. The last option is to allocate funds, for instance for machinery (p.60 ibid).

6.1.4 Application of the Certification Schemes

In quite some cases, farmers do know about schemes existence and have the means to start the process to become certified producers. Whether or not assisted by managers, the principles of the schemes have to be put in place.

Knowledge Gap

In the interview with respondent 8, this became clear. The respondent mentioned that nowadays, there are high standards on the use of fertilisers set by companies, which are not always understood by farmers. Moreover, it was emphasised that there is quite a large "knowledge gap" for farmers with regard to the right application of prescriptions (interview respondent 8, 2015). Another issue to bear in mind when thinking of obstacles for farmers and cooperatives, is the difference between richer, educated farmers and non-educated poor farmers. Especially for the latter group, the knowledge gap is present, which makes it especially difficult to apply standards without any intermediary helping them with it (interview respondent 8, 2015).

Change to a new system

Next to this, as came clear in chapter four by respondent 2's interview: the majority of farmers would have to change to a new system. They are used to a system in which a relatively high amount of pesticides and fertilisers are used (interview respondent 2, 2015). To change to a new system could be seen as an obstacle. This was also indicated by respondent 3, whereas out of 8 mentioned pesticide use as the major environmental issue, this respondent was the only respondent to specifically mention it as an obstacle for trade.

6.2 Conclusion

In sum, this chapter has dealt with the question: *what barriers exist for tea farmers to participate in the certification schemes? I*n theory there are much opportunities for export, however in practice the large majority of the Chinese tea ends up at the domestic market because of these obstacles. When thinking of overcoming barriers for instance to increase the sales by exporting to the European market, the aforementioned four barriers should be considered. This can be done in the following manner.

First of all, there is a discrepancy with regard to the availability of schemes in the region. Although export to Europe may sound promising, this only happens for poor-quality and large quantities of tea rather than the smaller amounts of loose-leaf tea the majority of tea farmers produce. Therefore, most farmers are not reached by the certification schemes. They lack a financial incentive and- the available means such as the ability to bear the costs for the certification process. Another important factor is the level of organisation that would enable them to cope with the administrative burden that certification would bring. Moreover, most farmers are not aware of the risks the agrochemical use poses. They are often only made aware of this by NGO's or certification schemes that focus on these small-scale farmers. Lastly, in case farmers do work with certification, there is also a problem in the form of a knowledge gap and the converting to a new system. For a conversion to certified tea production, it is therefore essential that either the certification organisation or an NGO helps farmers with applying the measures. Only then, the numerous barriers could possibly be overcome.

7. Analysis & Conclusion

This chapter analyses the outcomes of the previous chapters in order to answer the main question of this chapter, which is: what is the potential of sustainability certification schemes to address environmental sustainability issues on the production-side of the Chinese tea supply chain, focused on export to Europe? This will be done by taking three steps. First, the analysis will be made by linking the findings of chapter 4, 5 and 6 to the theory from the theoretical framework. Second, a summary of this analysis will be given, which answers the main question and gives recommendations for the different stakeholders. Finally, the limitations of the research as well as potential future research lines will be presented.

7.1 Outcomes of the Research Chapters & Theory

The Market

It became clear that tea at the domestic market is sold by making use of an auction system. The quality of tea is determined by tea-tastings, which makes the tea´s quality rather than its quantity leading for its price. The export market system is however dominated by large firms which are buying up leaves and offering low prices per kilogramme, regardless of the quality, because of which low-quality tea ends up in Europe. Looking at the range of Gereffi's (2005) market's systems (market, modular, relational, captive and hierarchical) can give insight into this process. The domestic market could be seen as the 'market' type with some elements of a relational system, as personal relations between buyers and sellers are very important in Chinese marketing of products. The export system can be seen as a more 'captive' type, with powerful and larger firms imposing their requests on the producers. The export market is, therefore, differing largely from the domestic market. In order to change to more certified tea selling to Europe, a major conversion to a new market type would be required, with more organisation, for instance, cooperatives and more bulk production. It would be nice if this could be combined with high-quality tea as these at least domestically can be sold at higher prices, but currently, quantity is leading over quality.

Environmental Sustainability

As all types of global environmental issues of the IDH's (2011) sector report are to varying extents recognised in the Chinese tea sector, environmental sustainability is an issue in China as well as elsewhere in the global tea sector. Although, it comes in a different form: with more focus on agrochemicals and less on deforestation. Additionally to the global issues, other ones are recognised such as affection of the biodiversity by high nitrate levels and food safety related issues such as air pollution. Moreover, two unintended outcomes came to the fore. First, some respondents consider environmental sustainability as a minor issue compared to social sustainability of the sector. Secondly, this also holds for food safety issues, which are seen as a more important threat to the long-term sustainability of the sector than environmental issues. These unintended outcomes may undermine outlook to transformations of the sector, and hamper persuading an environmental stable future. Concluding, is important to use all components of sustainability and formulate an all-encompassing strategy for sustainability.

Complexities in Certification Schemes

Apart from complexities for farmers, or complexities of principles meeting the exact needs of a particular area, it should be taken into account that certification itself is a contested and complex

governance structure. Böstrom (2015)'s theory on complexities can help to untangle this problem. He distinguishes six complexities, which are also interrelated with each other.

First, *geographical gaps* describe that governance is taking place at a distance, which makes it harder to carry out governing processes. Besides the physical distance between Europe and China, certification schemes employees have to rely on intermediaries in the field. Despite some visits every now and then, it is not possible to be on the tea plantations constantly. Second, *information and knowledge gaps* refer to that often there is no reliable and transparent information available about the origin of a product. As employees of certification schemes are not continuously present at the tea plantations, it is hard to determine from which garden the certified tea comes. UTZ is the only certification scheme with a tracking system: its GIP ('Good Inside Portal'). The other schemes do not make explicit reference to such a system that can help to deal with information gaps. Another issue lies in interpretation differences between standard setters and standard takers, also identified as the 'knowledge gap of farmers', as many farmers are poorly educated and do not exactly know what they have to do or monitor when producing for a certification scheme. This may worsen the complexity around information and knowledge gaps. Third, *communication* criticises the audit and communication processes in general. During an audit, communication does not always take place in an optimal way. This can be linked to language problems. Not only farmers at the plantations, but also intermediaries and staff offices often do not speak English, or just only to a very limited extent, this may hamper communication and therefore the quality of the audit. The fourth complexity looks at *compliance and information gaps*. This complexity holds for standards' policies: products do not necessarily meet all of the standard's criteria. All standards leave some room for non-compliance to parts of their principles, for instance, to make it easier for farmers to apply the schemes. Especially Fairtrade gives farmers a relatively long time period: three years, to adjust to the new practices. At the one hand, this gives an opportunity for the farmers to very gradually change to a new system. However, when farmers fail to meet all requirements, it also may lead to non-compliance. Fifth*, power gaps in the supply chain* looks at power misbalances. Sometimes powerful buyers, like for instance Unilever with its Lipton brand, want to impose a standard on tea from farmers working under a cooperation. This can lead to that the suppliers lack influence on the exact criteria of the standard. Therefore, requirements do not always fit with the local practices and understandings, such as the large cultural value that is being attributed to tea, the 'culture dynamic'. When this takes place, buyers misuse their power. The sixth complexity looks at *credibility or legitimacy gap*s. It is not always the aim of certification organisations to improve their practices and safeguard long-term environmental sustainability to the best of their abilities. Although the certification schemes are not-for-profit organisations, they earn money by certifying products which can create a discrepancy. An example increasing credibility is by subscribing to ISEAL because this organisation focuses on increasing the credibility of standards and has overarching principles to which subscribers must adhere to. UTZ, Rainforest Alliance, Fairtrade International are full members, IFOAM is a subscriber.

Strategies for upgrading

When certification schemes are active in a region or country, it does not automatically mean that tea producers will switch to certified production. Farmers have to see the advantage of 'upgrading' their tea to certified tea. Upgrading can take place by 'functional downgrading' (Vellema & van Wijk, 2014). This takes place when individual firms or cooperatives start engaging in fewer activities and specialise on key performances. This happens, for instance by withdrawing from higher-value-added activities and concentrating on more upstream activities. Most farmers in China have small individual firms or work for cooperatives with very little money, the described 'functional downgrading' might be a solution to their financial problems only when considering the following aspects. First of all, it is hardly possible that farmer-intended change in the tea sector will occur

because of the numerous obstacles. Whereas the presence of the certification schemes is increasing, and the problem of availability could eventually be overcome, the administrative burden is a quite severe threshold. However, the most important obstacle is the lack of incentive among farmers and should, therefore, be taken as a point of departure. As long as prices offered for tea on the domestic market are higher than at markets overseas, farmers are not willing to enter the export market. A solution to this would be to let external parties, like certification schemes, NGOs, the government or companies organise farmers into cooperatives so that they can produce large quantities which make export more interesting.

An alternative potential future solution can be found in focusing on the speciality tea market or loose leaf market. An example of a speciality tea is 'Dragon Well tea', which is solely produced in Zhejiang province. Slowly, this market is developing in Europe and European consumers are willing to pay a higher price for this type of tea. For the speciality tea market to develop, it would be great if people in Europe would familiarise themselves more with higher quality tea. For 'standard' higher priced loose-leaf Chinese tea, this cultural conversion would also be needed in Europe, as most tea drunk in Europe is low quality 'bag' tea that is not worth selling internationally for small-scale farmers.

7.2 Summary & Recommendations

The main question of the research is: *what is the potential of sustainability certification schemes to address environmental sustainability issues on the production-side of the Chinese tea supply chain, focused on export to Europe?* The answer follows from a summary of the analysis. Currently, certification schemes only have a very small percentage of their market share in Chinese tea. It is hard to increase their potential, but in order to reach this, several steps should be taken. First, certification schemes should preferably adjust to the Chinese context, as the issues differ from global issues. Besides an all-encompassing strategy for sustainability is needed. Moreover, information/knowledge gaps and credibility are the most serious complexities regarding certification processes. The first gap applies because only one scheme has a track and trace system. The second gap: credibility is underlying the very nature of certification schemes as the aims of certification organisations often differ from reaching environmental sustainability. In order to enlarge the potential for the schemes the major obstacle for farmers: their lack of incentive should be addressed. Upgrading of their position in the value chain can be reached by conversion into a new type of quantity-oriented market, needed for the export market. Potentially also by converting into speciality teas but that is less likely to emerge.

It follows from the analysis and the chapters 4, 5 and 6 of this report that some issues with regard to certification schemes in China could be improved. Therefore, some recommendations are formulated for the several involved stakeholder groups. It should be noted that no companies have not been interviewed but do have recommendations in the list below.

- C*ompanies* should aim at creating a larger demand among European consumers for loose-leaf Chinese tea and potentially even speciality tea. When possible, they should organise tea farmers into cooperatives.
- *NGO's* should take into account the cultural dimension; as well as the warm relations between farmers and local governments when approaching farmers. Their training for famers should focus on relating tea to environmental problems and the problems with MRL's for export to Europe.
- *Certification Schemes* should also take the warm relations between farmers and local governments into account when approaching farmers. When possible, farmers could be organised into cooperatives. Ideally, together with companies.

- *Standard Setters* should integrate the specific issues for Chinese tea farming into their environmental standards.
- *Umbrella Organisations* could support NGO's and certification schemes and enable them to use their existing networks.
- *Research Institutes* should focus on marketing loose-leaf tea outside of China, and possibly more research could be done about the adverse health effects of MRL's in tea to enlarge the focus on this problem within China.

7.3 Limitations of this Research & Future Research Lines

The report has four important limitations, which are often interrelated with each other as well. In some cases, limitations could partially be obviated. First, not all relevant numbers were available for the research, such as exact data on the size of the (Zhejiang) tea market. There are sources where these data can be found such as the International Tea Committee: a not-for-profit organisation provider of global tea statistics, Euromonitor and Statista. However, the first two are only accessible against payment and the third only has limited access for non-payers. This leads to the second issue: there was no research budget available for the research. All costs for practicalities like flights, visa, insurances, travelling and housing had to be borne by the researcher itself. Therefore, it was not possible to visit multiple tea fields or for instance visit, Beijing were also quite some main NGO and research organisations were based. The third issue is language. As the researcher did not speak Mandarin, almost all interviews had to be held in English. When a professional translator would have been available, more key informants could have been interviewed in Mandarin, and in combination with a better network, perhaps also farmers could have been interviewed, which would have increased the value of the research. Moreover, contacting could have been more efficient. Prior to getting in touch with potential respondents, often secretaries had to be consulted, which all spoke English poorly or not at all. A solution could be found sometimes in sending an e-mail or asking someone to do the calls for the researcher. However, this was not always possible, due to time constraints, by which some interview contacts got lost. A fourth limitation was network: both due to the language barrier as well as that the company the researcher was based does not focus on tea or certification, the researcher lacked a network in the particular field of the research. Especially in China, where hierarchy and especially a personal relation with the aimed respondents, are more important than for instance in the Netherlands. Therefore, it was as good as impossible to get in contact with companies without knowing their employees personally.

Future Research Lines

When combining the outcomes of the research and the limitations, some interesting lines for future research can be drafted. It would be interesting to research how the current operating certification schemes in China could adjust their schemes more to the situation in China. Moreover, it is also thought-provoking to include a discussion of the Chinese initiatives. There are many initiatives for organic tea production in China, however, the requirements differ largely from the international schemes, as they have many additional requirements. With organic with the largest potential for addressing the environmental issues, and many national initiatives present already, it could be a very motivating objective to set-up initiatives that combine the two.

References

(Online) Articles, Books & Reports

- An, N., & Schaller, E. (2014). Issues and Opportunities for Implementation of VSS in China. In Voluntary Standard Systems (pp.243-251). Springer Berlin Heidelberg.
- Blackmore, E., Keeley, J., Pyburn, R., Mangus, E., Chen, L & Yuhui, Q (2012). Pro-poor certification: Assessing the benefits of sustainability certification for small-scale farmers in Asia. International Insitute for Environment and Development (UK). International Institute for Environment and Development (IIED) http://www.european-fair-trade-association.org/efta/Doc/Propoorcert-IIED.pdf Retrieved: 08/08/2016
- Boström, M., Jönsson, A. M., Lockie, S., Mol, A. P., & Oosterveer, P. (2015). Sustainable and responsible supply chain governance: challenges and opportunities. *Journal of Cleaner Production*, *107*, 1-7.
- Brandt, L., & Rawski, T. G. (Eds.). (2008). *China's great economic transformation*. Cambridge University Press. p. 375-428.
- Bryman, A. (2008). *Social research methods*. Oxford university press.
- Carter, N. (2007). *The politics of the environment: ideas, activism, policy*. Cambridge University Press.
- Chen, W. (2009). China's tea Sustainability Report. Social Resources Institute. https://www.somo.nl/nl/from-tea-garden-to-cup/ Retrieved: 05/09/2016
- Connelly, S. (2007). Mapping sustainable development as a contested concept.*Local Environment*, *12*(3), 259-278.
- Derkx, B., & Glasbergen, P. (2014). Elaborating global private meta-governance: An inventory in the realm of voluntary sustainability standards.*Global Environmental Change*, *27*, 41-50.
- Dryzek, J. S. (2013). *The politics of the earth: Environmental discourses*. Oxford University Press.
- Egelyng, H., El-Araby, A. Kledal, P., and Hermansen, J.E. (2010) Global Governance for Environmentally Sustainable Food Systems: Certified Organics in a North – South and South-South Perspective. Paper at: The International Symposium 'Governing through Standards' arranged by the Danish Institute, 24-26 February 2010
- Gereffi, G., Humphrey, J., & Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy*, *12*(1), 78-104.
- Goodland, R (2002) WorldBank, Washington DC sample of Encyclopedia of Global Environmental Change. Copyright John Wiley & Sons http://www.balticuniv.uu.se/index.php/component/docman/doc_download/435-sustainability-human-social-economic-and-environmental. Retrieved: 20/08/2016
- Groosman, M (2011) IDH Sector Overview report, the sustainable trade initiative. http://www.bibalex.org/Search4Dev/files/432041/460374.pdf Retrieved 14/10/'15
- de Hek, P. A., Immink, V. M., Tacken, G. M. L., Ruissen, A., van Haaster-de Winter, M. A., & Meeusen, M. J. G. (2012). *Kracht van keurmerken: een systematisch inzicht in keurmerken en de beleving door de consument*. LEI, onderdeel van Wageningen UR. http://edepot.wur.nl/242551 Retrieved 05/09/2016
- Ho, B. Sustainable development of tea industry in China, 2010. http://business-humanrights.org/en/sustainable-development-of-tea-industry-in-china retrieved 07/05/2016
- Hopkins, T. K., & Wallerstein, I. (1994). Commodity chains: construct and research.

- Huang, J., Yang, J., Zhigang, X. U., Rozelle, S., & Ninghui, L. I. (2007). Agricultural trade liberalization and poverty in China. *China Economic Review*,*18*(3), 244-265.
- Humphrey, J. (2001). Governance in global value chains. *IDS bulletin*, *32*(3), 19-29. https://opendocs.ids.ac.uk/opendocs/bitstream/handle/123456789/8755/IDSB_32_3_10.1111-j.1759-5436.2001.mp32003003.x.pdf?sequence=1 retrieved 21-09-2016
- Li, X. (1993) Chinese tea culture. Journal of popular culture, 27(2), 75
- Loconto, A., & Fouilleux, E. (2014). Politics of private regulation: ISEAL and the shaping of transnational sustainability governance. *Regulation & Governance*, *8*(2), 166-185.
- Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. *Ecological Indicators*, *17*, 4-13.
- Van der Meulen, B (2011). Private food law. Wageningen: Wageningen Academic Publishers.
- Potts, et all (2014) IISD report http://shapingsustainablemarkets.iied.org/state-sustainability-initiatives-review-2014-standards-and-green-economy retrieved: 15-09-2016
- Van Reenen, M., Panhuysen, S., & Weiligmann, B. (2010). Tea Barometer 2010. *Leiden, NL: Tropical Commodity Coalition for Sustainable Tea, Coffee Cocoa*.
- Robert (2012) http://www.tandfonline.com/doi/pdf/10.1080/00139157.2005.10524444?needAccess=true
- Vellema, S., & van Wijk, J. (2014). Partnerships intervening in global food chains: the emergence of co-creation in standard-setting and certification. *Journal of Cleaner Production*.
- Wal, S. (2008). Sustainability issues in the tea sector: a comparative analysis of six leading producing countries.
- Wei, G., Huang, J., & Yang, J. (2012). The impacts of food safety standards on China's tea exports. *China Economic Review*, *23*(2), 253-264.

Websites

- CBI Product Factsheet: Certified Tea in Europe (2016), https://www.cbi.eu/sites/default/files/market_information/researches/product-factsheet-europe-certified-tea-2016_0.pdf retrieved 06/06/2016
- CBI Product Factsheet: Specialty Tea in Europe (2016) https://www.cbi.eu/sites/default/files/market_information/researches/product-factsheet-europe-specialty-tea-2016.pdf retrieved 06/06/2016
- Chang, K & FAO Intergovernmental Group on Tea (2015). World tea production and trade, current and future developments http://www.fao.org/3/a-i4480e.pdf
- China Daily, 2016 http://www.chinadaily.com.cn/china/2011-11/11/content_14075815.htm retrieved: 15/05/2016
- Chinafolio, 2016 http://www.chinafolio.com/provinces/zhejiang-province/ retrieved 16/09/2016
- Core code of conduct for individual and multi-site certification, 2015 https://www.scsglobalservices.com/files/en_utz_core_code_for_individual_certification_2014.pdf last acceded at 15/05/2016
- EPA, 2016 https://www.epa.gov/ems retrieved 02/08/2016
- Ethical Tea Partnership, 2015 http://www.ethicalteapartnership.org/ retrieved 02/01/2016
- Ethicalteapartnership: case study supporting Chinese Farmers, 2015 http://www.ethicalteapartnership.org/wp-content/uploads/Case-Study-Supporting-Chinese-Producers.pdf retrieved: 28/12/2015
- Eur-lex,2016 http://eur-lex.europa.eu/legalcontent/EN/TXT/PDF/?uri=CELEX:32002R0178&from=EN retrieved: 29/07/2016
- Fairtrade, 2006 http://www.fairtrade.net/about-fairtrade/certifying-fairtrade.html last accessed at 16/09/2016
- Fairtrade, 2016 http://www.fairtrade.net/ retrieved 20/01/2016
- Fairtrade Standard for Small Scale Producer organisations, 2011 http://www.fairtrade.net/fileadmin/user_upload/content/2009/standards/documents/SPO_EN.pdf retrieved: 15/05/2016
- FAO, 2016 http://www.fao.org/fao-who-codexalimentarius/standards/pestres/commodities-detail/en/?lang=en&c_id=101 retrieved: 16/05/2016
- FAO, 2016 http://www.fao.org/agriculture/crops/thematic-sitemap/theme/pests/ipm/en/ retrieved: 01/07/2016
- Flocert, 2016 http://www.flocert.net/ retrieved: 13/01/2016
- Global GAP, 2016 http://www.globalgap.org/uk_en/ retrieved: 13/01/2016
- Globalgap, 2016 http://www.globalgap.org/uk_en/what-we-do/globalg.a.p.-certification/globalg.a.p./ retrieved: 20/01/2016
- Greenpeace: Hidden Ingredients in Chinese Tea http://www.greenpeace.org/eastasia/publications/reports/food-agriculture/2012/pesticides-chinese-tea-report/ retrieved 15/05/2016
- IFOAM, 2016 http://www.ifoam.bio/en/ifoam-standad retrieved: 06/09/2016
- ILO, 2015 http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/instructionalmaterial/wcms_110196.pdf retrieved: 28/12/ 2015
- ISEAL Alliance, 2016 http://www.isealalliance.org/ retrieved 20/01/2016
- ISEAL Alliance, n.d. http://www.isealalliance.org/sites/default/files/SSCT_Factsheet.pdf retrieved: 07/09/2016

- Kaleidoscope.cultural-China, 2015. http://kaleidoscope.cultural-china.com/en/131Kaleidoscope97.html retrieved 09/05/2016
- PRweb, 2006 http://ww1.prweb.com/prfiles/2005/06/01/246771/IFOAMLOGO.jpg retrieved: 16/09/2016
- Rainforest Alliance, 2016 http://www.rainforest-alliance.org/about retrieved : 16/09/2016
- Rainforest-Alliance, 2015. http://www.rainforest-alliance.org/work/agriculture/tea, retrieved: 20/06-2015
- Standardsmap, 2016 http://www.standardsmap.org/identify retrieved: 20/01/2016
- Statista, 2016, http://www.statista.com/statistics/242927/tea-production-in-thousand-tons-by-region/ retrieved: 24/02/2016
- Sustainable Agricultural Standard SAN, http://www.san.ag/biblioteca/docs/SAN-S-1-4_Sustainable_Agriculture_Standard.pdf retrieved: 15/05/2016
- Tea Research Institute, the Chinese Academy of Agricultural Science (2013) http://www.caas.cn/en/administration/research_institutes/research_institutes_out_beijing/zhejiang_hangzhou/77940.shtml retrieved: 15/09/2015
- TeaVivre, 2013, http://www.teavivre.com/info/zhejiang-tea-area/ retrieved: 24/02/2016
- Tetley, 2015. http://www.tetley.cou/about-us/ethical-tea-partnership , retrieved: 20/01-2016
- UTZ certified, 2015. https://www.utzcertified.org/products/tea retrieved: 20/06/2015
- UTZ certified, 2015. https://www.utzcertified.org/products/tea retrieved: 19/01/2016
- UTZ file://vuw/Personal$/Homes/11/s1149997/Downloads/EN_UTZ_Chain-of-Custody-Standard-Tea-Annex_v1.1_2015.pdf retrieved: 19/01/2016
- Xm tea, 2015, http://www.xm-tea.net/tea-maps.html retrieved: 24/02/2016

Personal Communication – Interviews

- Interview respondent 1, Shanghai 28-10-2015
- Interview respondent 2, Shanghai, 17-11, 2015
- Interview respondent 3, Amsterdam, 30-01-2016
- Interview respondent 4, Questions by e-mail 2015 24-11- 2015
- Interview respondent 5, Nanjing, 14-11-2015
- Interview respondent 6, Telephone Interview, 6-11, 2015
- Interview respondent 7, Telephone Interview 22-10-2015
- Interview respondent 8, Telephone Interview 21-10-2015
- Interview respondent 9, Hangzhou, 5-11-2015

Appendix 1: Interview Questions

Dear Sir/Madam,

- *Would you mind me to tape the interview. In this case it is easier for me to listen back to it at a later moment and to make sure that no information will be lost. I will only use the tape for my research and will not share it with any third parties but Wageningen University. I will come back to this point at the end.*
- *The interview will approximately last approximately between 30 minutes. It is a qualitative data gaining method, the questions are 'open questions' so therefore especially the 'why' of the questions are important.*

<u>The Questions.</u>

1. **General questions: work & occupations**
    - What are your major occupations during your work
    - Which part(s) of the tea value chain are you focussing on or working with
    - Do you work with….
        - Small firms (2-3ha) or large firms (>3ha)
        - Is your work export market or domestic mark oriented
        - Sole business/organisation or a cooperative
        - Do you work with genuine or non-genuine tea
        - Do you work with part-time or full time tea farmers

2. **Environmental sustainability issues in the supply chain**
    - What issues do you recognise in the tea supply chain
    - What environmental issues do you recognise in your part of the supply chain, such as
        - Deforestation
        - Loss of biodiversity (nature)
        - Loss of biodiversity (animals)
        - Soil erosion
        - Low soil fertility
        - Agrochemical use / use of fertilizers
        - Air pollution
        - Water pollution
        - Other pollution
        - Other issues
    - Please put the issues in order of importance of potential value adding to the product.

3. **Application of standards**
    - Do you work with certified tea (to what extent)
    - Do you think certification standards would contribute to deal with the environmental issues?
    - Are there sufficient means in the value chain to apply for certification?
    - (what) are the major obstacles,
        - Knowledge about application of certification schemes

    - Availability of certification schemes in the region
    - Money available within farm or cooperative.
    - Administrative burden
    - No benefits recognised / lack of incentive
    - Other obstacles
- Please put them in order of importance for the long-term usage of the tea-plantation.

4. Use of data

Thank you so much for your cooperation. The data will be just used for my thesis, which will be accessible for other Wageningen University students and my supervisor.
If you agree I would also like to share it with the interviewees that are contributing to the report.
Are you ok with this [yes / no]

5. Other contacts

Do you have any other contacts I can contact to interview for my thesis?

Appendix 2 : Standards Map Overview

When using Standardsmap.org and selecting for: any environmental standards, tea, being produced in China, and Europe as destination market: 28 standards meet the criteria. They are listed in the table below (Standardsmap, 2016). The ones marked, are the ones used for this report. Since UTZ activities on tea in China have started only relatively recently, since 2014, their activities are not yet represented by the Standardsmap overview.

1. Bio Suisse
2. BRC Global Standards – Food
3. Business Social Compliance Initiative Code of Conduct - BSCI
4. China Gap
5. Chinese National Organic Products Certification Program
6. EcoVadis
7. Ethical Tea Partnership
8. Ethical Trading Initiative – ETI
9. EU Organic Farming
10. Fair Trade International – Hired Labour
11. Fair Trade International – Small Producers Organisations*
12. FLA Workplace Code of Conduct
13. Green Food
14. Guide on Social Responsibility for Chinese Int. Contractors
15. IFOAM Standard*
16. IFS Food
17. International Labour Organisation Labour Standards
18. Naturland
19. OFDC Organic Certification Standards
20. SAFA - Sustainability Assesment of Food and Agriculture Systems
21. SAI Platform Farm Sustainability Assesment
22. Sedex Global (supplier ethical data exchange)
23. Sedex Member Ethical Trade Audit – SMETA Best Practice Guidance
24. SQF - Safe Quality Food Programme
25. Sustainable Agriculture Network – Rainforest Alliance*
26. Unilever Sustainable Agriculture Code
27. Verified Carbon Standard VCS
28. WFTO Guarantee System