**Wageningen University - Department of Social Sciences - Rural Sociology Group**

# "Two Times More with Two Times Less"

## Framing and Reframing of Global Food Security at Wageningen University and Research Centre

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# Abstract

Wageningen University & Research Centre (Wageningen UR) is one of the world's leading education and research institutes in the area of life sciences, agriculture and food. One of the core areas of Wageningen UR focuses on food and Global Food Security (GFS). Today, food security is a term used for a broad issue, which is widely used in a broad variety of discursive contexts. The current debate on GFS is multidimensional and complex. At the present moment, no consensus of how to achieve it exists. GFS can hence be called a 'consensus frame'. The way Wageningen UR currently frames GFS internally as well as externally determines the measures it perceives as necessary to achieve it. This framing may limit Wageningen UR's ability to take advantage of the full range of solutions available. Not only can this existing frame limit solutions, but these solutions may not adequately address the key elements of GFS. The aim of this thesis was to investigate if Wageningen UR's GFS framing adequately addresses GFS.

The theoretical framework of this thesis is framing theory. Framing elucidates  how something is presented and the influence this has on people. An inductive frame package analysis was conducted, using four data sources: Wageningen UR's website, speeches of- and interviews with members of Wageningen UR's Executive Board, interviews with key informants and MSc and BSc course descriptions from Wageningen UR's study handbook 2013-2014.

Wageningen UR's main frame accentuates GFS as a *future* challenge; A challenge of increasing primary production of adequate and sustainable land-based food. A challenge, which emphasizes science and technology, focusing primarily on the 'smaller level' of products, organisms, cells and molecules in the natural sciences. However, both literature and interviews indicate that there is *more* than merely increasing the primary production of food and the production efficiency when addressing issues of GFS. Reframing is hence important. Grasping and defining what this *more* is however, is illusive, given the large variety in opinions.

There is great opportunity to  include and emphasize additional topics in the Wageningen UR main frame. The existing overarching theme is twofold: the socio-cultural and the agroecological aspects of GFS. Finally, four aspects important for operationalizing a (new) frame at Wageningen UR have been identified: collaboration and integration between disciplines, a stronger sociocratic approach, a stronger focus on qualitative research and methodological pluralism, and enhanced collaboration with society.

**Keywords**: Global Food Security, Frame, Frame analysis, Reframing, Wageningen UR

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# List of abbreviations

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|---|---|
| AEP | Agricultural Economics and Rural Policy |
| BSc | Bachelor of Science |
| ENP | Environmental Policy |
| FAO | Food and Agriculture Organization of the United Nations |
| FCH | Laboratory of Food Chemistry |
| FSE | Farming Systems Ecology |
| GFS | Global Food Security |
| HNE | Human Nutrition |
| MDG | Millennium Development Goals |
| MOA | Master Organic Agriculture |
| MSc | Master of Science |
| NGO | Non-Governmental Organization |
| ORL | Operations Research and Logistics |
| PAP | Public Administration |
| SCH | Sociology of Consumption and Households |
| SDG | Sustainable Development Goal |
| UN | United Nations |
| Wageningen UR | Wageningen University and Research Centre |
| WASS | Wageningen School of Social Sciences |

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# Preface

Five years ago I arrived in Wageningen to begin a Bachelor in Animal Sciences. After two years I wanted to broaden my knowledge and travelled to Brazil to study agroecology and sociology for six months. In Brazil, I realized I wanted to know everything about sustainable food from farm to fork, for all.

Over the course of the next years I could not learn everything there is to sustainable food, but what I did do was to approach the topic from as many angles as possible. I tried to understand the different meanings of it and gain insight in the discussions held and arguments used. From gender studies to soil science, from human nutrition to food law, I immersed myself in the topic. In my search for a holistic food Master's to continue this hunger for knowledge, I ended up enrolling in the Organic Agriculture programme at Wageningen UR. Why organic agriculture? Because this programme had a lot of room for free choice courses. This way I could design my own holistic programme as much as possible.

While studying for the Master of Organic Agriculture (MOA) I became fascinated by the difficulty in defining the 'typical' organic agriculture student. Management, anthropology, biology, animal sciences, agronomy, human nutrition and economy were only some of the backgrounds of my fellow students. Another observation was that many of these students were not necessarily interested in organic agriculture per se, they rather wanted to study something else than conventional agriculture: food sovereignty, urban agriculture, alternative food networks, food security or food policy. Was it time for a new Master's programme that could address the question of feeding the world in a holistic way by integrating different disciplines, especially between the social and the natural sciences?

The most important thing I learned in my last five years in Wageningen was not how photosynthesis works or what a product of a protected designation of origin is. The main lesson was that food means something else in every single discipline and that to achieve Global Food Security (GFS) today, and in the future, the meanings of food should be understood better between different disciplines. How is it possible that nutritionists know everything about the nutritional benefits of fish, while animal scientists know that the seas are actually almost empty? And what is the role of Wageningen UR in moulding students' worldviews?

In this thesis, I therefore went back to the roots of these questions: the meaning of GFS at Wageningen UR. What does GFS mean at Wageningen UR? What different meanings could be discovered? Which topics were left untouched and for what reason? And most important: what

topics might offer opportunities and are necessary to still introduce or emphasize when addressing GFS?

Lara Sibbing

*The way people think about hunger is the greatest obstacle to ending it*

*(Lappé et al. 1998, p.7)*

# 1   Introduction

In this chapter the problem statement is presented and the research questions are explained and contextualized. Section 1 describes the background and context for this thesis. Section 2 follows with the problem statement, while in section 3, the consecutive aim and research questions are presented. The final section of this chapter provides a reading guide for this document.

## 1.1    What happened prior to this thesis?

In September 2012, the president of Wageningen University and Research Centre (Wageningen UR), Aalt Dijkhuizen, gave an interview in Dutch newspaper *Trouw* on how to feed the world in the future. He proclaimed that the way approach this challenge was through 'sustainable intensification', promoting intensive agricultural production systems. In his opening speech of the 2012-13 academic year, he repeated this message. A storm of criticism erupted. The criticisms which ensued can be divided into two arguments. The first and most heard argument is this: the strength of Wageningen UR (and in general of a university: Latin: 'universitas', 'a whole') is the diversity of opinions and paradigms. To proclaim one view as *the* corporate view of Wageningen UR undermines embracing this essential diversity.

Secondly, although to a lesser extent, the actual content of Dijkhuizen's message was criticized. There were both scientists and non-scientists who found sustainable intensification being 'the only way to feed the world' a far too narrow approach. They saw more in agroecological approaches, as for example promoted by former UN Special Rapporteur on the right to food: Olivier de Schutter.

This was the start of a new wave of discussions about the identity of Wageningen UR and about how to sustainably feed the world's population in order to achieve Global Food Security (GFS). In other words: how to frame – i.e. how to define and where to put the emphasis in – GFS at Wageningen UR?

## 1.2    What is the problem?

The debate on GFS is multidimensional and complex. Even today there is no general consensus on how to achieve it. This diversity of views starts with the differences of perceptions regarding the problem at hand. Are we addressing a lack of food? Are we addressing a lack of food in the future? Are we addressing a lack of *quality* food or a lack of *responsible* food?  Are we addressing poverty? Or an unequal distribution of food? Or are we addressing all these problems in isolation without acknowledging the importance of potential connections?

Wageningen UR is one of the world's leading education institutes in the area of life sciences, agriculture and food. It has been among the best universities in international rankings for years (ARWU 2014; NTU 2013; Times Higher Education 2013), certainly within the domain it covers (Wageningen UR 2014):

1.      Food and food production

2.      Living environment

3.      Health, lifestyle and livelihood

Especially within this first area, one of the main concentrations is GFS, which nicely reflects Wageningen UR's mission statement: *'To explore the potential of nature to improve the quality of life'* (Wageningen UR 2014).

Wageningen UR offers many BSc and MSc programs addressing this first core area: *Nutrition & Health*, *Plant Sciences* and *Food Technology* are only a few of the options. In these programmes, a wide range of courses which discuss food and food production is offered. For example: *Globalization and Sustainability of Food Production and Consumption, Quantitative Aspects of Crop Production, Sustainability in Food Chains, Global Food Security, Food Safety Economics*, *Food Quality Management*, *Food Law, Organic Plant Production, Food Process Engineering, Cropping Systems & Knowledge of Crops, Psychobiology of Food Choice and Eating Behaviour* and *Analysing Sustainability of Farming Systems* (Wageningen UR 2013). As is evident here, the range of courses is diverse. It hence seems that Wageningen UR addresses many different aspects of food, food production and GFS (Wageningen UR 2013).

However, former president Aalt Dijkhuizen (who resigned in February 2014) addressed GFS from only one perspective. This raises the question: are there certain perspectives on GFS that get more attention than others at Wageningen UR? Or is there perhaps only one dominating perspective?

One dominating perspective would form a risk for the diversity of Wageningen UR's educational offerings and would limit Wageningen UR's ability to take advantage of the full range of GFS solutions available. Quality education embraces pluralism of thought and also explores counter-hegemonic perspectives to avoid getting trapped in one particular way of seeing the world and 'singular' solutions. This is a healthy, critical, scientific attitude that allows for new ideas to emerge. Opening spaces for learning, rather than closing them down is therefore important (Wals, 2014). A university should hence aim to stimulate different critical views and encourage dialogue between these views. Using only one perspective for GFS is therefore not desirable (see also Stirling (2009, pp.23–27), who

stresses the importance of diversity in approaches regarding the topic of sustainability; this could easily be extrapolated to GFS). Furthermore, as one of the world's leading education and research institutes in its area, Wageningen UR has a strong influence on the direction of research, education and on the perception of GFS in general. The GFS perspective(s) Wageningen UR uses is/are therefore important since their influence goes further than just the institute itself.

The problem statement of this thesis – which echoes the two criticisms mentioned in section 1.1 – is as follows: firstly Wageningen UR might be emphasising one GFS perspective over others, while proclaiming this one view as *the corporate* view of Wageningen UR. This would undermine the importance of having diverse views and opinions at Wageningen UR. Secondly, if the perspective of 'sustainably intensifying production' is the dominant frame at Wageningen UR, this is most probably too narrow of an approach to adequately address GFS.

## 1.3    Aim and main research questions

To investigate the identified problem of this thesis, the initial first research question was: is Wageningen UR using one dominating perspective for GFS? After a brief review of the Wageningen UR website and other external communication media, it became glaringly clear that Wageningen UR has one corporate message on GFS. How GFS is defined and where the emphasis lies in this message can be called the 'frame'. What exactly this frame is and what the key elements are, remained an essential question.

This thesis therefore aims to investigate how GFS is framed – i.e. how it is defined and where the emphasis lies – at Wageningen UR, in order to determine if this frame is adequate for addressing GFS or if reframing is needed. The last part of this objective – determining if the frame is adequate – refers to the second part of the problem statement: if the perspective of 'sustainably intensifying production' is the dominant one at Wageningen UR, this approach is likely too narrow for addressing GFS. Therefore, the main research question of this study is:

**How is Wageningen UR's framing of Global Food Security (GFS) affecting its ability to address GFS adequately?**

In order to answer this question five sub questions are addressed within this study:

1.      **What is Wageningen UR's corporate main frame for GFS?**

2.      **How does this main frame relate to internal GFS frames used in current BSc and MSc programs at Wageningen University?**

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**3.**       **Is there a gap between Wageningen UR's frame and current debates on GFS?**

**4.**       **How could GFS be reframed at Wageningen UR?**

**5.**       **What is necessary to adequately address GFS at Wageningen UR?**

### 1.4    Outline of this thesis

In Chapter 2 the concept of GFS is defined and a literature review on the current GFS discussion is presented. Chapter 2 explains the research design and the methodology used for this study; it introduces the theoretical framework and the data collection methods. In Chapter 0 the main GFS frame of Wageningen UR is elucidated and discussed, in other words: 'where do we stand now?' After discussing this main frame, opportunities for reframing GFS are discussed in Chapter 5: the 'where do we need to go?' Chapter 6 presents suggestions for general changes to Wageningen UR's education and research structure and characteristics: the '*how* to do it?' question. Finally, conclusions are drawn, recommendations are made and reflections on the thesis research are presented in Chapter 7. Chapter 8 presents the author's personal reflections on this research.

# 2 Global Food Security debates in literature

In this chapter the conceptual framework of GFS is discussed. The first section elaborates on the definition of GFS, while the second section presents a detailed account of the current GFS debates.

## 2.1 Defining 'Global Food Security'

Today, food security is a term addressing a broad issue, which is widely used in a broad variety of discursive contexts. The definition of the Food and Agriculture Organization of the United Nations (FAO) from 1996 is currently the most cited definition internationally. According to the FAO, food security "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996). Candel et al. (2014, p.48) argue that:

> *It is a particular term or concept that is widely shared and accepted in terms of its values and objectives. A concept that no one can be against and finds wide resonance, and therefore is used by a broad range of actors, even though many of them hold contradictory policy positions.*

Gamson (1995) calls such terms 'consensus frames'. Mooney & Hunt (2009) argue that this consensus frame is a 'false prophet' of unity and that food security is what Snow & Benford (1992) call an 'elaborate master frame'. Elaborate master frames comprise a wide range of ideas, they are flexible modes of interpretation and as a consequence, allow for extensive amplification and extension of ideas (Snow & Benford 1992). Food security could now be interpreted as having become a 'plastic term' where it has so many meanings that it does not mean anything anymore. Much like 'sustainability' – food security is an inexorably ill-defined concept which is both appealing to those who wish to give in meaning in a context and to those seeking universal truth and a precise definition. Many countries and organizations are now moving away from the concept of food security since they do not find it to be addressing the topic adequately anymore. Instead, they are now adopting new terms such as *nutrition security*, *food and nutrition security* and *global food and nutrition security*.

Mooney & Hunt (2009, p.469) argue that food security "is a potent consensus frame that has generated at least three distinct collective action frames". (1) Food security as hunger; (2) food security as a component of a community's developmental whole; and (3) food security as minimizing

risks with respect to an industrialized food system's vulnerability to both 'normal accidents' as well as the 'intentional accidents' associated with agriterrorism (Mooney & Hunt 2009).

The previous paragraphs demonstrate the importance of defining the term 'Global Food Security' (GFS). The starting point in this study was Mooney & Hunt's (2009) hunger frame. This frame originally derives from Malthusian assumptions (Mooney & Hunt 2009). In the hunger frame, food security is framed broadly as encompassing three dimensions identified by Busch & Lacy (1984) as: availability, accessibility and adequacy. Busch & Lacy (1984) argue that 'availability' (having enough food to sustain the lives of the entire population) depends on a system that (1) can produce enough food in the short run, (2) is sustainable in the long run, (3) does not place undue risks on agricultural producers, and (4) responds rapidly to disruptions in the food supply due to natural disasters, civil disturbances, environmental imbalances or other causes. 'Accessibility' refers to food that is not only available, but also accessible (Busch & Lacy 1984). The difference between availability and accessibility is nicely expressed by Sen (1981, p.1) in his famous quote: "Starvation is the characteristic of some people not *having* enough food to eat. It is not the characteristic of there *being* not enough food to eat" (emphasis in original). 'Adequacy' refers to balanced diets for the nutritional needs of various segments of the population, implying that food is free from disease and toxic substances (Busch & Lacy 1984). In short: it is not only quantity that counts, but also quality. The FAO approximates Busch & Lacy (1984), identifying four food security dimensions: 1; availability, 2; access, 3; utilization and 4; stability (of the availability of food, the access to food and the utilization of food *over time*) (FAO 2013b; FAO 2008).

In this section the definition of food security was explained. This thesis uses the term *Global* Food Security (GFS). In the narrowest sense, the term 'global' refers to: pertaining to the whole world. However, in literature the term 'global' is often used to address the myriad interactions that take place across multiple spheres. From the individual, through to the family level and from local communities, to nations, up to the international level (Duncan, 2014). In the 'All people at all times' portion of the FAO's definition, the 'everywhere' component is already present. In this thesis it was decided to add 'Global' to the term 'Food Security' to include the different spheres and to hence stress that food security is about all people, at all times, *everywhere* and at all *levels* around the globe.

## 2.2    Global Food Security debates

In order to more adequately assess the existence of a WUR main frame and to in turn contextualise it, a literature analysis was conducted. The leitmotif of this literature study was simple: 'What are the

key issues defining global food insecurity and what are the proposed solutions?' For this analysis academic literature was used.

According to the FAO, 845 million people did not meet their dietary needs in 2013 (FAO 2013b). Some claim this is an underestimation and more accurate estimates are over one billion undernourished people, since seasonal hunger, qualitative hunger, higher caloric demand under hard labour conditions and gender inequalities are not taken into account in the FAO's statistics (Schutter 2014). The urgency of this situation is demonstrated by the fact that eradicating extreme poverty and hunger is the first Millennium Development Goal (MDG) of the United Nations (UN)(UN 2000). On the other hand, over one third of all adults across the world – 1.46 billion people – are currently considered obese or overweight (Keats & Wiggins 2014).

Meanwhile, the global population is continually increasing and it is expected that the population will be reach 8.3 and 10.9 billion by 2050 (UN 2012). Feeding the roughly 1 billion hungry, while keeping the other 1.46 billion healthy today and feeding 1.1 to 3.7 billion more in 2050 is undisputedly an immense challenge, let alone doing so in a socially, environmentally and economically sustainable way.

Over the past decades the dominant paradigm, the productionist paradigm, has treated food security as a question of scarcity and hence focused on the 'availability' dimension of food. Food production needed to increase in order to end food scarcity. The origins of the productionist paradigm lie in the industrialisation of food over the last 200 years (Lang & Heasman 2004, p.19). This approach finds its origins in Malthusian thinking. The essence of the productionist paradigm can be found in concurrently increasing production and productivity with the focus on yield considerations. "Productionism is the idea that agricultural yield, especially of staple food and feed crops, is the most important goal of farming" (Finnan 2011). The main features of the productionist paradigm therefore are its focus on high inputs and high outputs.

In the second half of the 20th century however, the amount of calories per person per day increased tremendously. Abundance, rather than scarcity best describes the supply of food in the world today. More than 2700 calories per person per day have been available for decades, vastly exceeding the average minimum energy requirement of 1600-2000 calories per person per day, depending on the country (FAO 2013a). Poverty and inequality, rather than scarcity, are now considered the principal causes of hunger (Lang et al. 2009, pp.253–287; Holt-Gimenez 2012; WFP 2014).

In the GFS debate there are two main positions: (1) GFS as a future problem of feeding a growing population with changing demands and (2) GFS as a problem that already exists today and is caused by poverty and inequality. Environmental sustainability plays an important role in both.

The authors supporting the first position state that food production needs to double to feed the extrapolated population in 2050 (see for example van Ittersum et al. (2013), Ray et al. (2013) and Godfray et al. (2010)). This group advocates sustainable intensification. In sustainable intensification – an internationally referenced term – GFS challenges are traditionally framed as availability issues. "The origins of SI [sustainable intensification] lie in discussions about increasing yields, chiefly of arable crops, in the face of resource scarcity and environmental challenges" (Garnett et al. 2013). In sustainable intensification, it is not just about *availability* however, it is also very much about *efficiency.* Traditionally sustainable intensification is an ideology that adheres to a productionist view of feeding the world. Although sustainable intensification is now interpreted in many different ways, by many different users, the original concept (which is still used most often) fails to take into account power, profit, politics and participation in the food system.

Tomlinson (2013) criticizes the specific claim in the sustainable intensification discourse that global food production *needs* to be increased by 70-100% in order to feed the world in 2050. Her critique is based on two main observations. First, she argues that increasing production on such a scale was never intended as a normative goal of policy in the original publications (Rosegrant et al. 2006 and the FAO 2006) and, second, she argues that to do so would exacerbate many of the existing problems within the current, global food system.

Tomlinson's second argument is the main argument of the second group of authors. They believe that the question "why, if there is enough food in the world today, do people still go hungry?" entails the core of the GFS problem (see for example Tittonell (2013) and De Schutter (2014)). Wageningen UR Professor Pablo Tittonell (2013), for example, states that:

> *The right question to ask ourselves in order to nourish a more fruitful debate is then:*
> *Why does conventional agriculture fail to feed the world? There are several partial*
> *explanations to this, but the more fundamental problems are:*
> 1. *Worldwide, food is not produced where it is mostly consumed or needed;*
> 2. *Chemical, genetic and energy inputs used in conventional agriculture are not*
>    *affordable to all farmers;*
> 3. *Current trends in diets and food habits are not compatible with the sustainable*
>    *use of global resources;*
> 4. *Market chains are ineffective in ensuring access to food for everyone and lead to*

*substantial food waste.*

Lang & Heasman (2004, p.26) argue there are currently two paradigms next to the Productionist paradigm: the Life Sciences Integrated paradigm and the Ecologically Integrated paradigm. The first group of authors discussed in this section are considered to belong to the Life Sciences Integrated paradigm, and is currently the dominant GFS paradigm. The Life Sciences Integrated paradigm can be described as follows:

> *The Life Sciences Integrated paradigm describes the rapidly emerging scientific framework that is heralding the application of new biological technologies to food production. We propose this paradigm as a way of capturing a body of thought that has at its core a mechanistic and fairly medicalized interpretation of human and environmental health (Lang & Heasman 2004, pp.21–22).*

The second group of authors are considered to belong to the Ecologically Integrated paradigm:

> *The Ecologically Integrated paradigm is also grounded firmly in the science of biology, but it takes a more integrative and less engineering approach to nature. (...) In its thinking about agriculture, the Ecologically Integrated paradigm framework corresponds closely to the body of thinking described as agroecology (Lang & Heasman 2004, p.26).*

In addition, this approach closely reflects with what McMichael & Schneider (2011) call the 'multifunctionality approach'.

One of the most important internationally used targets for improving GFS are the UN's MDG's. These MDG's will end in 2015 and therefore new goals are currently being developed. In July 2014 the UN General Assembly's Open Working Group for Sustainable Development Goals proposed the Sustainable Development Goals (SDG) to the Assembly. The first proposed SDG is "to end poverty in all its forms everywhere". Proposed goal 2 is: "to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture" (UN Open Working Group for Sustainable Development Goals 2014). The eight proposed targets for this second goal are as follows (UN Open Working Group for Sustainable Development Goals 2014; emphasis added):

> *2.1 by 2030 end hunger and ensure access by all people, in particular the poor and people in vulnerable situations including infants, to safe, nutritious and sufficient food all year round.*

*2.2 by 2030 end all forms of malnutrition, including achieving by 2025 the internationally agreed targets on stunting and wasting in children under five years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women, and older persons.*

*2.3 by 2030 double the agricultural productivity and the incomes of small-scale food producers, particularly women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets, and opportunities for value addition and non-farm employment.*

*2.4 by 2030 ensure sustainable food production systems and implement **resilient** agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.*

*2.5 by 2020 maintain **genetic diversity** of seeds, cultivated plants, farmed and domesticated animals and their related wild species, including through soundly managed and **diversified** seed and plant banks at national, regional and international levels, and **ensure access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge as internationally agreed.***

*2.6 **increase investment, including through enhanced international cooperation, in rural infrastructure**, agricultural research and extension services, technology development, and plant and livestock gene banks to enhance agricultural productive capacity in developing countries, in particular in least developed countries.*

*2.7 **correct and prevent trade restrictions and distortions in world agricultural markets** including by the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round.*

*2.8 **adopt measures to ensure the proper functioning of food commodity markets and their derivatives**, and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility.*

As compared to the MDG's, the SDG proposal sets out a new line for addressing food security in its second goal. The targets show a strong focus on the social aspects and on the on larger scale (i.e. governmental, international and global level) and to a much smaller extent on technology, as can be

observed form the emphasized parts in the SDG's in the previous paragraph. It seems that the recommended approach for GFS in the future is taking a different course of one moving from the Life Sciences Integrated paradigm to the Ecologically Integrated paradigm.

# 3   Research design and methodology

In this chapter the theoretical framework, research design and methodology are discussed. The first section explains framing theory; the theoretical framework of this thesis. Section 2 describes how data collection was completed, while section 3 presents the data sources used. The final section describes the coding methods used for an in depth analysis of the data.

## 3.1   Theoretical framework

The theoretical framework used in this thesis is framing. Framing is contrary to the central concept of rational choice theory. It rejects the idea that people strive to make the most rational choice. Instead, framing suggests that people are influenced by the way an issue is presented (framed) and that there is no neutral way of presenting any information. Therefore, capturing the essence of framing is to determine how something is presented and the influence this has on human beings. There are different traditions of framing, but a common denominator is that framing is a 'sensemaking device' (Weick 1995).

The origins of framing lie in two main traditions: cognitive psychology (Bartlett 1932) and anthropology (Bateson 1972). Framing has been used by many different authors, for example in sociology (Goffman 1974), artificial intelligence (Minksy 1975), communication (Entman 1993; Tannen 1993; Scheufele 1999), psychology (Levin et al. 1998; Tversky & Kahneman 1981), social movements and public policy deliberations (Benford & Snow 2000; Hajer & Wagenaar 2003; Rein & Schön 1996), management (Fairhurst & Sarr 1996; Creed et al. 2002) and conflict and negotiation studies (Dewulf et al. 2009; Lewicki et al**.** 2003).

Due to its wide use, various definitions of framing exist. In this thesis Entman's (1993) definition, which originates from communication studies, is used:

> *Framing essentially involves selection and salience. To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described [emphasis in the original] (Entman 1993, p.52).*

Since the topic of this thesis could be viewed as a combination of sociology, communication,

education and media studies, there are other interesting definitions from different fields which demonstrate the value of framing theory for this thesis.

Dewulf et al. (2009) make a useful distinction between cognitive and interactional approaches to framing. Cognitive frames are relatively static categories, while interactional frames are about the interaction between groups or individuals. Cognitive frames could hence be seen as 'between the ears', whereas interactional frames are 'between the noses' (Zwartkruis 2013). Dewulf et al. (2009) combine this distinction with a one based on *what* is actually framed (Table 1 shows an overview of their concepts). *What* is framed can be interpreted as an 'issue' frame, an 'identity' or 'relationship' frame or an 'interaction process' frame. Issue framing refers to attaching meaning to agenda items, events or problems in the relevant domain or context (Dewulf et al. 2009). In the case of this thesis, 'Global Food Security' holds a cognitive representation, which can hence be categorized as a cognitive issue frame (see Table 1).

*Table 1  Overview of framing concepts (Dewulf et al. 2009, from Zwartkruis 2013)*

| | **What is framed?** | | |
|---|---|---|---|
| Nature of frames | *Issues* | *Identities* <br><br>*Relationships* | *Process* |
| *Cognitive representations* | **1. Cognitive issue frames** | 2. Cognitive identity and relationship frames | 3. Cognitive process frames |
| *Interactional co-construction* | 4. Interactional issue framing | 5. Interactional identity and relationship framing | 6. Interactional process framing |

According to Goffman (1974, p.11) frame analysis is "the examination of the organization of experience". Framing can hence be defined as 'the organization of experience'. Chong & Druckman (2007, p.104) translate this into: "the major premise of framing theory is that an issue can be viewed from a variety of perspectives and be construed as having implications for multiple values or considerations". Entman's (1993) definition is stronger than Goffman's and Chong & Druckman's: he defines framing as a very active concept. Where Chong & Druckman (2007) speak of *viewing* and

*construing*, Entman (1993) talks about *selecting*, *promoting* and *making more salient.* Entman's active definition is especially interesting for this thesis, as it focuses on the messenger (in this case: Wageningen UR) as an active party in the framing process. The active role of the messenger is a key presumption in this thesis.

Elliott et al. (1998) argue that a frame is an institutional framework within which information is considered, selected, interpreted, evaluated, or simply, understood. "*Framing* is then a manipulation of factors causing a change in an individual's frame such that predictable behaviour is effected" (Elliott et al. 1998, p.456). This definition is even more intriguing than the previous. The idea of a frame as an institutional framework that comprises manipulated factors suggests that a frame is something very well-thought-out and that it is an active way of influencing people. *Manipulating* seems to even go a step further than *promoting* or *making more salient,* although it could be argued that *manipulating* is the same as promoting, but seen from a different (negative) *perspective*. The phrase *predictable behaviour of an individual* could among other things refer to a way of thinking. As a result of these two observations framing could be interpreted as the manipulation of factors to generate a way of thinking. Especially for Wageningen UR as an education institute, this is an interesting way to look at framing.

According to Nelson et al. (1997) framing is the process by which a communication source constructs and defines a social or political issue for its audience. Here the topic of politics is introduced. Framing is indeed a concept often used in politics. *The construction of a social or political issue* is probably superlative in the sense of active framing definitions. Since the way Wageningen UR communicates about GFS can be interpreted as a form of politics, Nelson and colleagues' (1997) definition of framing is also relevant for this thesis.

In addition, framing is often utilized in media studies. Specific pages of Wageningen UR's website, are interpreted here as news media. Entman (1993) and Nelson et al. (1997) state that by emphasizing specific values, facts, and other considerations, news media frame news items which promote particular definitions, interpretations, evaluations, and/or recommendations.

In literature a distinction is made between frames and framing. Zwartkruis (2013) suggests that frames are less visible than framing. "One could see frames as sources, which are not always very visible" (Zwartkruis 2013, p.35). Gray (2003, p.11) defines framing as: "the activity and process of creating and representing frames". As mentioned previously, this thesis focuses on the frame and not on the process of framing. This choice was made because the frame is a more adequate concept for analysing static data sources (such as webpages, course descriptions and speeches) at one specific

moment in time. It should be kept in mind though that frames change through time and are by no means static. However, it was beyond the scope of this thesis to study the process of framing and the development of frames over time.

'Reframing: the art of thinking differently' is the title of Dutch philosopher Karim Bennamar's book about reframing and this is exactly how reframing can be defined. Reframing is about changing an existing frame; by taking a step back, looking through different 'lenses' and considering alternatives for the existing frame. Reframing is an important concept which will be discussed in depth in the 5th chapter of this thesis.

Framing theory has also spawned criticisms (Steinberg 1999). One of the most important critiques is that it lacks conceptual precision in its delineation of frame elements and processes (Steinberg 1999). In other words: it is argued to be a loose and confusing concept. As Scheufele & Iyengar (2012, p.2) point out:

> *Current communications research on framing has largely abandoned the more rigorous (and narrow) definition of frames derived from psychology - frames as informationally equivalent labels – in favour of a much looser definition – stemming from work in sociology – that blurs the distinction between frames and other informational or persuasive features of messages.*

To avoid ambiguity, this section has described the concept of framing in detail and the definition of framing used in this thesis has been clearly specified. To avoid ambiguity in the way the frame analysis was conducted in this study, a detailed description of the methodology utilized has been included in the remaining sections of this chapter. Although these precautions were taken however, the poor delineation of frame elements and processes remains a key weakness of frame theory. The result of this interpretive character of frame theory, is both the strength and the important weakness in the using frame theory. The interpretive character of framing is discussed into more detail in section 3.4 'Data analysis' as it is in the analysis that this interpretive character is crucial.

Moreover, Steinberg (1999) argues that frame theory is too static and he stresses the dynamic characteristics and contextual and repetitive aspects of frames. He argues that analysts tend to present frames as relatively stable systems of meaning, similar to modular texts or maps with an articulated logic and structure of argumentation (Steinberg 1998). This critique about framing is especially relevant for this study, since frames were analysed at a static moment in time as compared to an analysis of the framing process over time. Unfortunately, it was beyond the scope of this research to conduct a dynamic framing analysis, although it would be useful to do so in further research.

Another critique, that is closely related to the lack of dynamics in frame theory is that framing gives an abstract meaning to things that might be mere indications in reality (Steinberg 1999). The weakness here is that in order to identify a frame, the use of a frame is actually necessary. This holds for both inductive as well as deductive analyses. Throughout this thesis, the term Global Food Security (GFS) is used to investigate how this concept is framed at Wageningen UR. It is important to note that framing food in terms of security, by using the term GFS, also represents a frame. In the discourse about food (and in research on discourses) other terms could also be used. Food equity, food justice, sustainable food practices, modern food practices or food transitions are terms that could frame food— and might lead the discussion in a very different way. A key limitation of this thesis therefore is the use of the GFS frame, which is in fact a frame used to identify a frame. In this way GFS is artificially approached as a relatively stable system of meaning, while in reality it is 'a complex web'.

Though framing proves a valuable theory for this research, it is essential to be aware of the critiques and to keep them in mind while conducting a framing analysis.

## 3.2    Data collection

In this thesis an inductive frame package analysis was conducted. This type of analysis is a heuristic tool suitable to identify frames behind the consensus frame of food security (Candel et al. 2014). Most framing studies use a deductive approach and the purpose is then to determine whether a list of a priori defined frames is retraceable in a source or whether these frames cause an effect (Van Gorp & van der Goot 2012). In an inductive frame analysis, however, the aim is to identify with an open view (a) possible frame(s) (Van Gorp & van der Goot 2012; Semetko & Valkenburg 2000). This is in line with Hope (2010, p.2), who states that "frame analysis is a discourse analysis method that is principally concerned with dissecting how an issue is defined and problematized, and the effect that this has on the broader discussion of the issue".

The methodological concept of a frame's interpretive package can be described as a "cluster of logical organized devices that function as an identity kit for a frame" (Van Gorp 2007, p.64). In other words, a frame package is a frame that becomes visible through various signifiers (Gamson & Lasch 1983). Signifiers are particular elements of a sentence, symbols or images that suggest the presence of a frame (Candel et al. 2014). Van Gorp (2007) divides these frame packages into framing devices and reasoning devices. Framing devices consist of "manifest elements in a message that function as demonstrable indicators of the frame" (Van Gorp & van der Goot 2012, p.131; Candel et al. 2014). These elements can be specific words, mottos, or images. Reasoning devices, on the other hand, are "explicit and implicit statements that deal with justifications, causes, and consequences in a temporal

order" (Van Gorp 2007, p.64). Reasoning devices are a frame's causal line of arguing (Candel et al. 2014). As Candel et al. (2014, p.49) state:

> *An essential difference between the two types of devices is that framing devices are directly visible in a text, whereas reasoning devices can lie hidden behind the formal wording and must therefore be distilled by the researcher through careful reading and through analysing the context in which a message is communicated.*

Orlikowski & Gash (1994) argue that frames are time- and context-dependent and should therefore be examined *in situ.* An inductive frame package analysis for the case study of Wageningen UR, is hence an adequate method.

Four main data sources were used in the frame package analysis:

1.      Wageningen UR's website (www.wageningenUR.nl)

2.      Interviews with key actors

3.      Speeches of the Executive Board members

4.      BSc and MSc courses from the study handbook

Figure 1 provides an overview of the structure of this thesis and how it was set up.
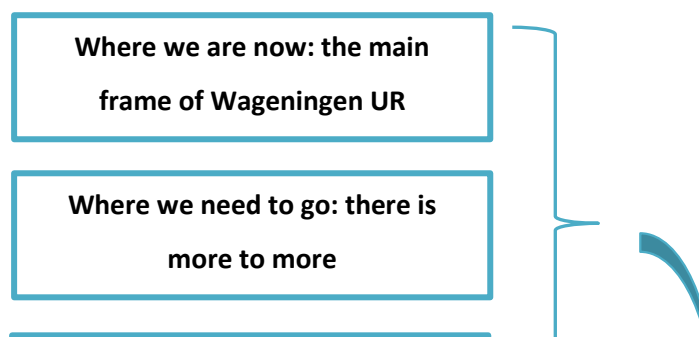
*Figure 1 Structure of this thesis*

In the next section: 'Data sources,' data sources and the way they were used are described in more detail.

## 3.3    Data sources

### 3.3.1  Website pages

An important source to study the frame(s) in Wageningen UR's corporate message is its website: www.wageningenUR.nl. On this website, webpages related to the topic of 'GFS' were selected. The first page selected was 'About Wageningen UR'. The mission and the domain of Wageningen UR are elucidated particularly clearly on this page. Moreover, the website includes pages that aim to inform future BSc and MSc students about the educational offerings of Wageningen University. For this audience an interesting tool has been added: potential future students now have the option to click on 'study something with…'. Here students can pick a topic of interest and find out what courses Wageningen University offers related to the topic. One of the topics is Nutrition (*Voeding* in Dutch) for BSc students and Food Production or Nutrition for MSc students. Moreover, on the website dossiers on various key topics can be found. Among these is the dossier 'Food Security'. Table 2 displays the webpages analysed, and a frame analysis was completed for each. For all webpages analysed the English version was used, except for the page 'Iets studeren met', as this page was only available in Dutch.

*Table 2 Webpages*

| Webpage | URL | Date accessed |
| --- | --- | --- |
| About Wageningen UR | http://www.wageningenur.nl/ en/About-Wageningen- | September 10, 2014 |

| | UR.htm | |
|---|---|---|
| Domain | http://www.wageningenur.nl/ en/About-Wageningen- UR/Domain.htm | September 4, 2014 |
| Dossier Food Security | http://www.wageningenur.nl/ en/Dossiers/file/Dossier-Food- security.htm | September 12, 2014 |
| Food | http://www.wageningenur.nl/ en/Education- Programmes/prospective- master-students/Themes- Wageningen- University/Food.htm | September 4, 2014 |
| Food Production | http://www.wageningenur.nl/ en/Research- Results/Themes/theme-food- production.htm | September 3, 2014 |
| Iets studeren met…[study something with…] | http://www.wageningenur.nl/ nl/Onderwijs- Opleidingen/Studiekiezers- bachelor/Iets-studeren- met.htm | September 12, 2014 |
| Mission and Vision | http://www.wageningenur.nl/ en/About-Wageningen- UR/Mission-and-vision.htm | September 4, 2014 |
| Nutrition & Health | http://www.wageningenur.nl/ en/Research- Results/Themes/Nutrition- Health.htm | September 4, 2014 |
| Research and Results | http://www.wageningenur.nl/ en/Research-Results.htm | September 4, 2014 |
| Strategic plan | http://www.wageningenur.nl/ en/About-Wageningen- UR/Strategic-plan.htm | September 4, 2014 |

For each webpage, all written content was copied into the first column of a table, created in a Word document. A second column included codes per phrase. For the page 'Iets studeren met' a translation column was added before coding.

### 3.3.2    Speeches and interviews of Executive Board members

The Executive Board plays a crucial role in the external communication of Wageningen UR. Its members are the representatives of Wageningen UR. Therefore key speeches from the two Executive Board members that are involved in the food security topic, were selected for analysis. This includes two opening speeches of the academic year 2012-2013 and 2013-2014 by former Chairman of the Board Aalt Dijkhuizen, one speech at the 95th birthday of Wageningen UR, the Dies Natalis: "Food for all: sustainable nutrition security" by Rector Martin Kropff and the previously-mentioned interview (see Section 1.1) with Chairman of the Board Aalt Dijkhuizen in the Dutch newspaper *Trouw.* All speeches used were in English. The interview with Aalt Dijkhuizen was in Dutch. Per interview or speech, all written content was copied into the first column of a table, created in a Word document. A second column, included codes per phrase. For the interview with Aalt Dijkhuizen a translation column was added before coding.

### 3.3.3    Interviews

To complement the data from Wageningen UR's website and the data from the speeches and the interview, interviews were conducted with six key informants involved in the GFS topic at Wageningen UR. Table 3 displays the interviewees.

*Table 3 Interviewees*

| Interviewee | Function | Date of interview |
|---|---|---|
| **Simon Vink** | Spokesperson Wageningen UR | April 16, 2014 |
| **Arthur Mol** | Director WASS (Wageningen School of Social Sciences) & Chairholder of the Environmental Policy group | May 21, 2014 |
| **Jac Niessen** | Science information and press officer Wageningen UR | May 22, 2014 |
| **Martin Kropff** | Rector Wageningen UR | May 28, 2014 |

| Kees van Veluw | Columnist Resource magazine, Wageningen UR, Lecturer Farming Systems Ecology group. | May 30, 2014 |
| --- | --- | --- |
| Tiny van Boekel | Director Education Institute Wageningen UR | June 4, 2014 |

These informants were selected based on their role at Wageningen UR. All are involved in communication, either internal or external. Furthermore, all interviewees have a relation with education and with GFS, since this topic is one of the core areas of Wageningen UR. Simon Vink is the official spokesperson of Wageningen UR. Jac Niessen is the science information and press officer at Wageningen UR. Both work at the 'Corporate Communications & Marketing General' division and are hence involved with the external communication of Wageningen UR. Both hold a degree in biology. Professor Arthur Mol is the chair holder of the Environmental Policy (ENP) group and the director of the Wageningen School of Social Sciences (WASS): Wageningen UR's social sciences graduate school. Martin Kropff is the vice president of Wageningen UR and the rector magnificus of Wageningen University. He is a plant scientist and holds a PhD in Agricultural and Environmental Sciences. Kees van Veluw is a lecturer in organic animal production at Wageningen UR's Farming Systems Ecology (FSE) group. He is a columnist for Wageningen UR's 'Resource' magazine. Tiny van Boekel holds a PhD in food technology, he is currently the director of Wageningen UR's Education Institute.

The interviews were open-end and semi-structured allowing each interviewee freedom to elaborate on his ideas. Moreover, all interviews included questions specifically adapted for the interviewee in order to take advantage of their expertise. For example: the interview with Tiny van Boekel had a stronger focus on education, while the interview with Simon Vink had a stronger focus on corporate communication. Data from previous interviews were used in those following; interviewees were confronted with ideas and quotes of other interviewees. For these two reasons, no interview was exactly the same. In the interviews, framing of GFS was discussed, but more importantly the topic of reframing of GFS was addressed and interviewees were asked for themes that could be added to or should be given a stronger emphasis to strengthen the GFS main frame at Wageningen UR. The aim of the interviews was two-fold: 1) discovering GFS framing devices used by key informants and 2) discovering GFS framing reasoning devices and ideas about reframing at Wageningen UR.

All interviews lasted about 60 minutes, except for the interview with the rector, which lasted about 40 minutes. Interviews were held in Dutch for interviewees to be able to clearly express themselves and to facilitate communication. Many English GFS jargon terms, such as food sovereignty were also

referred to in English, while speaking Dutch. Therefore, no differences in terminological meaning between English and Dutch were observed. Each interview was recorded with a mobile device. Per interview all data from the recording were transcribed into the first column of a table, created in a Word document. Subsequently a translation column was added. No specific software was used for translation. A third column was added, in which codes per phrase were added.

Pseudonyms were not used in this thesis, as all key informants gave permission to use their names. Moreover, the use of pseudonyms in combination with a description of their professional positions would not have been logical, as it would be easy to deduct who the key informants were from the information presented here.

### 3.3.4 Study handbook courses

To gain additional insight of how GFS is framed in courses in current BSc and MSc programs at Wageningen UR, a frame analysis for the courses from the study handbook 2013-1014 was performed.

Wageningen UR offers hundreds of courses. Many of these courses address the topic of GFS, as this is one of the main focus areas of Wageningen UR. The course 'Aquaculture and Fisheries' for example "gives an overview of the different forms and management opportunities of aquatic production" (Wageningen UR 2014b). This course could hence be considered to indirectly contribute to the achievement of GFS, as aquatic production generates an important source of food for billions of people. The course 'Life Styles and Consumption' on the other hand "will connect concrete empirical examples of specific lifestyles, e.g. related to food and sustainable development with more abstract theoretical perspectives on consumer society" (Wageningen UR 2014f). This course could hence also be considered to address GFS as lifestyle and consumption are essential aspects for GFS. These two examples show that it proves difficult to determine precisely which courses are addressing the topic of food security and to what extent.

It would be very labour-intensive and time-consuming to conduct such an analysis. More importantly, it was not the aim to thoroughly investigate the education offered by Wageningen UR in this thesis. The aim was rather to get an impression of the framing used within it. In the analysis of the study handbook courses it was therefore not the aim to perform a detailed analysis. The aim was to get an *impression* of how GFS security is *framed* in courses. These findings were used to complement the findings of the other data sources, rather than being a stand-alone research tool. A word cloud analysis with the Wordle online application (www.wordle.net) was chosen for this purpose. The word cloud analysis is described in further detail in section 3.4: Data analysis.

Since it proved difficult to determine which courses address GFS, the investigation focused on the frames used for three general key terms closely related to GFS: 'Food', 'Agriculture OR Agricultural', 'Nutrition OR Nutritional'. All Wageningen UR courses with the word 'Food' in the title were selected from the online study handbook 2013-2014, resulting in N=61 courses. The same was done for 'Nutrition AND nutritional' and 'Agriculture AND Agricultural' resulting in N=29 and N=12 respectively. This results in a total of N=102 courses. Theses, internships and Capita Selecta courses were not included in this selection. The 'content' and 'learning outcomes' paragraphs contained most information on course content, whereas 'activities' and 'examination' contained more information about the didactic process and are similar for the majority of the courses. The 'literature' paragraph would have been an interesting source for content analysis, however most often little information on literature sources was provided or the information was incomplete (e.g.: it was mentioned: "Literature will be distributed via Blackboard"). 'Literature' would thus have been an unreliable resource. Therefore the course name, 'content' and 'learning outcomes' paragraphs were selected from the online study handbook for further analysis. In Figure 2 an example of a course outline is depicted.

Subsequently word clouds for the three different terms were made. General, non-topic related words, such as 'course', 'outcomes' or 'able' were excluded. Words such as 'research' sometimes applied to the topic and sometimes not. The final decision was to include these words in the word clouds, since excluding them would run the risk of excluding valuable information. The maximum amount of words was limited to 35 per cloud to ensure visibility and clarity in the final graphic. These word clouds gave an initial impression of the most frequently used terms in the selected course descriptions. Afterward, cloud creation word counts per term were performed. In this analysis the following terms for word counts were included: (1) most frequently used terms and (2) a selection of terms that were of specific interest for this thesis.

In this way it was possible to get a first impression of which framing devices are used in Food, Nutrition and Agriculture-related courses at Wageningen University and the framing differences and similarities between topics. However, it is important to note that the framing of these three terms cannot be directly extrapolated to the framing of GFS, it rather gives an indication.

**Contents:**
Food Logistics Management (FLM) is about how organisations fulfil market demand by getting the right food product, in the right quantity and quality, at the right time and place, as efficient and sustainable as possible. It discusses issues and developments in logistics theory (such as buffering, inventory management, risk pooling) and combines it with developments in food quality management (such as quality monitoring and control, product quality prediction models) and information technology. Together it provides a firm basis for research on Quality Controlled Logistics (QCL), i.e. using information on the dynamic product quality behaviour to control goods flows in the supply chain in order to optimize product availability at retail outlets in an efficient and sustainable way. Students will learn how to analyse, model and design innovative and sustainable logistics systems for agrifood products. Next to that, a web-based simulation game, called The Fresh Connection, is used in the course to give students the opportunity to experience in a virtual business environment what the effects are of logistic decision making in a food supply chain.

**Learning outcomes:**
After successful completion of this course students are expected to be able to:
- demonstrate a detailed understanding of logistics and food quality management concepts in food supply chains;
- model and design logistics systems that incorporate quality and sustainability issues using appropriate modelling techniques;
- apply food logistic and quality control theory in practical decision making;
- explain the interactions between technological developments, food quality management and logistics management;
- analyse and diagnose a business case using logistics and food quality management theories.

**Activities:**
- following lectures on food logistic and quality control theory;
- making exercises;
- simulation gaming;
- analyzing and diagnosing a business case;
- studying written material.

**Examination:**
The final grade = (25% * grade simulation game) + (25% * grade case work) + (50% * grade written closed book exam).
To pass the course the final grade should be at least 5.5 AND a minimum grade of 5.5 for the written exam should be obtained. Details: see course guide.

**Literature:**
Literature will be distributed via Blackboard.

| | Programme | Phase | Specialization | Period |
|---|---|---|---|---|
| Restricted Optional for: | MFT Food Technology | MSc | H: Sustainable Food Process Engineering | 5AF |
| | MFQ Food Quality Management | MSc | | 5AF |

*Figure 2 A Wageningen UR course outline example*

## 3.4 Data analysis

Conducting a frame package analysis on four different data sources requires adaptation of several methods to create a tailor-made method. As a foundation, the four steps for conducting a frame analysis as summarized by Chong & Druckman (2007) were followed. Chong & Druckman (2007) consider identifying a specific issue as step number one. The specific issue for this research is: GFS. Since the second step in Chong & Druckman's approach (2007) is only applicable in studies on frames affecting public opinion, step two was not performed. The third step according to Chong & Druckman (2007) is to inductively identify repeated patterns and an initial set of frames for the issue in order to create a coding scheme. Only after defining the repeated patterns and frames, do Chong & Druckman (2007) suggest identifying them in specific data sources. At this point, this study's approach differs from Chong & Druckman (2007) as step three and four were reversed. It was a conscious decision made to ensure the analysis was *inductive* instead of *deductive*. In an inductive frame analysis the aim is to identify (a) possible frame(s) with an open view (Van Gorp & van der Goot 2012; Semetko & Valkenburg 2000). Therefore it was important to let the data illuminate the frame instead of trying to find particular existing frames in the selected data sources.

A guide to conducting frame analysis of news media was developed for the 'Sociology of news' course at the University of Vermont (University of Vermont 2009). This guide's useful steps were integrated and complemented the method developed by Chong & Druckman (2007) . This resulted in the following general steps which were conducted for all four data sources in this study:

**1. Selection of sources for content analysis**

- Wageningen UR's website pages (www.wageningen UR.nl)
- Speeches of- and interviews with Executive Board members
- Interviews with key informants
- BSc and MSc courses from the Wageningen UR study handbook 2013-2014

**2. Inductive identification of repeated patterns and an initial set of frames for the issue to create a coding scheme**

- Identify broad forms of emphasis or selection
- Identify master narratives or themes
- Create a coding scheme
- Consider other ways the relevant facts could be turned into stories/framed

**3.**      **Explanation of the underlying assumptions of the frame discovered**

- What does this frame imply as important?
- What does this frame exclude from the discussion?
- What world views or ideas is this frame reinforcing?
- What is the potential of different frames?

For an inductive frame package analysis, step 2 is an important part of the study and is therefore described in more detail in the following paragraph.

The terms and issues that Wageningen UR links to GFS were investigated as part of step 2. This approach is similar to the grounded theory approach, since "a fundamental premise of grounded theory is to let the key issues emerge rather than to force them into preconceived categories" (Charmaz 1996). Among the distinguishing characteristics of grounded theory, two specific steps are useful for coding: (1) the creation of analytic codes and categories developed from data, not from preconceived hypotheses and (2) memo-making, that is, writing analytic notes to explicate and fill out categories (Charmaz 1996). Both of these steps were performed in this thesis. In grounded theory the boundary between data collection and data analysis phases is blurred (Charmaz 1996) as has been the case in this study as well. An important rule from grounded theory that was therefore taken into account is: study the emerging data (Charmaz 1996). What links this study to grounded theory is that both it and framing look for patterns (Charmaz 1996). To identify frames, coding is hence a very useful method. Charmaz (1996, p.37) articulates:

> *Coding is the process of defining what the data are all about. Unlike quantitative coding that means applying preconceived codes (all planned before the researcher even collects data) to the data, qualitative grounded theory coding means creating the codes as you study your data. The codes emerge as you study your data.*

Although Charmaz (1996) writes about coding in the field of psychology and her methods focus on coding interviews with patients, much of the methods on coding that she describes have proven useful for- and applicable to this thesis.

Line-by-line coding was the initial starting point, as recommended by Charmaz (1996). Line-by-line coding is characterized by examining each line of data and defining actions, events or particular terms, associated with GFS. Line-by-line coding made it possible to take an analytic stance towards the data, but at the same time stay close to them; it forces the researcher to think about the material in new ways. Line-by-line coding, was followed by focused coding. Charmaz (1996, p.40)

recommends focused coding as the next step after line-by-line coding, "taking earlier codes that continually reappear in the initial coding and use these codes to sift through large amounts of data". Focused coding is considerably more selective and conceptual (Charmaz 1983; Glaser 1978). With focused coding, categories are defined and certain codes with overriding significance can be identified (Charmaz 1996). It was aimed to frame codes as specific and active as possible, this is considered important for adequate and successful coding (Charmaz 1996).

After finalizing the coding process, all codes from the coding columns in the tables with webpage content, interview and speech content and interviews with key informants content were combined and codes were raised to categories in order to identify general themes of the Wageningen UR main frame. This was done through the recommended approach of (1) explicating the codes properties, (2) specifying conditions under which it arises, is maintained and changes, (3) describing its consequences and (4) showing how this category relates to other categories (Charmaz 1996; Charmaz 1983; Glaser 1978; Glaser & Strauss 1967).

At the end of step 2 of this thesis's method, after disentangling the Wageningen UR main frame and explaining its underlying assumptions, findings were used to investigate opportunities for reframing the Wageningen UR's GFS main frame. "Considering other ways the relevant facts could be turned into stories/framed" was taken as a starting point.

In any research the researcher plays an important role and human action inevitably brings subjectivity. In frame analysis, both the strength and weakness is the interpretive character of framing theory. As Zwartkruis (2013, p.48) states: "Framing analysis is a type of analysis in which the interpretation of the researcher is key". The strength of this interpretative character is that framing embraces the researcher's subjectivity and uses it, rather than suggesting false objectivity. The researcher's interpretation hence allows apparent objective information to be translated into valuable data. The weakness of framing analysis can however be found in this same interpretive character: data depend strongly on the interpretation of the researcher. A tool to limit the degree of subjectivity of the researcher that was used in this thesis is coding (as described previously in this section), as coding adds framework for the researcher to analyse the data. However, coding also remains an interpretive process. Charmaz (1996) warns about bias, by perspectives brought upon the data by the researcher, while coding. For the researcher it is important to see his or her perspective as one view among many, instead of 'the truth' (Charmaz 1996). Another method to limit subjectivity is to read data over and over again and to discuss them with other researchers. By this means, the analysis is improved and further developed and hence the reliability of the study increases (Zwartkruis 2013). In this study, data were therefore studied various times and discussed with other

people. However, the prominent interpretive role of the researcher remains a key limitation of framing analysis. Especially in interviews the interpretation of the researcher is crucial and it is hence impossible to avoid a certain degree of subjectivity. Although it was aimed to use the data from the interviews according to the interviewees' intentions, it is essential to keep in mind that there is a certain level of the researcher's own interpretation.

In order obtain an accurate impression of the framing in Wageningen UR's BSc ad MSc courses, an adapted analysis was performed for the study handbook: a word cloud analysis. This analysis, using the Wordle online application, is a good tool for the purpose of this analysis: "Word clouds can be a useful tool for preliminary analysis and for validation of previous findings" (McNaught & Lam 2010, p.630). McNaught & Lam (2010) explain that Wordle can be used both as (1) a tool for preliminary analysis, quickly highlighting main differences and possible points of interest, thus providing a direction for detailed analyses in following stages and (2) as validation tool to further confirm findings and interpretations of findings. The word clouds thus provide additional support for other analytic tools.

As research tools, word clouds also have limitations. An important limitation is that the words are retrieved out of context and it is therefore difficult to trace the codes back to the original text (McNaught & Lam 2010). Moreover, since words are the unit of analysis in a word cloud, semantics of the words and also the phrases and even sentences the words are used in are neglected. This can sketch a misleading image (McNaught & Lam 2010). Therefore a word cloud analysis is not recommended as a stand-alone research tool comparable to traditional content analysis methods (McNaught & Lam 2010). In this thesis the word cloud analysis is therefore part of the 'frame package' analysis, rather than a stand-alone tool.

# 4 Where we are now: the main frame of Wageningen UR

## 4.1 Introduction

In the previous chapters of this thesis, the problem was stated and the methodology described. This chapter begins the analytical portion of this study. The analysis continues in Chapter 5 and 6. Chapters 4, 5 and 6 aim to answer the research questions. The first section of *this* chapter aims to answer the first research question: "What is Wageningen UR's corporate main frame for GFS?" Section 2 aims to answer the second research question: "How does this main frame relate to internal GFS frames used in current BSc and MSc programs at Wageningen University?" The first section of this chapter therefore discusses the main frame of Wageningen UR that became clear from Wageningen UR's communication. For this analysis, mainly three data sources provided valuable data: the selected pages from Wageningen UR's website, the speeches and interviews from the Executive Board members and interviews with the key informants. The second section of this chapter elaborates upon the relation between Wageningen UR's main GFS frame, and the internal frames used in education. For this section the interviews with the key informants and the courses from the study handbook provided the most relevant results.

## 4.2 The main frame

Wageningen UR uses a strong uniform corporate message in its external communication. Moreover, Wageningen UR claims to be comprised of just one faculty: the faculty of Agricultural and Environmental Sciences (Wageningen UR 2013a). Wageningen UR science information and press officer Jac Niessen explains that this makes it easier for Wageningen UR to use one strong uniform vision: "We are thematically organised, that makes it easy to carry out a message" (Jac Niessen, interview, May 22, 2014).

At Wageningen UR, GFS is considered a complex challenge. Many interviewees agreed that there is no one single way to find GFS solutions and this is often confirmed in Wageningen UR's external communication. Wageningen UR's message is refined, but clear assumptions are made and according to the definition of Entman (1993, p.52) that framing is about "selecting some aspects of a perceived reality and make them more salient in a communicating text," a main frame can be distilled from Wageningen UR's message.

The following quote, from the 'strategic plan' on Wageningen UR's website, is a key example of the Wageningen UR GFS main frame:

*In the coming decades, the world's population will grow from seven billion people today to eight billion in 2025 and nine billion in 2050. The demand for food will double as wealth increases. Dietary needs will also change to include more animal protein. The key question for the future is how this new demand for food can be met in a responsible manner. With the extra people and all their activities there is also extra need to use all available space and further pressure is put on nature, climate and the environment. This is a huge challenge. One that can only be met with the help of breakthroughs in science and technology (Wageningen UR 2014a).*

In the next paragraphs, Wageningen UR's main frame – as it was determined from the data, through the inductive frame analysis – will be discussed. As the quote from Wageningen UR's strategic plan mentioned above is a key example of the Wageningen UR main frame, this quote will be referenced to explain the different elements of the frame.

First, the quote clearly demonstrates how Wageningen UR frames the problem of GFS as an imminent future problem due to a larger and wealthier population in 2050. The quote begins with a reference to the future and with the assumption that the global population will reach 9 billion in 2050. Framing devices used here are: *the coming decades, the future* and *new demand*. Continuing along this same line is the identified key question ("the key question *for the future*"): "How this *new demand* for food can be met in a responsible manner?" The *huge challenge* of these *future* developments is emphasized at the end of the quote. The combination of references to GFS as a 'future problem' and a 'huge [future] challenge' is a framing device commonly used by Wageningen UR. The 'future' aspect is almost without exception mentioned first in every corporate Wageningen UR discourse about GFS. A quote of former Wageningen UR president Aalt Dijkhuizen, from his interview with Dutch newspaper *Trouw*, demonstrates the same framing (emphasis added):

*I see two things **coming** towards us. In **2050** there will be about 9 billion people on the planet, two billion more than currently. Moreover, wealth in emerging economies is increasing, therefore consumers there will use more meat and dairy. This means that food production – for man and animal together- per hectare has to double. Of course under the precondition that the environment will be maximally spared. In short this means: more production with less use of resources and chemical resources (Dijkhuizen 2012).*

Dijkhuizen is even stronger in his wording than Wageningen UR's website when addressing the necessary measures for this future challenge: "This means that food production – for man and animal together – per hectare has to double. (…) In short this means: more production with less use of

resources and chemical resources." This is a clear example of another critical element contriving Wageningen UR's main frame: the focus on increasing primary production.

The second phrase in the first quote of this section – from Wageningen UR's strategic plan – demonstrates the same focus: *The demand for food will double as wealth increases.* This phrase also addresses the doubling of the amount of food in quantitative terms as a necessary measure. The focus on increasing primary production in Wageningen UR's frame demonstrates the influence of the productionist paradigm as previously described in section 2.2.

Perhaps the most significant example reiterating the importance of increasing primary production is Wageningen UR's motto and strong framing device: "Two times more with two times less":

> *Providing everyone with healthy food without harming the environment will become increasingly challenging. In 2040 there will be 9 billion people to feed. Food demands will change, emerging economies will require more meat and at the same time certain limited resources such as water and phosphate will have to be managed sustainably. Wageningen UR approaches this 21st century challenge through the motto 'two times more, with two times less' (Wageningen UR 2014d).*

This motto refers to the aim of producing two times more food, while using two times less resources. In one phrase the motto reduces GFS to kilos per hectare and it frames GFS as a quantitative matter: *more*, *less* and *two times* are all quantitative terms.

A more specific framing device used by Wageningen UR within this theme is the term 'sustainable intensification'. In sustainable intensification – an international and widely used term – GFS challenges are traditionally framed as availability issues. Focusing on availability seems to be strongly embedded in the Wageningen UR frame as well This path of thought has its roots in the reductionist scientific thinking which gained popularity in the 19th and 20th centuries. This reductionist approach resulted in the dominating productionist paradigm, which also became dominant at Wageningen UR. The focus on increasing primary production, as a result of the idea that GFS can only be achieved through 'sustainable intensification' is clearly present, as the following quotes demonstrate:

> *As Mother Earth will not grow bigger,* **we do not have a choice but to increase productivity and efficiency** *in food production (Dijkhuizen 2013a).*

The reasoning device used here is that*: we do not have a choice but to increase productivity and efficiency.* Kropff (2013) argues:

> *The challenges of tomorrow are still along these lines: we need **more food**, produced in a **more sustainable way**. We call that **sustainable intensification** (Kropff 2013).*

Kropff addresses both the increase in production (*more food*) and the sustainability (*more sustainable way*). However, in sustainable intensification 'sustainability' mainly refers to the more efficient use of resources. Spokesperson of Wageningen UR, Simon Vink demonstrates this in his quote:

> *You will need to, if you have a limited area available, **produce in the most efficient way**, and achieve the highest possible output per unit. The definitions of potentially and high you can then discuss still. But in general, almost all scientists agree with him I think, also in organic farming, that you need to aim for **a production per production unit as high, effective and efficient as possible**. Whether it is per hectare or per volume or per animal (Interview, April 16, 2014).*

The framing devices used here are: *produce in the most efficient way* and *a production per production unit as high, effective and efficient as possible*. Moreover, in Wageningen UR's 'sustainable intensification' discourse, sustainability is strongly linked to the environment and to a lesser extent also to animal welfare.

Science information and press officer of Wageningen UR; Jac Niessen (Interview, May 22, 2014) articulates: "Sustainable intensification has been the focus [at Wageningen UR] for the last couple of years and it still kind of is." (Jac Niessen, interview, May 22, 2014). Niessen adds however that sustainable intensification is not *officially* used in Wageningen UR's communication (Jac Niessen, interview, May 22, 2014).

'Responsible growth' is another framing device along this same theme, used by former Chairman of the Board Dijkhuizen. Here, the economic dimension is emphasized:

> *The theme of this year's opening is **'Responsible Growth'**. Economic growth is important to improve people's prosperity and realize a better quality of life. Food & agri is an important growth work field, as the demand for food will strongly increase in the coming decades, especially for animal protein. At the same time, the impact of the production on natural resources and the environment should be minimized. More with Less, so to speak. For that, productivity and efficiency is key. And that is exactly what the Dutch sector is good at and known for and for what we are being asked to collaborate from all over the world (Dijkhuizen 2013b).*

Wageningen UR's prominent theme of increasing primary production closely relates to another element in the main frame: the focus on the natural sciences. Wageningen UR frames the challenge of GFS as requiring more food, which ought to be produced more efficiently and more sustainably. This increase is mainly addressed through the natural sciences. The 'Dossier Food Security' on Wageningen UR's website is a clear example of the focus on increasing food availability through primary production in the natural sciences. The first website in the list with links to other websites for instance is the 'global yield gap atlas' (Wageningen UR 2014c). The concept of 'yield gap' refers to the gap between actual and attainable primary production yields in crops. Yield gaps exist in many places in the world and the atlas hence shows the yield gaps around the world. The yield gap is a concept that is approached from areas such as plant sciences, soil sciences, genetics, natural resource management and weeds, pest and disease control.

A fourth aspect of the GFS framing by Wageningen UR is the need for science and technology and the need for 'innovations' and 'scientific breakthroughs'. In the first quote of this section – from Wageningen UR's strategic plan – the GFS challenge is argued to be: "one that can **only** be met with the help of breakthroughs in science and technology." Only is the crucial word here since it insinuates that without science and technology the challenge cannot be face. With this insinuation Wageningen UR excludes many different ideas and paradigms that could be valuable in order to achieve GFS. Moreover it excludes different types of knowledge, such as indigenous knowledge. The focus of these breakthroughs implicitly lies in the 'smaller' level of products, organisms, cells and molecules within the natural sciences of the agrifood domain. In the need for science and technology, especially the focus on the smaller level thus seems to be important. The quest for finding new genes is one of the clearest examples of this aspect. A typical example is the CAB-13 tomato gene that was discovered by Velez-Ramirez et al. (2014). This gene enables the tomato plant to grow for 24 hours under continuous light conditions.

Table 4 provides a summary of the main framing devices used in Wageningen UR's external communication discussed in this section.

*Table 4 Wageningen UR's framing devices in the GFS discourse*

| Framing devices |
| --- |
| Huge challenge |
| Future, coming decades, 2030, 2050, tomorrow |

Sustainable intensification, responsible growth, more with less, double production, two times more with two times less, more food in a more sustainable way, productivity, efficiency

Growing population, increasing wealth, increasing demand of animal products

Science, technology, innovation, breakthroughs

Based on this research the unravelled Wageningen UR main frame frames GFS as a future challenge of increasing the primary production of adequate and sustainable land-based food. A challenge which is framed to require an approach of science and technology, focusing primarily on the 'smaller level' of products, organisms, cells and molecules in the natural sciences.

Wageningen UR's main GFS frame can be considered as belonging to what Lang & Heasman (2004, pp.21–25) call the 'Life Sciences Integrated paradigm', while having strong traces of a productionist legacy:

> *The Life Sciences Integrated paradigm describes the rapidly emerging scientific framework that is heralding the application of new biological technologies to food production. We propose this paradigm as a way of capturing a body of thought that has at its core a mechanistic and fairly medicalized interpretation of human and environmental health (Lang & Heasman 2004, pp.21–22).*

It could hence be called a 'Life Sciences Integrated frame'. It is important to keep in mind that the frame described in this section is the general GFS frame of Wageningen UR and many (individual) nuances can be found within it.

### 4.3    The main frame versus the internal diversity

Wageningen UR is a collaboration of Wageningen University and several specialized research institutes. With its 6500 staff members, 10,000 students, and 1300 PhD candidates Wageningen UR is an internationally recognized leading knowledge institute. Wageningen University consists of one faculty with five sciences groups: the Agrotechnology & Food Sciences Group, the Animal Sciences Group, the Environmental Sciences Group, the Plant Sciences Group, and the Social Sciences Group. Each of these sciences groups specializes in specific research fields, although there is also collaboration *between* the different sciences groups. Within each of the sciences groups at Wageningen University there are a number of chair groups (WASS PhD Council Wageningen

University 2014). The research institutes of Wageningen UR conduct applied research and research in practice. They work on behalf of the government, businesses and NGO's.

Wageningen UR has a supervisory board and an executive board. The Executive Board consists of three board members. At the time this research started the Executive Board members were: Aalt Dijkhuizen, Martin Kropff and Tijs Breukink. In July 2014 Louise Fresco became the chairwoman of the executive board, succeeding Aalt Dijkhuizen, who resigned in February 2014. Figure 3 shows the organizational structure of Wageningen UR.
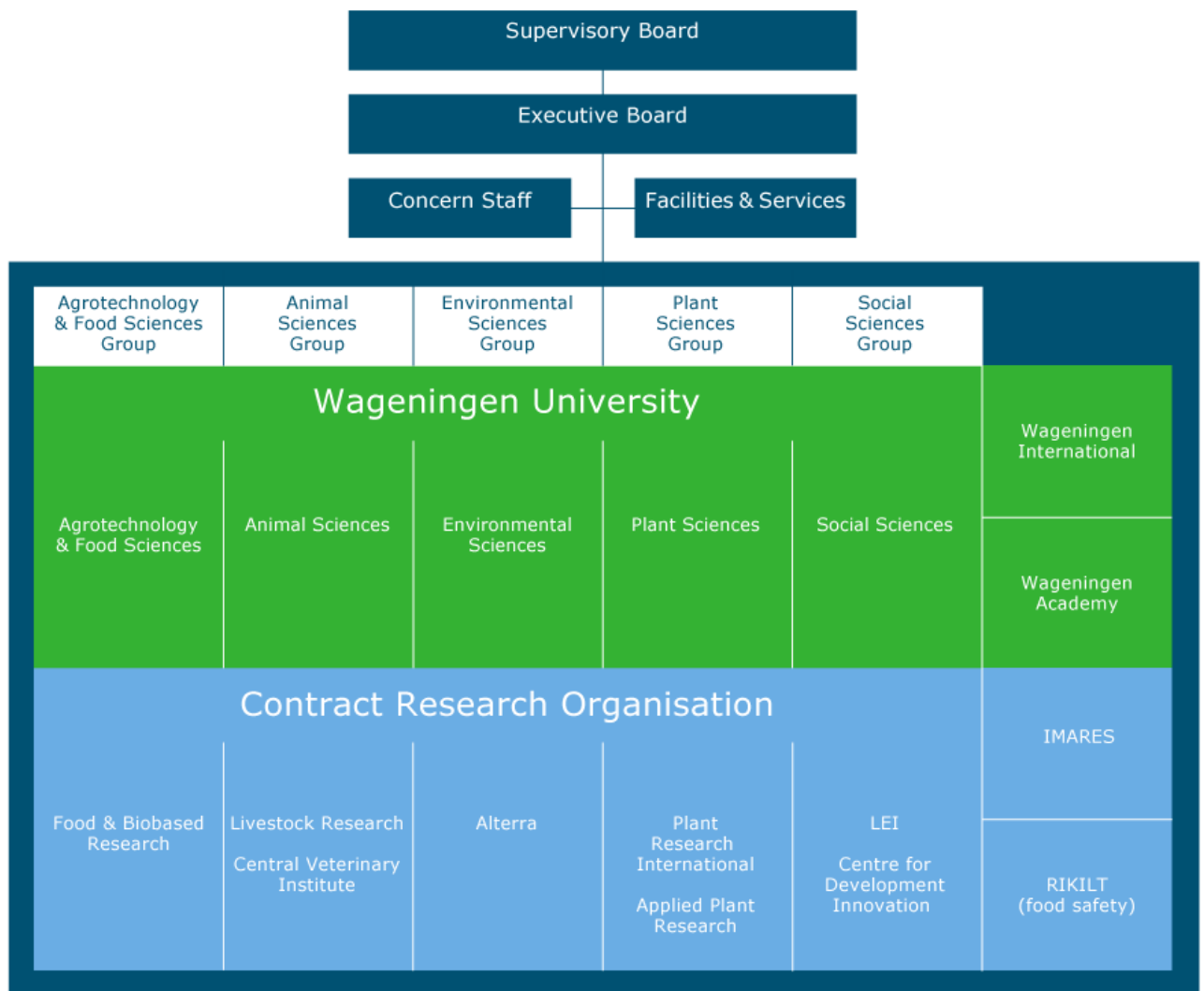


*Figure 3 Organogram of Wageningen UR (Wageningen UR, 2014)*

As explained in the previous section, Wageningen UR uses a strong uniform corporate message in its external communication. However, the strength of a university (Latin: 'universitas', 'a whole') is the

diversity of opinions and paradigms present within it as elaborated upon in Chapter 1. To proclaim one view as the corporate view of Wageningen UR therefore undermines the importance of diversity.

At Wageningen UR, internally a great diversity of frames exists. This diversity is reflected in Wageningen UR's education. However, it is not communicated externally. Externally the one main frame (as described in Chapter 4) is used. An indication of this diversity is the different key terms used in the different courses in Wageningen UR's study handbook (see Appendix). Professor Arthur Mol, director of the Wageningen School of Scoial Sciences (WASS) does not see the influence of the dominant main frame as a threat to the different internal frames:

> *The nice thing about a university and about Wageningen UR is that chair groups are pretty autonomous, they can pretty much decide themselves what research they do as long as they generate money. It is not like the Executive Board can decide what happens in research and education. In that sense there still is sufficient pluralism (Arthur Mol, interview, May 21, 2014).*

Mol argues that groups "can pretty much decide themselves what research they do as long as they generate money". The prerequisite of generating money is interesting here, since it in fact does influence what research is being conducted and might influence the objectivity of academic research. There is hence an essential difference between "deciding what research they do" and deciding "what research they do as long as it generates money". It is likely that financial returns have an influence on the research conducted at Wageningen UR, however it was beyond the scope of this research to investigate this influence.

The Wageningen UR main frame is the dominant frame and although there sufficient pluralism may exist, the dominant frame does seem to influence the other frames at the university. Wageningen UR's Resource magazine columnist and lecturer Kees van Veluw (Interview, May 30, 2014) points out: "The influence of the external message on the internal education is still mainly in one direction: from external to internal." Mol does see that among the large diversity of frames, there are differences, he uses the term *marginalized* (emphasis added):

> *People [i.e. employees] that use a more **marginalized** frame; hence a by the Executive Board less politically covered frame, are still given full freedom in education programmes etc., because those [i.e. education programmes] are still strongly determined on the work floor (Arthur Mol, interview, May 21, 2014).*

Mol believes that most students become aware of these different frames over the course of their studies:

*In education there are many different frames present, from which students can choose. The only thing is that as a student you should know they exist. I think that most students learn that while they are studying. But it is also possible that you are kind of locked in one frame, because of your study path and that is more complicated. You should prevent that (Arthur Mol, interview, May 21, 2014).*

Although Wageningen UR offers the opportunity to 'shop' courses in and between many different programs, the average student experiences the frames of their own program. Most of his or her education is after all within this disciplinary work field of the study program (except for during the minor and free-choice courses). Most often, study program chair groups which use the same frame for GFS work together. Moreover, as was previously mentioned: some frames are marginalize as the Wageningen UR main frame is also dominant in education. It can hence be questioned if Wageningen UR students experience the Wageningen UR main frame more than other, more marginalized, frames.  If students indeed experience one frame more than other, more marginalized frames, this might form a risk for the diversity of Wageningen UR's educational offerings. Pluralism of thought to avoid getting trapped in one particular way of seeing the world and 'singular' solutions is important. A dominating frame could inhibit pluralism of thought. Unfortunately, it was beyond the scope of this research to investigate how Wageningen UR students experience different frames. This is an interesting question for further research.

Corporate communication plays an important role in preventing certain frames from becoming more dominant over others: the different frames should also be communicated, instead of just communicating the main frame message:

*The majority of the plant scientists are model builders and they think that [fragmented] way. They just calculate: there's this many people, then we need to produce this much food. And the population is growing from 7 to 9 billion, then these are the consequences. Scientifically that is of course sound. But you forget some other questions, is what others say. That's about what you are going to grow and how you are going to grow it and how are you going to distribute it and how do you take care that cycles are closed and that less food is wasted: calculate that! Both true and both need to happen. But you do need to take that broad agenda into account in corporate communication. There, improvements can be made still (Arthur Mol, interview, May 21, 2014).*

Van Veluw (Interview, May 30, 2014) adds to this:

> *(…) biodiversity also applies to the visions within Wageningen to solve that problem of feeding the world population, as a university you should not profile yourself with one vision.*

This chapter has unravelled the main GFS frame of Wageningen UR and the way this frame relates to the different frames present within Wageningen UR. As such this chapter delineates the current line of thinking at Wageningen UR, in other words: it serves to find out *where we stand now.* The Wageningen UR main frame frames GFS as a future challenge of increasing the primary production of adequate and sustainable, land-based food. The need for science and technology – focusing primarily on the 'smaller level' of products, organisms, cells and molecules in the natural sciences – is framed to be key in this challenge.

To conclude: within Wageningen UR, a variety of GFS frames can be found. The Wageningen UR main frame is dominant though and its influence can be found in many disciplines, chair groups and science groups.

# 5   Where we need to go: there is more to more

## 5.1   Introduction

Chapter 4 articulated the main frame of Wageningen UR. In *this* chapter, the main frame is critically analysed. This chapter therefore delineates the Wageningen UR main frame in more detail and discusses its elements. In this critical reflection, aspects which are currently underexposed or absent in the main frame – but which both academic literature and the interviewees from this study argue to be crucial in addressing GFS – are illuminated. These underexposed and absent aspects offer opportunities for reframing in order to strengthen the existing GFS frame of Wageningen UR. This chapter presents building blocks that could either be added to the existing frame or could be given greater emphasis, in order to reframe and address GFS more adequately. In other words: *where do we need to go*?

Section 5.2: 'More to more' is a general reflection on Wageningen UR's main frame. In sections 3 and 4, reframing opportunities are illuminated. These reframing opportunities can be divided into two overarching categories: more socio-cultural aspects and more agroecological aspects. The first section discusses the socio-cultural opportunities: the socio-cultural aspects of food, food production and food consumption. The second section discusses the agroecological opportunities: topics that are related to the agroecological aspects of food production and the resources necessary for food production.  These two opportunities cannot be seen separately. They should rather be seen as intertwined. For clarity however the two opportunities are discussed in separate sections.

## 5.2   More to more

All key informants in this study agreed that GFS is not only about the availability dimension and the production of enough food, which are dominant themes in Wageningen UR's frame. In other words: there is more to the '*more* with less', or the 'two times *more*, with two times less' from Wageningen UR's motto. That GFS takes into consideration more than availability is also supported by literature (see Chapter 2) and hence seems like a clear consensus. The difficulty however lies in grasping *what* exactly that '*more'* is. Defining this proves illusive, due to the large variety in opinions.

A common denominator for the aspects beyond the availability dimension and the primary production of food is their relation to the FAO's other three dimensions of food security (2013b; 2008): access, utilization and stability (of the availability and utilization of- and the access to food

over time). The main and overarching theme covered by '*more*' could hence be summarized as the three other dimensions of food security. This is a broad theme which makes it difficult to grasp the exact meaning and scope in relation to the Wageningen UR main frame.

In their book: '12 myths about world hunger', Lappé et al. (1998, p.6) state the principles around which many people and organizations have come to organize their thinking relating to hunger: "the views embodied may not be totally false. Many have some validity. It is as organizing principles that they fail". The principles mentioned by Lappé et al. refer to principles from the productionist paradigm and the problem addressed here also holds for Wageningen UR's main GFS frame. Many central themes in the Wageningen UR frame, such as the need to increase production and productivity and the importance of science and technology certainly have validity. It is as organizational principles, however, that the central themes in the frame have proven too narrow for addressing GFS: increase in production and production efficiency receive the main emphasis. Kees Van Veluw, columnist for Wageningen UR's magazine: 'Resource' and lecturer at the Farming Systems Ecology (FSE) group, points this out relatively strongly: "In Wageningen it [i.e. sustainability] is currently framed as the production per hectare. That's the only thing" (Kees Van Veluw, interview, May 30, 2014).

Although Chapter 0 has shown that the Wageningen UR frame does include more than merely increasing kilos per hectare, there are several crucial aspects that are being insufficiently addressed currently. These aspects are highlighted in this chapter. Often this does not mean that aspects are completely absent (although some are). It rather means that they do not receive the emphasis necessary to adequately address GFS. As Arthur Mol, director of the WASS and professor of the ENP group notes: "You can think of all kinds of aspects that can be marginally found somewhere, but that are not really dominant" (Arthur Mol, interview, May 21, 2014).

Moreover, the new direction of the SDGs warrants the question of whether Wageningen UR should reconsider its GFS main frame. The new SDGs could be interpreted as an indirect UN invitation to Wageningen UR, to take a different course in addressing GFS. By remaining anchored to its current predominant GFS main frame, Wageningen UR runs the risk of becoming out of touch with the global debate.

## 5.3   Socio-cultural opportunities

An analysis of the Wageningen UR website, interviews with key informants and an analysis of GFS related courses at Wageningen UR, showed that many aspects within the overarching theme of '*more*' have socio-cultural roots. This includes a range of aspects, among which are: policy, politics,

distribution, accessibility, utilization, culture, psychology, ethics, anthropology, philosophy, and justice. Academic literature on GFS, from different disciplines, was used to complement this analysis.

Over the last decades, Wageningen UR's GFS frame has mainly focused – and still focuses – on the availability dimension of food security. A metaphor to address this primary production, used by opponents of this frame, is 'kilos per hectare'. Kilos refer to the primary production from agricultural yields, while hectares refer to agricultural land. In this availability dimension producing a sufficient amount of food for the global population is central. The Wageningen UR frame considers the natural sciences as a key element here and GFS is hence predominantly approached from a natural science perspective. The plant sciences and the animal sciences for instance. Up until today the access and utilization dimensions receive much less attention in the frame, while 'stability' is a term not even included in Wageningen UR's discourse.

A clear example of the social sciences' underexposure can be found on Wageningen UR's website. The 'Research and Results' webpage displays seven areas of expertise. Two of these areas are: 'Food Production' and 'Nutrition and Health'. Interestingly food is hence framed as either being about production (availability) or about nutrition. At the bottom of the particular pages, study programmes that address the particular area are presented, following the question: "Want to study… (either food production or nutrition) at Wageningen University?" (Wageningen UR 2014e; Wageningen UR 2014d). Figure 4 shows this question and the suggested MSc programmes for the topic of food production. According to this image food production can be studied in three MSc programs: Plant Sciences, Animal Sciences and Aquaculture and Marine Sciences. Figure 5 presents the MSc programmes related to the topic of nutrition. According to this image nutrition can be studied in the MSc programmes of Food Quality Management, Food Safety, Food Technology and Nutrition and Health.

The programmes suggested by Wageningen UR for these two topics are predominantly programmes in natural science disciplines. Plant sciences, Animal sciences and Aquaculture and Marine sciences are all natural science programmes as are the Food Quality management, the Food Safety, the Food Technology and the Nutrition and Health programmes. Although the Nutrition and health programme and the food safety programs include more social sciences than the other programmes, the social sciences and especially socio-cultural and socio-ecological aspects, are undoubtedly underrepresented in the programmes. The food production theme again emphasizes the availability aspect: all three programmes focus on the primary production of food. Moreover, from the suggested study programmes it can be concluded that food production and nutrition are framed as technical topics. Only the food safety law specialisation of the food safety programme is a non-

technical program, however it is also not socio-cultural. Wageningen UR hence frames the topics of food production and nutrition as technical, natural science topics. The technical approach, the focus on availability and the underexposure of the social sciences are three key deficiencies and hence weaknesses of Wageningen UR's GFS main frame of Wageningen UR. In the suggestions for future students in Figure 4 and Figure 5, the underexposure of the social sciences from Wageningen UR's GFS main frame clearly resonates.

## Programmes
Want to study food production at
Wageningen University?

- MSc Plant Sciences
- MSc Animal Sciences
- MSc Aquaculture and Marine
  Sciences

*Figure 4 Study something with food production (Wageningen UR 2014d)*

## Programmes
Want to study nutrition at
Wageningen University?

- MSc Food Quality Management
- MSc Food Safety
- MSc Food Technology
- MSc Nutrition and Health

*Figure 5 Study something with nutrition (Wageningen UR 2014e)*

Caution is needed, while making this argument. In order to be able to prove the underexposure of social sciences and especially the socio-cultural and socio-ecological aspects, more research is necessary. The percentage of Wageningen UR's faculty that works in the social sciences, the percentage of the budget dedicated to the social sciences groups and financial returns of the social sciences groups are important topics to investigate here.

On the webpage of food production the underexposure of the social science also becomes clear from the 'topics' presented to be related to food production (see Figure 6). These topics are all technical, natural science topics.

## Topics

> Potential plant and animal use
> Sustainable growth
> Conscientious animal husbandry
> Sustainable fishing
> Food security
> Food waste
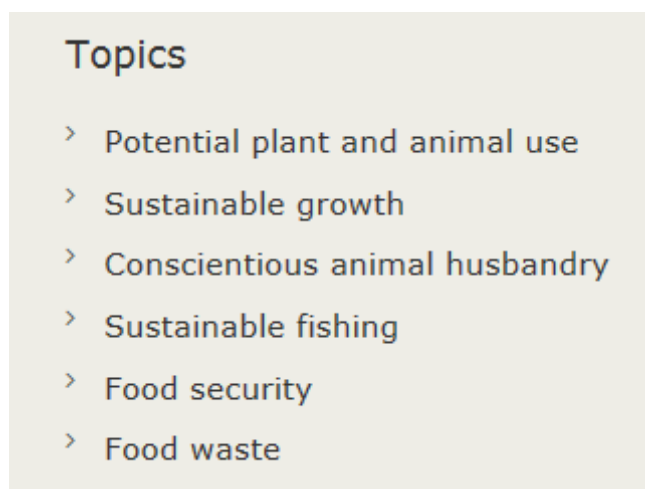
*Figure 6 Topics related to food production*

Moreover, alongside its underexposure, a particular view of the social sciences is present at Wageningen UR in which first technology is developed. Subsequently, the social sciences enter to implement, sell or convince society of the developed technology. This structure is clearly present in the examples spokesperson Simon Vink gave in the interview(Interview, April 16, 2014). Most examples are commercial examples, about products. The technical/natural aspects were usually mentioned first, only after which the social aspects were mentioned. The construction used is that of developing a product and then selling it to-,implementing it in-, or having it accepted by society. The next quote about a large Dutch breeding company demonstrates this clear reasoning device:

*They can produce a lettuce, which if you cut off the stem, has leaves all the same size, which then fall apart. That is of course ideal for cooking and when you want to make a salad. It's good for the caterer, for cutting the lettuce and in case you want to buy lettuce, packaged in*

*the supermarket. However, the growers didn't see any added value, they said quite technically: what is the benefit for me? It's just lettuce, which provides a certain amount of kilo's per hectare. Then the plant breeder started at the other side of the chain. He went to the supermarkets and asked Albert Heijn, Jumbo and C1000: what do you think? What would consumers think of this product? And he asked packers and cooks as well. The breeders then discovered from this social research he did, that there was a demand from society. They returned to the growers in those greenhouses, it is greenhouse lettuce I think, to say: "hey guys, if you grow this, there is a market for it". So they can technically make it, but to then really make it work, you need the social sciences more than you think. This is a very commercial example of course (Simon Vink, interview, April 16, 2014).*

This is a very typical example for the approach of the social sciences at Wageningen UR: first the technology for the new lettuce was developed, while afterwards the sociological research of 'who wants it and how can it be sold' was done. Moreover, this is a supply-based approach instead of a demand-based approach: what can we supply, not: what is the demand? Vink:

> *Wageningen University is a university that works with business and government to ensure that the knowledge that we have can be used by a company or a party and can be transformed into a **product** that you can use (Interview, April 16, 2014).*

In the Wageningen UR frame, the social side of GFS often focuses on marketing and economics and it is often still centred around improving products or crops: 'the smaller level' of products, components, cells, genes and molecules.

Another finding is that, although the Wageningen UR discourse is often about a wide range of disciplines, the technological aspects are usually mentioned first, while the social sciences are mentioned last. Moreover, at Wageningen UR, social sciences and economics are usually referred to in the same breath, under the denominator of 'socio-economic'. The term 'socio-economic' is used as complementary to 'technological'. A good example is the figure used for innovations (Figure 7), where all innovations are stated to have a socio-economic dimension and a technological dimension.

*Figure 7 Successful innovations (Wageningen UR 2013b, p.14)*

At Wageningen UR, *when* the social sciences are addressed, they are usually linked to economic aspects. Another example of this strong link between economics and social sciences is the BSc programme: 'Economics and Governance', which includes courses on sociology, governance and economics. 'Socio-economic' seems to refer to the sociological side of GFS. Although economics is of course *a* social science, it is too narrow to only refer to the two in one breath; social sciences is clearly different from economics. Using the term socio-economic suggests that social aspects are always connected to economic aspects. In this way the social aspects are linked to economic capital Food is an important aspect of culture. Many other forms of capital are present in the sociology of food, such as cultural capital, gender capital or bridging capital. These forms of capital are excluded when addressing social aspects as socio-economic. Moreover, socio-ecological aspects are neither addressed, while ecology plays a crucial role in the production of food The term socio-economic is therefore shortcoming for socio-political, socio-cultural or socio-environmental issues.

Social food dimensions other than socio-economic, such as socio-cultural or socio-political or socio-ecological, are mainly left untouched in Wageningen UR's external discourse. This is acknowledged by Vink (Interview, April 16, 2014) and he sees it as a missing part:

> *I do not think we have a lot of cultural anthropology at Wageningen UR. I also think we don't have very strong political sciences here in Wageningen. And you might say that's a misstep. I think it is defensible to say: there should be more attention for cultural-anthropology and political sciences. For psychology alone already: psychology determines why people do what they do. And that they continue to hold on to it, while it is proven unwise behaviour*. (…) *We do not have many cultural anthropological research groups. Neither do we have real political research groups. I'm not in charge, but I would think that you should have that. At least, that there is nothing against it to have them.*

Moreover, sociology works towards complexity. Complexity does not facilitate graphs, where developments are dissected into different characteristics. It rather aims to describe a web of interrelated aspects.

The importance of both social and natural sciences was addressed by the interviewees in this study, for example by Van Veluw (Interview, May 30, 2014):

> *Social and natural sciences should be equal. If you put it very black-and-white, the social scientists deal with the emotional and the intuitive part, while the natural scientist deals with the numbers and the kilos. But both are equal and you need both, on an equal level.*

Van Veluw addresses the emotional and intuitive part. This is not the only part the social sciences address, as he recognizes too by using the phrase "If you put it very black-and-white". It is interesting that he addresses this however: in Wageningen UR's discourse intuition and emotions seem to be completely absent and are considered 'unscientific'. In this light science information and press officer Jac Niessen recognizes this about the social sciences: "I also think that the social factors like accessibility and utilization are a little underexposed" (Jac Niessen, interview, May 22, 2014).

Mol (Interview, May 21, 2014) states he believes that food security is a field where within the social sciences more research and education could be conducted. He summarizes:

> *Another underexposed theme, but of course an ever recurring topic is: what is the meaning of food? It [i.e. the discourse] is still very often about the nutritional value of food, the amount of food, if we can feed the world, about the farmers, etc. But there is of course also a whole cultural component, a social meaning of food. How do different people and groups see that [*

*i.e. the social meaning of food], what does it mean to take in food in a certain way? But also the formation of social groups, coherence in society, what social problems are partly being solved and also enlarged around food? We actually pay very little attention to that as a university (Arthur Mol, interview, May 21, 2014).*

An explanation for the underexposure of the social sciences is given by Niessen:

*It is quite difficult to get information from the Leeuwenborgh [i.e. the social sciences building at Wageningen UR]. Maybe that's because of the physical distance, but before [the Wageningen UR headquarters moved from the city centre to the Wageningen UR campus] it used to be like that as well. It's a different kind of people I think, a different culture. And maybe they're also a little snowed under here in Wageningen, with the relatively beta-like [i.e. natural sciences] focus. There is [only] one group [i.e. the social sciences group] and there's the Agricultural Economic Institute 'LEI' in the Hague and those two are even physically separated.(…) We have just started to give the social sciences a little more attention, because very often they remain underexposed within Wageningen. That is a pity, because there are many beautiful results and there is very good research [in the social sciences]. These don't all get to the desks of the communication department.(…) As communication employees we should be visible for researchers and they should also be able to find you, there shouldn't be any barriers. We do think that could be improved still (Jac Niessen, interview, May 22, 2014).*

As a validation tool to further confirm these findings, the word-count analysis was used. The underexposure of socio-cultural and socio-ecological aspects also became clear from the word count analysis for courses with the terms 'Food', 'Nutrition AND Nutritional' and 'Agriculture AND Agricultural' in the title. All Wageningen UR courses with the word 'Food' in the title were selected from the online study handbook 2013-2014, resulting in N=61 courses. The same was done for 'Nutrition AND Nutritional' and 'Agriculture AND Agricultural' resulting in N=29 and N=12 courses respectively.

Word clouds for the three different terms were made with the 'Wordle' internet application (www.wordle.net). These word clouds gave an initial impression of most frequently used terms in the descriptions of the selected courses. After cloud creation word counts per term were performed. In this analysis word counts were performed for (1) most frequently used terms and (2) a selection of terms that were of specific interest for this thesis.

In all three word clouds, few terms relating to access, utilization and stability can be found (Figure 8,9 and 10). In the word count tables (see Appendix) in the appendix, this factor is also evident. In the

word counts analysis, the terms 'Quality', 'Production' and 'Health' with 122, 91 and 89 word counts respectively, immediately stood out (see Appendix). In courses with the word 'food' in the title 'quality', 'products' and 'production' were the most frequently used terms after 'food'. It is apparent that aspects of quality, products and production are important in 'food' courses. For 'Nutrition' courses, the terms health, human and metabolism were frequently mentioned while economic, development and rural were terms mentioned frequently in 'Agriculture' courses.



*Figure 8 Word cloud for courses with the term 'Food' in the course title*



*Figure 9 Word cloud for courses with the term 'Nutrition' or 'Nutritional' in the course title*

*Figure 10 Word cloud for courses with the term 'Agriculture' or 'Agricultural' in the course title*

*\*(CA = Conservation Agriculture, PRC = Peoples Republic of China, EU = European Union)*

These findings seem to confirm the absence of the socio-cultural and socio-ecological aspects from Wageningen UR's GFS frame in Wageningen UR's food-related courses.

An important reason for the lack of attention of the accessibility, the ultilization and the stability dimensions is the influence of former president of Wageningen UR Aalt Dijkhuizen in addressing food security at Wageningen UR. Dijkhuizen did not explicitly express social aspects of food, as the next quote from an interview with Dijkhuizen demonstrates:

> *This 'doing better' is still very often: more technology. What about ethics? Should we not bring that back in foodland, which for too long has been dominated by the desire to maximize production and money? Dijkhuizen, slightly annoyed: "Food should be **safe**, of good **quality** and produced **sustainably"** (Vré 2012).*

Aalt Dijkhuizen uses the framing devices *safety*, *quality* and *sustainably*. His quote also literally shows his reasoning device: "Food should be safe, of good quality and produced sustainably". Important aspects for addressing GFS, but the social aspects are missing. Although Dijkhuizen addresses that food should be produced sustainably, *social* sustainability is not explicitly present in the 'sustainable intensification' discourse which has a prominent position in Wageningen UR's frame – and of which Dijkhuizen is an advocate – , whereas it does aim to include the environment and animal welfare.

In line with Wageningen UR's focus on the availability dimension, one could state that it is currently already being proven that enough food does not equal the entire world population being food secure

and hence getting to eat. Abundance, rather than scarcity best describes the supply of food in the world today. More than 2700 calories per person per day have been available for decades, vastly exceeding the average minimum energy requirement of 1600-2000 calories per person per day, depending per country (FAO 2013a). Poverty and inequality, rather than scarcity, are now considered the principal causes of hunger (Lang et al. 2009, pp.253–287; Holt-Gimenez 2012; WFP 2014). In the light of these facts, the lack of socio-cultural and socio-ecological aspects in Wageningen UR's framing proves a shortcoming.

Many interviewees think the Wageningen UR frame should shift its emphasis on this point, like Vink for example: "Should we add the social aspect even more? Absolutely" (Simon Vink, interview, April 16, 2014). Or as Van Veluw argues: "The awareness should come that natural and social sciences should be balanced a bit again" (Kees Van Veluw, interview, May 30, 2014). Mol thinks it's time to give more attention to social sciences in addition to attention to the natural sciences, though keeping the balance:

> Yes it is time to also deal with other topics, with an emphasis on 'also'. And then it of course comes more towards the social sciences as well (Arthur Mol, interview, May 21, 2014).

The main building blocks that should hence be added to the GFS frame are the socio-cultural and socio-ecological aspects of GFS as compared to the natural and socio-economic aspects.

The opportunity for the socio-cultural and socio-ecological aspects is also demonstrated by the focus on availability *in the future*. In Wageningen UR's discourse (on its website and in speeches of Executive Board members), GFS is framed as a future problem we are facing, as opposed to a current problem. The GFS question is framed as 'how to feed the world in 2025 or 2050?' This is a safe way to frame the question, as in the future nobody can be held responsible. It also leads the focus away from the current situation of there being enough food, despite the fact that there are people both underfed and overfed. There is nothing wrong with addressing questions relating to the future, but it is a shortcoming in the sense that it fails to address *current* food insecurity.

Sociological aspects hence form an important opportunity for reframing Wageningen UR's GFS frame. GFS *today* – which is a question of access and utilization and has a strong social science dimension – is underrepresented in Wageningen UR's frame. Adding more emphasis on the question of GFS today would be a way to address the social sciences more and therefore forms an opportunity for adequately addressing GFS.

Within the overarching social sciences theme at Wageningen UR, food policy is an important opportunity. For some interviewees food politics is another promising facet. Agricultural policy is a

topic traditionally addressed at Wageningen UR by, for instance, the Agricultural Economics and Rural Policy (AEP) group. However, as the term suggests this is about agriculture, not about food (i.e. also including topics like food in the city, logistics, food security, food and health). This is logical since food policy is a relatively new topic as opposed to agricultural policy. Food used to be a rural issue and only for a few decades has attention been increasingly directed toward food policy rather than agricultural policy. On the other hand nutritionists have traditionally addressed the nutritional aspects of food in health policies. The new and innovative aspect about food policy is that it aims to connect and integrate these different policies that have traditionally dealt with food. As the title of Lang et al. (2009) summarizes: 'Food policy: integrating, health, environment and society'. Director of Wageningen UR's Education Institute; Tiny van Boekel notices this gap between agricultural and food policy at Wageningen UR: "Yes, it's mainly about agricultural policy and not about food policy, that could be extended a little more" (Tiny van Boekel, interview, June 4, 2014). How or to what level agricultural policy could be extended to include food policy is a topic Van Boekel unfortunately does not elaborate upon. It would be interesting and important to investigate these possibilities in further research.

Niessen also recognizes the gap between agricultural policy and food policy:

> *We do have a lot of chain management, which leans against policy. But if you take food policy to a higher level: global food policy, that chair group we don't have here. Does that matter? I don't know if that absence is being felt. If it is being felt, then that's a problem. It's also possible that you're not aware of this absence yet and that you don't know what you don't feel. Perhaps it is a future work field. Globalisation is important. A chair group 'Globalisation and Food' for example, that could be something interesting (Jac Niessen, interview, May 22, 2014).*

Niessen introduces an interesting topic here: global food policy. He vocalizes that Wageningen UR does not explicitly deal with food at the global level yet. Adding a chair group 'Globalisation and food' could create links between different spheres of the food chain. Niessen also suggests this might 'globalisation and food' might be a future work field. The new course for addressing food security, set out by the proposed SDGs, also addresses both the need and the potential for global food policy in connecting different spheres and fields. The SDGs show a strong focus on the social aspects and on the on larger scale (i.e. governmental, international and global level) and to a much smaller extent on technology. Adding a global food policy group could therefore be a way to connect different fields and spheres that deal with food and GFS. It could hence be a crucial development in adequately addressing GFS. Moreover, it could bring more attention for the links and connections in the food

sciences, as compared to the strong focus on separate elements such as components, products and ingredients.

In its external message Wageningen UR tends to depoliticise food. The argument used here is that Wageningen UR does not take a position in the debate and only provides information. As Vink (Interview, April 16, 2014) states:

> *We hence consider the issue of GFS, the global food question, a knowledge issue. That is what it is for us. In that sense, Wageningen University and Wageningen UR are amoral, a non-committed party [in the sense of emotional involvement], since the issue is a knowledge issue.*

Kropff argues that politics is not one of the core businesses of Wageningen UR. Governance however he finds as a significant field for Wageningen UR. Kropff: "Studying those political processes is very interesting, but I don't see that as our core business. Governance, however, I find very essential" (Kropff 2014). Kropff argues governance to be essential. On the other hand he states that:

> *I think the number of breakthrough studies possible in the development of new materials of plants, new technologies and so on is much higher. Therefore you can put more people on it to do research than if you would say: we all just analyse the governance. I think we can get more there, more research questions can be still found there. Not that this [governance] is not complicated but you are not going to study governance systems with a thousand researchers in the Netherlands. But we do work on molecular systems with at least a thousand researchers. But it is important to think about this question, it is an important question (Kropff 2014).*

In this quote lies an interesting assumption: the assumption that there are more breakthroughs to be found and that there is hence more to be researched in the natural sciences. This is an odd assumption, as Kropff argues governance is essential. A second, related odd assumption is the idea that in social science research there will not be the kind of scientific breakthroughs as there will be in the natural sciences. These breakthroughs in social sciences might have a different nature and are probably more complex (no 'silver bullets' like genes for instance), however this does not mean that they do not occur (many Nobel prizes have been won in the fields of psychology, economics and sociology). Moreover they might be more difficult to communicate about, which could be a reason why they receive less attention and are not considered 'breakthroughs'.

> *There [i.e. at the ENP group] they look at which governance mechanisms and administrative measures actually work well. That is hence more governmental than political. Politics is, in fact, what kind of action you want to take, what goals you want to achieve. World food security solutions are about governance: what works and what doesn't (Kropff 2014).*

Here, Kropff frames governance as something that either works or does not. Governance is about roles and decision-making. Van Boekel agrees with Kropff on the topic of politics and he adds:

*What I do think is important, is that students know or at least learn that political decisions and policy are very essential for where the world is going. So that awareness should be there I reckon (Tiny van Boekel, interview, June 4, 2014).*

Interestingly, Van Boekel brings in another element here: the *awareness* about policy and politics rather than actually studying these topics. This is a vital difference between science and education. Studying decision-making might not be Wageningen UR's core business. Being aware of the fact that political decisions are essential for GFS is something most students are probably not fully aware off. Hence, the importance does not lie in studying food politics in detail, but in teaching students that there are political aspects to food.

Spokesperson Simon Vink (Interview, April 16, 2014) does think Wageningen UR could include politics in its domain:

*I think we don't have very strong political sciences here in Wageningen. And you might say that's a misstep. I think it is defensible to say: there should be more attention for cultural-anthropology and political sciences.*

Mol (Interview, May 21, 2014) addresses that the focus here was mainly economic:

*Agricultural politics used to be dealt with at the Agricultural Economics and Rural Policy Group (AEP), but that was primarily economical. You could propose to set up an additional chair group there that gives added value to what is already present in Wageningen.*

As Nobel-prize winning economist Amartya Sen has demonstrated in his famous book "Poverty and Famines: An essay on entitlement and deprivation": there is no such thing as an apolitical food problem (Sen 1981). Food is different from other commodities since it's the basis of life. Food is a subject of business, environment and health. It is even used as a weapon  (even through today in the Syrian civil war for example (e.g. Al Arabya news 2014)).

*Food politics are the political aspects of the production, control, regulation, inspection, distribution and consumption of food. The politics can be affected by the ethical, cultural, medical and environmental disputes concerning proper farming, agricultural and retailing methods and regulations (Unknown).*

Not food availability, but food security is one of the main topics at Wageningen UR. Food politics could be interpreted as belonging to the 'core business' of Wageningen UR, as the political aspect of food is crucial in addressing GFS adequately.

Lang et al. (2009, pp.21–23) give an extensive explanation as to what exactly food policy entails in their book: 'Food policy: integrating, health, environment and society' define food policy as "What people eat when, where and how". A food policy is:

> *Any decision, program or project that is endorsed by a government agency, business, or organization which effects how food is produced, processed, distributed, purchased, protected and disposed. Food policy operates at the global, national, provincial, regional, local and institutional levels. World Trade Organization regulations, welfare policies, farm subsidies and labelling standards are some examples of higher level polices that influence the food system (Vancouver Food Policy Council 2014).*

Lang et al.(2009, p.23) add to this that: "the best way to understand food policy is as a contested terrain, where actions and implications are tussled among interested groups and social forces from the state, supply chain and civil society".

Food policy is thus not only about the availability of food. It also treats the accessibility, utilization and the stability components. It therefore has the potential to include these topics to a greater degree and hence to adequately address GFS. It is therefore an important multi-disciplinary field which deserves greater emphasis in the Wageningen UR main frame.

Food justice is another underrepresented theme at Wageningen UR. The term 'Food justice' refers to social justice in the food system (Allen 2008). This broad theme, which includes topics like food sovereignty, food democracy, the 'right to food' and could even include ethics, is remarkably absent in Wageningen UR's GFS frame. Food sovereignty is not used on Wageningen UR's webpages, nor in the speeches of the executive board members. Table A.1 and Table A.2 in the Appendix show that 'justice' is mentioned only once in all 102 courses and that 'food sovereignty' is a term not mentioned at all. In Table A.2 'food democracy' is also mentioned once. For ethics the statistics are better: this term is mentioned 12 times, mainly in the specific 'Food Ethics' course.

Food justice was also not often mentioned in the interviews. An exception is Van Boekel (Interview, June 4, 2014) who explains his opinion of food sovereignty:

> *I think it [i.e. food sovereignty] is a component of food security: that if you give people food sovereignty, it's also in their power to grow enough food and to have access to it. But I think it*

*is currently a dilemma that when you talk about food security this is filled in mainly in a technical way. (…) It is not the case that food sovereignty is only [a topic] present at alternative conferences. I have led a big project in South-America, Africa and India and there it really wasn't just something alternative, there it's simply in the law. But here, in the Netherlands, it does have this [alternative] connotation (Tiny van Boekel, interview, June 4, 2014).*

In this quote Van Boekel addresses that food sovereignty is an extremely important concept in many parts of the world. "Several countries have incorporated food sovereignty into their national constitutions and laws including Venezuela, Mali, Bolivia, Ecuador, Nepal and Senegal"(Peña 2013, p.2). However, in the last part of his quote Van Boekel addresses that food justice seems to be a concept present in the other 'marginalized' frames at Wageningen UR, but not in the GFS main frame. The concept of food sovereignty for example is used in grassroots lectures (as for example organized by The Boerengroep, a student organization in Wageningen) and conferences organized by Non-Governmental Organizations (NGO's), student organizations and farmers (such as the Food Otherwise conference in February 2014).

The difficulty with the term food sovereignty is that it is over defined (Patel 2009) and just like food security it could be considered a consensus frame. An important element regarding the concept of food sovereignty is that its origins lie in a reaction against the term 'food security'. In Food First's Backgrounder of 2003's fall, Peter Rosset (2003, p.1) clarifies the differences between the two concepts:

*Food sovereignty goes beyond the concept of food security.(…) Food security means that every child woman and man must have the certainty of having enough to eat each day; but the concept says nothing about where that food comes from or how it is produced.*

The original definition of food sovereignty comes from the global peasant movement 'La Via Campesina': "Food sovereignty is the right of each nation to maintain and develop its own capacity to produce its basic foods respecting cultural and productive diversity" (Via Campesina 1996, p.1). Friends of the Earth International (2012, p.7) add that "It enshrines people's right to define, and own, their own food and agriculture systems and demands that those who produce, distribute and consume food be at the heart of food systems and policies, rather than markets or corporations. If this framework was followed we would have a completely different form of sustainable agriculture". Put simply, food sovereignty is "precisely about invoking a right to have rights over food" (Patel 2009, p.663). Food sovereignty also includes the right over land. Food sovereignty goes beyond food security by attributing rights and decisions about food (Peña 2013). "Moreover, the food sovereignty

discourse also involves the value of what is not quantifiable in the food security paradigm: matters of culture, biodiversity and traditional knowledge"(Peña 2013, p.9).

A key difference between the concepts of food security and food sovereignty is hence that food security addresses the question of *how* to feed the world, whereas food sovereignty also addresses the question: *who* feeds the world? This last question is not addressed in depth in the Wageningen UR main frame[1].

Moreover, as Candel et al. (2014) point out:

> *A good example of framing and counter-framing in the context of food security is the invocation of food sovereignty. Both non-governmental organizations, such as via Campesina – representing small farmers – and academics (..) use food sovereignty as an alternative for food security. According to them, food security is associated with neo-liberal and agri-industrial interests, whereas food sovereignty offers a more inclusive approach to issues of food provision, such as regional and cultural aspects of food production. Food sovereignty is thus a counter- frame to food security in the context of food provision debates (…) (Candel et al. 2014).*

A concept similar to food sovereignty is food democracy. Hassanein (2003, p.79) argues that the core of food democracy is:

> *the idea that people can and should be actively participating in shaping the food system, rather than remaining passive spectators on the side-lines. In other words, food democracy is about citizens having the power to determine agro-food policies and practices locally, regionally, nationally, and globally.*

Since most of the world's food is grown by small farmers, without the use of industrial inputs, and makes use of traditional seed varieties, food sovereignty and food democracy are important concepts and present opportunities for Wageningen UR to include in its main frame.

Ethics is also an underexposed theme in the Wageningen UR main frame. Wageningen emeritus professor in applied philosophy: Michiel Korthals (2014) uses a framework that consists of six ethical criteria according to which food and farming style can be evaluated: (1)Can the farming and food style reduce hunger, poverty and malnutrition? (2) Is it sustainable? (3) Is it animal welfare friendly?

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[1] Wegner & Zwart (2011) for example do elaborate on the question of who will feed the world.

(4) Is it fair and just to farmers and others? (5) Does it stimulate rural liveability? (6) Is it consumer friendly: does it decrease the gap between production and consumption and does it connect positively with urban areas? He states that:

> *Together, the balanced fulfilment of these criteria comprise something like a fair representation of food and farming styles in science, governments and markets, that culminates in food democracy where gaps between consumers and producers are mitigated, bridged or deconstructed (Korthals 2014, p.9).*

Interestingly, Korthals does not use the term food security. He uses ethical food and farming and food democracy in his wording. Exactly the use of this different frame shifts the emphasis tot the ethical aspects in food security.

Currently, the ethical component of Wageningen UR's frame mainly focuses on the first criterion: the moral duty to feed the world. To a lesser extent it also includes criteria 2: sustainability and 3: animal welfare. The last three criteria: fairness for farmers and others, rural liveability and consumer friendliness are not part of the Wageningen UR frame. Including these three criteria in the GFS frame is likely a necessary step to achieve GFS and presents an important opportunity.

Another aspect of the GFS framing by Wageningen UR is the need for science and technology and the need for 'innovations' and 'scientific breakthroughs'. The focus of these breakthroughs lies mainly in the 'smaller' level, meaning the organism, cell and molecular level within the natural sciences of the agrifood domain. The need for science and technology, particularly the focus on the smaller level, thus seems to be imperative.

At Wageningen UR 18 different chair groups offer courses with the word 'food' in the title. Some groups offer even up to 10 courses (the Laboratory of Food Chemistry: FCH for example), while others offer only a single food course (the Agricultural Economics and Rural Policy (AEP) Group, the Operations Research and Logistics group (ORL) and the Sociology of Consumption and Households group (SCH)). The actual meaning of the word 'food' varies greatly between the courses. This became apparent from the many different terms that came up. However, some terms appeared much more frequently than others. 'Quality' immediately stood out with 116 counts. Also 'production' and 'products' with 76 and 67 counts respectively were prominent terms. Interestingly 'Law' appeared 65 times. It was notable that there were many terms with high frequencies related to food on food product and nutrition level, like properties, chemicals, components, nutrients. Related word counts can be found in Table A.2 in the appendix. In the 'Nutrition' courses term like health, human and metabolism were most frequently used: Table A.4 shows the nutrition related word counts. Table A.5

shows the word counts for agriculture related terms, here terms like agriculture, rural and economics were most prominent. These findings give an indication of the different meaning of food and associated terms.

Also the word counts analysis confirms that the focus often lies with the smaller level (see Appendix). For courses with 'food' in the title, many terms with high frequencies are related to food on product and nutrition level. For example: 'properties', 'chemicals', 'components', 'nutrients'. These are all aspects of the 'smaller' product level.

For courses with 'food' in the title, almost all 'quality's refer to food quality. Almost all 'components' refer to food components. 'Management' is often related to food quality management. To conclude: food is about quality management, about food technology (chemical, components), logistics and to a small degree, about governance. It is more about micro-level (smaller than a food product), than about macro-level (larger than a food product).

An explanation could of course be that the term 'food' is used more at the micro level than the macro level, as also rector Martin Kropff states: "Perhaps, the term food is not so much used in the title in the courses that deal with the topic of food on a more macro level" (Kropff 2014).

However, "It may be that there is much more research and education at the micro level of food, so up to the molecular level than at the meta or macro level, what I actually think is the case." (Jac Niessen, interview, May 22, 2014). He continues:

> There is a lot more being done at the micro level (smaller than a food product) than at the macro level (larger than a food product), that is true. You just see that. Three out of five groups: plants, animals and agro technology & food are by definition dealing with the micro level and the environmental group a little bit. It is an option to pay more attention to the macro level. We should explore that option (Jac Niessen, interview, May 22, 2014).

Mol (Interview, May 21, 2014) about adding other aspects to Wageningen UR's frame:

> Which already happens quite a bit, but often still at the atomic level. On choice behaviour for example: what they do here in marketing. There [in marketing research] they look very much how individuals choose foods in a supermarket for example. But it is really about that level just one step higher, not people as individuals, but groups in society.

Kropff demonstrates the same focus:

*Again indicating, it's not just food production, but it's also ensuring the leveraging for nutrition and health, recognising the entwinement of these sectors. New challenges are found for example in the field of bio fortification, by the effect of breeding high nutrient crops, or nutrition status is studied. But also the field of nutrient genomics., we recently have seen a lot of articles in the newspapers, where the interaction between food and our genome is being studied (Kropff 2013).*

The argument stated by Kropff (2014) to focus on this 'smaller' level is, that there are more breakthroughs to find in this field than in the 'macro' levels of governance, for example, in the social sciences. He argues that in the social sciences it is much more difficult to find breakthroughs. Van Veluw (Interview, May 30, 2014) comments about this statement with the following:

*If you believe that there are more breakthroughs possible in the natural sciences as compared to the social sciences, then you neglect the fact that there are already 2800 kilocalories available per person per day.*

The Wageningen UR main frame is about an increased world population in the future, which will consume more animal products and therefore there will need more food. A shift in diets around the world can be seen. When the topic of changing diets is touched upon in Wageningen UR's discourse, usually the benefits of this development are emphasized: with growing economies people in developing countries are able to buy more nutritious food and more animal products (see for example Dijkhuizen 2012). The framing with a focus on the future and the framing of the issue of changing diets are demonstrated in the 'Food security dossier' on Wageningen UR's website:

*The world's population is increasing quickly, and it is predicted to grow to 9 billion people in 2050. In less than forty years the earth will gain 2 billion extra inhabitants who will also have to live, work and eat. **Fortunatel**y, our **prosperity** is also predicted to **increase**, which means that diets will be subject to change (Wageningen UR 2014c).*

Wageningen UR frames this as an undeniable and very positive effect as framing devices like the words *fortunately* and *prosperity* in combination with *increase* demonstrates.

Moreover, at Wageningen UR diets are usually linked to nutrition on the individual level: how can we define or meet dietary needs, what are components of a diet, what are dietary consequences of an allergy free diet? The link between diet and the environment is usually not made in the GFS main frame.

However, many authors predict that the rise in wealth and the related diet changes will also have negative implications (see for example Keats & Wiggins 2014). According to Keats & Wiggins (2014) there are two emerging concerns about changing diets: 1- the effect of diet on health; and 2- the demands made by changing diets on agriculture. Currently over one third of all adults across the world – 1.46 billion people – are obese or overweight (Keats & Wiggins 2014). Wherever incomes are rising in the developing world, there is a marked shift from cereals and tubers to meat, fats and sugar, as well as fruit and vegetables (Keats & Wiggins 2014).

Though, the first emerging concern addressed by Keats and Wiggins (2014) is partially addressed in the main GFS frame, the emerging environmental and health concerns about changing diets is another underexposed topic. Moreover, when Wageningen UR does address the topic of changing diets it is usually in a technological manner. The best example here is the trend of insects as 'new' proteins: a lot of research is currently being done in order to use insects as 'new' protein sources.

According to Keats & Wiggins (2014, p.1):

> *There seems to be little will among public and leaders to take the determined action that is needed to influence future diets, but that may change in the face of the serious health implications. Combinations of moderate measures in education, prices and regulation may achieve far more than drastic action of any one type.*

Professor Tim Lang calls for an increased international effort to define and clarify a 'sustainable diet' (Lang 2012, p.21). He proposes important steps in order to do so (see Lang 2012, p.24). The SDG 12: "Ensure sustainable consumption and production patterns" addresses the same issue (UN Open Working Group for Sustainable Development Goals 2014).

## 5.4    Agroecological opportunities

An analysis of the Wageningen UR website, interviews with key players and an analysis of GFS related courses at Wageningen UR, revealed that many aspects within the overarching theme of 'more' have sociocultural roots. Another elemental category under 'more' are the agroecological aspects. The agroecological approach corresponds closely with what McMichael & Schneider (2011, p.132) call: 'the multifunctionality approach'. Multifunctionality however addresses a diversity of practices and goes beyond farming This 'more' includes a range of aspects, among which are: environment, biodiversity, waste, water and post-production aspects. Literature confirms these findings. Moreover, the agroecological or multifunctional approach also includes social aspects. Since these were already discussed in Section 5.3 , this section will focus less on the social aspects.

In this section the agroecological opportunities for reframing at Wageningen UR are illuminated. They form an important opportunities when included or emphasized within the existing Wageningen UR main frame.

Over the last decades up until today, Wageningen UR's GFS frame has mainly focused on availability. This frame can be considered as belonging to what Lang & Heasman (2004, pp.21–25) call the 'Life Sciences Integrated paradigm', and have strong connections to a productionist legacy. This means that the Wageningen UR frame focuses on new biological technologies to increase food production. The frame has a mechanistic and fairly medicalized interpretation of human and environmental health.

In practice this results in Wageningen UR framing GFS in a technical, fragmented way. Food security has a different meaning across departments, which all approach it from their own perspective. Each discipline addresses an aspect of food security, while the focus in the main frame lies on new biological technologies for food production. The mechanistic way corresponds with this fragmentation: improving components of food security instead of using an integrated approach. This is for example visible on Wageningen UR's website, as discussed in Section 5.3. These characteristics correspond with the Life Sciences Integrated paradigm, to which Wageningen UR's frame belongs.

Lang & Heasman (2004, p.26) argue that next to the Life Sciences Integrated paradigm, a second paradigm exists: the 'Ecologically Integrated paradigm':

> the Ecologically Integrated paradigm is also grounded firmly in the science of biology, but it takes a more integrative and less engineering approach to nature. Its core assumption recognizes mutual dependencies, symbiotic relationships and more subtle forms of manipulation, and it aims to preserve ecological diversity. It takes a more holistic view of health and society than the more 'medicalized' one of the Life Sciences paradigm.

The line of thinking of the ecologically Integrated paradigm corresponds closely to the body of thinking called 'agroecology' (Lang & Heasman 2004). Agroecological methods can be described to be:

> re-discovering local skills and traditional knowledge, but applied with modern understanding to meet the challenges of food production. This is because a guiding principle of the Ecologically Integrated paradigm is that diverse natural communities are productive and should be supported (Lang & Heasman 2004, p.27).

The holism, which is key in the Ecologically Integrated paradigm, or in the concept of agroecology is hard to find in Wageningen UR's main frame. In Wageningen UR's corporate communication's external discourse, holistic approaches to GFS, with agroecology as the overarching interdisciplinary field of science, are not used. Agroecological principles are not present in Wageningen UR's main frame discourse. The courses analysis showed that the term 'agroecology' is not used once in any of the 102 courses. In the speeches of the executive board members and on Wageningen UR's website pages the term is absent as well. This is posed as an error, since the ecologically integrated paradigm and the agroecological principles offer opportunities to effectively address GFS.

"Today, the term 'agroecology' means either a scientific discipline, agricultural practice, or political or social movement" (Wezel et al. 2009, p.503). An important advocate of agroecology is former UN Special Rapporteur on the right to food: Olivier de Schutter. He further explains the first two domains of the concept of agroecology; agroecology as a science and a practice:

> *Agroecology is both a science and a set of practices. It was created by the convergence of two scientific disciplines: agronomy and ecology. As a science, agroecology is the "application of ecological science to the study, design and management of sustainable agroecosystems" (Altieri 1995). As a set of agricultural practices, agroecology seeks ways to enhance agricultural systems by mimicking natural processes, thus creating beneficial biological interactions and synergies among the components of the agroecosystem. (…) The core principles of agroecology include recycling nutrients and energy on the farm, rather than introducing external inputs; integrating crops and livestock; diversifying species and genetic resources in agroecosystems over time and space; and focusing on interactions and productivity across the agricultural system, rather than focusing on individual species. Agroecology is highly knowledge-intensive, based on techniques that are not delivered top-down but developed on the basis of farmers' knowledge and experimentation (Schutter 2010).*

Agroecology as a political or social movement, more recently, includes various social movements based on reforming the food system (Foran et al. 2014).

Moreover, there is no strong tendency to take environmental sustainability into account and to go into the negative implications of production intensification into more detail in Wageningen UR's main frame. The implications are mentioned briefly, but not fully acknowledged.

According to Van Veluw (Interview, May 30, 2014) externalities of primary production, such as water pollution or soil degradation are not taken into account in Wageningen UR's main frame:

*If you conduct the discussion: organic or not, you reduce the question to 'how many kilos per hectare is the system producing?' And all the externalities are not taken into.*

It seems that it is justified not to do so by the need to feed the world population. Van Veluw (Interview, May 30, 2014) explains: "At the moment the worldview is: we must feed the world. With that, everything is legitimized". Also 'biodiversity' is almost totally absent from Wageningen UR's frame

The Ecologically Integrated paradigm and agroecology offer opportunities since these concepts do take externalities such as biodiversity into account.

In the Wageningen UR GFS main frame the focus lies on primary agricultural production. As a consequence; what happens to the products of agriculture after they come off the land, is an underexposed theme at Wageningen UR. The mission of Wageningen UR: *'To explore the potential of nature to improve the quality of life'* already eludes to this focus on agriculture. 'Exploring the potential of nature' is much closer to agriculture and hence primary production, than for example storage or logistics.

'After primary production' includes physical aspects like product quality, processing, storage, logistics, waste and utilization as well as more theoretical aspects like institutions, policies and laws. These aspects are however pertinent in addressing GFS adequately and hence form an important opportunity for Wageningen UR to include in its main frame. Van Boekel recognizes the theme:

*I personally think that what's missing is that food security in the past and I think even now still, has been dealt with, focusing too much on primary production: on the real agriculture and too little on what comes afterwards.(...)That [primary] production is of course the very beginning and is also incredibly important, but there is more and we would have to emphasize that more. (...) It should also be about: what happens after the primary production. And if you think like that, automatically things like institutions, law, policy-like things come into the picture and fall much better into place. Those aspects are also important because you have to start thinking about how the whole production chain can be controlled. And that is something I miss quite a bit in global food security (Tiny van Boekel, interview, June 4, 2014).*

He also gives a possible explanation:

*Global food security has been dominated too much by people who think in terms of primary production and not from the viewpoint of what needs to be done in the sense of: 1) many*

*losses can be controlled a lot better if you know the links in the chain better and: 2) that you shouldn't just talk about the yields, but also about the quality of yields. Hence, if you look at protein crops for example, you should also look at the quality of the protein and maybe your choice of crops should not only have to be influenced by yields, but also by what can be done with those yields after harvest (Tiny van Boekel, interview, June 4, 2014).*

He continues:

*I have been missing that and still notice that it is a world where there is a lot to improve in terms of thinking from that starting point: how can we think more from what people really need rather than from what farmers can produce? (Tiny van Boekel, interview, June 4, 2014).*

In Wageningen UR's main frame food waste is a growing theme. As can be seen in Table A.1. in the Appendix though, food waste is a term not yet used in Food, Nutrition or Agriculture related courses. A step in the right direction though for the academic year 2014-2015 is the new course on food waste: "Food Waste-Challenges and Opportunities", which was added to Wageningen UR's educational offerings.

Rector Kropff has addressed food waste in his speech on Wageningen UR's 95th Dies Natalis for example:

*We all know that we have 40% **losses in the chain**, in **the way we handle things in our homes**. We see that worldwide coming up. So 40% losses, if we reduce those losses, we can also increase availability. Simple wins (Kropff 2013).*

Kropff talks about losses, not about waste. Although he obviously addresses food losses AND food waste with *losses in the chain* and *the way we handle things in our homes*, Parfitt et al. (2010) makes a distinction between the two: Food waste is food loss occurring during the retail and final consumption stages due to the behaviour of retailers and consumers – that is, the throwing away of food (Parfitt et al. 2010). Food waste occurs mostly in medium- and high-income countries. Here, food is to a significant extent wasted at the consumption stage, meaning that it is discarded even if it is still suitable for human consumption (Gustavsson et al. 2011).

Food loss measures the decrease in edible food mass (excluding inedible parts and seed) throughout the part of the supply chain that specifically leads to edible food for human consumption. That is, loss at the production, postharvest and processing stages (Parfitt et al. 2010). The definition includes biomass originally meant for human consumption but was eventually also used for other purposes, such as fuel or animal feed. This type of food loss occurs mostly in low-income countries in the early

and middle stages of the food supply chain; in low-income countries much less food is wasted at the consumer level (Gustavsson et al. 2011).

This approach distinguishes 'planned' non-food uses to 'unplanned' non-food uses, which are hereby accounted under losses (Gustavsson et al. 2011). "Overall, on a per-capita basis, much more food is wasted in the industrialized world than in developing countries" (Gustavsson et al. 2011, p.V).

Roughly one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tons per year (Gustavsson et al. 2011). "This inevitably also means that huge amounts of the resources used in food production are used in vain, and that the greenhouse gas emissions caused by production of food that gets lost or wasted are also emissions in vain" (Gustavsson et al. 2011, p.V). Gustavsson et al. (2011) hence emphasize the importance of including food waste in the Wageningen UR frame.

Water is another topic seldom encountered in Wageningen UR's main frame. It is however a crucial theme for GFS (Falkenmark et al. 2009). In the courses analysed, water was a term mentioned 19 times. However, often the term referred to water as a component of a product (for example "emulsions containing oil and water"). Using water in reference to the production of food was less common.

The topic of water was not mentioned often in the interviews either. In the Wageningen UR main frame the reference to water lies in the framing device 'less resources', from the 'more production with less resources'. In that sense it can be argued that water use is indeed addressed in the GFS main frame. Here, it is again about emphasis. Water is addressed, but there is no strong emphasis on it. It is important to emphasize the topic of water in relation to food production more in the Wageningen UR frame. The urgency is demonstrated by Falkenmark et al.:

> *Food production is one of the world's largest freshwater consuming sectors, and (…) the process of growing biomass consumes huge volumes of water (an adequate diet consumes in the order of 1,000– 1,300 m3/capita/year) (Falkenmark et al. 2009, p.60).*

Falkenmark et al. (2009) argue that it is therefore necessary to provide evidence for strategic opportunities in order to obtain sustainable water resources for agricultural production. Again, an integrated approach is most beneficial here:

> *Achieving more food security with less pressure on scarce water resources requires a holistic perspective that goes significantly beyond increasing 'crop per drop.' It involves improving the use of water not only in crop production systems but also in livestock production, integrated*

> *cropping/fisheries/livestock systems, and food production processes (Robert B. Daugherty Water for Food Institute 2014, p.1).*

Giving more emphasis to the topic of water is therefore an important opportunity for Wageningen UR in order to adequately address GFS.

In this chapter two main themes that offer opportunities when included more in Wageningen UR's framing, were discussed. In order to adequately address GFS, Wageningen UR should move its emphasis toward embracing holistic approaches such as the concept of agroecology in the Life Science Integrated paradigm. Wageningen UR should also dedicate more attention to the socio-cultural dimension of food and include aspects like food justice and food policy.

# 6 How to do it: general research and education structure at Wageningen UR

## 6.1 Introduction

While discussing the topic of reframing in interviews with the key informant interviews, many themes where touched upon that did not necessarily apply to the framing of GFS. These themes rather referred to the actual *characteristics* and *structure* of research and education both in general and at Wageningen UR. This chapter goes into more detail on the current Wageningen UR science and education characteristics and structure and critically reflects on them. While Chapter 5 has elaborated upon topics for reframing, this chapter discusses important aspects to take into account when operationalizing a (new) frame at Wageningen UR. In other words: *how* to do it.

Brought up topics were divided into four main aspects of research and education, which are discussed in the four sections of this chapter: 'more integration', 'more than technology', 'more collaboration with society' and 'more than quantifiability'. In other words: four ingredients to make best use of the opportunities for Wageningen UR that were illuminated in Chapter 5. Needless to say, the topics in this chapter and the GFS framing themes are not always mutually exclusive and are in fact often closely intertwined. Therefore, some aspects have already been touched upon in Chapter 5, since these general aspects logically resonate in the opportunities for Wageningen UR's GFS main frame. Moreover, the four aspects are closely related, they all overlap and there is usually no strict distinction between them. **Error! Reference source not found.**9 shows these dynamics.
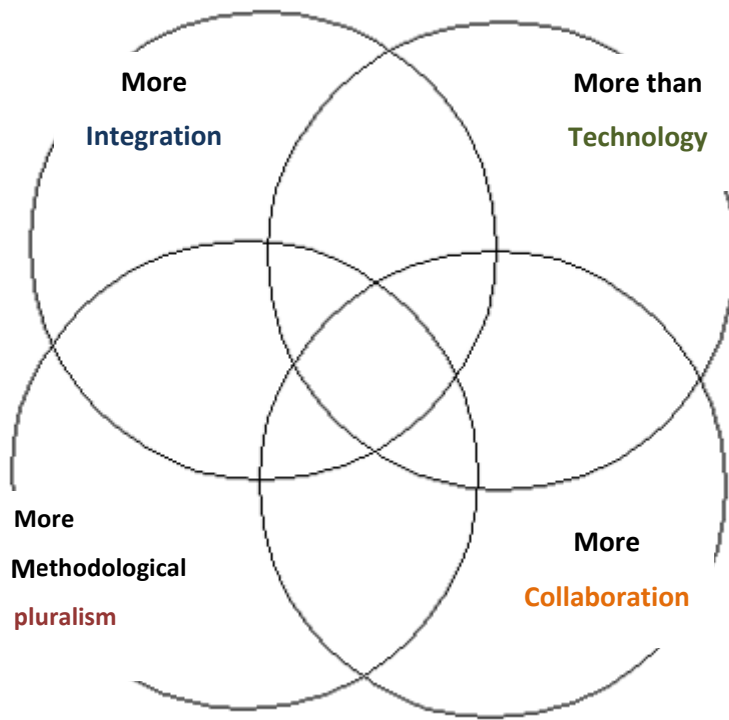
*Figure 9 The four aspects of this chapter*

 Figure 9 shows the four aspects of this chapter. These four aspects are all overlapping. In the middle of the figure all four aspects overlap, which represents the ideal focus to aim for. The ideal focus is hence a combination of more integration, less technology, more methodological pluralism and more collaboration.

## 6.2   More integration

Wageningen UR is unique in the sense that social sciences and natural sciences, combined in the area of 'the life sciences', can be found in one research and education institute. Wageningen UR flaunts its inter- and transdisciplinary approach, the so-called Wageningen approach:

> *The strength of Wageningen UR lies in its ability to **join the forces** of specialised research institutes and Wageningen University. It also lies in the **combined efforts of the various fields of natural and social sciences**. This **union of expertise** leads to scientific breakthroughs that can quickly be put into practice and be incorporated into education. This is the Wageningen Approach (Wageningen UR 2014a).*

*Join the forces, combined efforts of natural and social sciences* and *union of expertise* are strong framing devices that emphasise the inter- and trans disciplinary approach. Moreover, they suggest

that the integration of different disciplines is thriving at Wageningen UR. Especially the term *union* in the framing device *union of expertise* suggests that integration is successful.

Although Wageningen UR argues that integration is important and flaunts its integrated approach, this approach is not sufficiently brought into practice yet: "By mouth everyone professes that 'interdisciplinarity' is important, but in practice they much less do so" (Tiny van Boekel, interview, June 4, 2014).

All interviewees in this study argued that the integration aspect of different disciplines in Wageningen UR's research and education can still be improved. To which extent integration should be improved at Wageningen UR however, differs per person. Two examples demonstrate this variety: "Here in Wageningen the social and natural sciences are very separate, we should talk much more to each other" (Kees Van Veluw, interview, May 30, 2014) and "I'm a very strong advocate of precisely that combination between technology and social sciences and that there are joint projects. And we already do that pretty well in Wageningen. But it could be better and with that we could also take the lead in the world" (Kropff 2014).

Moreover the interviewees considered not only integration between fields of science as important. Niessen (Interview, May 22, 2014) adds that it is also about integration *within* fields of science: "It occurs regularly that even between gamma-gamma [studying human actions] and beta-beta [studying the non-human nature] the interaction is not optimal. That they don't know from each other what they're doing". Mol believes that: "it's less a natural versus social discussion, although there are elements of it in the discussion" (Arthur Mol, interview, May 21, 2014). He believes it's more a discussion of different *worldviews* or what Vink (Interview, April 16, 2014) refers to as *societal visions*. It is hence not only about integration between disciplines. "It is [about] an integration of world views and ideas and ways of communicating" (Kees Van Veluw, interview, May 30, 2014).

From Wageningen UR's website the fragmented approach also becomes clear. Findings from the course analysis support this too. Section 05 of this thesis is a clear example. Table A.3, A.4 and A.5 in the Appendix show that different words are most frequently used in the different courses with either 'Food, Nutrition OR Nutritional' and 'Agriculture or Agricultural' in the title. This shows that the meaning of food differs between the different groups of courses. Moreover, it might be the case that more holistic courses are offered by chair groups that only offer one or two food course and do this in collaboration with other chair groups (such as the Public Administration (PAP) group), while the more mono- disciplinary courses are offered by chair groups that offer many food courses (such as the Human Nutrition (HNE) group). Though it would be too early to draw conclusions here.

Wilk (2012) summarizes the problem for food studies and related subjects, which also holds for Wageningen UR:

> *Existing disciplinary paradigms continue to undercut interdisciplinary work and holistic thinking about food and related subjects. Holistic food studies are growing rapidly in traditional liberal arts colleges, including the humanities, arts and social sciences, but so far they have very limited connections with natural sciences including food science and agriculture (Wilk 2012).*

Although Wilk (2012) talks especially about *food studies* and not about science and education in general, much of his argument holds true for other topics as well: "existing disciplinary paradigms continue to undercut interdisciplinary work" and "the social sciences have limited connections with natural sciences".

Integration or in other words: a more interdisciplinary or even transdisciplinary approach are therefore desirable. At the heart of most definitions of integration is the acknowledgement that it refers to the process of forming an empirically discernible entity from a number of strongly connected components. At the most general level, it is understood to be the process of forming a new entity from different parts, resulting in something 'composite' or 'integral'. Integration is often referred to as the opposite to 'fragmentation' (Luukkonen & Nedeva 2010).

Aboelela et al. (2007, p.341) propose a useful definition for interdisciplinary research:

> *Any study or group of studies undertaken by scholars from two or more distinct scientific disciplines. The research is based upon a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process.*

Interdisciplinarity is closely related to multidisciplinarity and transdisciplinarity, where integration is strongest in transdisciplinarity, followed by interdisciplinarity and multidisciplinarity respectively. Table 5 shows the main characteristics of these three approaches.

*Table 5 Characteristics of multidisciplinary, interdisciplinary, and transdisciplinary research (adapted from Aboelela et al. 2007, p.340)*

|  | Participants/ Discipline | Problem Definition | Research Style | Presentation of Findings |
|---|---|---|---|---|
| **Multidisciplinary** | Two or more | Same question | "Parallel play" | Separate |

| | disciplines | but different paradigm OR different but related questions | | publications by participants from each discipline |
|---|---|---|---|---|
| **Interdisciplinary** | Two or more distinct academic fields | Described/defined in language of at least two fields, using multiple models or intersecting models | Drawn from more than one, with multiple data sources and varying analysis of same data | Shared publications, with language intelligible to all involved fields |
| **Transdisciplinary** | Two or more distinct academic fields | Stated in new language or theory that is broader than any one discipline | Fully synthesized methods, may result in new field | Shared publications, probably using at least some new language developed for translation across traditional lines |

Van Boekel thinks that Wageningen UR is in a transition phase towards a more interdisciplinary approach:

*The development of universities in history started very interestingly: mostly universities started as theology, philosophy and medicine universities. Only in the 19th century, the natural sciences, which were previously amateurish, were professionalized in universities. That was the second generation. That generation has come to fruition and we are now in a transition phase in which this way of organisation is broken open again. (…) We are literally searching: for people, but also for methods and for 'what is then the scientific level that you can reach with that.(…) I see the collaboration between the social sciences and the natural sciences as a search of people who want something together. This applies not only to students, it also applies to teachers and supervisors. (…) With each transition you obviously get quite a lot of resistance from established orders. Science is established quite strongly because people – and I don't find*

*that scientific – do not easily deviate from their beaten paths. I see this period as a real struggle*

*to get out of that pattern of 'you must think in disciplines' and to come up with new ways (Tiny*

*van Boekel, interview, June 4, 2014).*

The disciplinary thinking is probably an important reason why there exist such diverging views on GFS at Wageningen UR. More integration, as well as more collaboration between disciplines is therefore necessary. Moreover, Mol (Interview, May 21, 2014) suggests that those working interdisciplinary might be more open-minded: "The people I mentioned that are more open minded are all people that work more interdisciplinary. That might be an explaining factor" (Arthur Mol, interview, May 21, 2014).

Increasing the level of integration – or a reduction of fragmentation – is not only desirable for Wageningen UR. It has also become an important policy objective for European research (Luukkonen & Nedeva 2010). According to Luukkonen & Nedeva (2010) increasing the level of integration raises three sets of issues. First of all: issues regarding the meaning and nature of integration generally and more specifically integration in research. Key informant Van Boekel also addresses this challenge. He argues that nobody really has an image of what exactly 'interdisciplinary' entails and that it is a vague term (Tiny van Boekel, interview, June 4, 2014). Secondly, there are issues associated with the mechanisms to enable and facilitate higher levels of integration in research (Luukkonen & Nedeva 2010). The relative efficiency and effectiveness of different policy instruments is also important here (Luukkonen & Nedeva 2010). Third, there is the group of issues related to the assessment and evaluation of success or failure of increasing the level of integration (Luukkonen & Nedeva 2010).

For the first issue raised, the description of Luukkonen & Nedeva (2010) for integration and the definition of Aboelela et al. (2007) for interdisciplinary research could be helpful starting points for more clarification regarding the meaning and nature of integration. Moreover, the concept that Luukkonen & Nedeva (2010) call 'crystallising agents' can be of use. Crystallising agents are the catalysts for social integration and the common denominator that binds social entities together to form an integral whole. At the most general level crystallising agents can be norms, values and beliefs. Crystallising agents for research integration are mostly knowledge related (Luukkonen & Nedeva 2010). While aiming for raising the level of integration it is hence important to define the crystallising agents that are able to bind different entities, in order to clarify *what* the integration is about.

The second issue raised by Luukkonen & Nedeva (2010) is an important issue that refers to the mechanisms in science. This is a complicated issue that relates for instance to the mechanism of

funding and publishing in scientific journals, which are mainly organized monodisciplinarily. This is something that will not change from one day to another. Although crucial in order to facilitate more integration, it was beyond the scope of this study to investigate the ways of changing the general mechanisms of research. It is important to be aware of this issue though when aiming to increase integration levels at Wageningen UR.

Regarding the third issue: since integration is a dynamic but relatively slow process, registering the level of integration as measured by network density at the end of use of specific instruments might indicate a tendency, but does not inform about *sustainability* of the process (e.g. when financial incentives are withdrawn) (Luukkonen & Nedeva 2010, emphasis added). Moreover, the objective for increasing integration can be formulated only in general terms, since it is impossible to specify what level of integration is desirable or sustainable and different entities start with different levels of integration (Luukkonen & Nedeva 2010). Luukkonen & Nedeva (2010) argue that the success or failure of policy instruments to deliver increased levels of research integration is best measured by their capacity to develop appropriate and sustainable crystallising agents and clearly defined and communicated expectations of utility (Luukkonen & Nedeva 2010). When aiming for more integration at Wageningen UR, evaluation is best done by measuring the capacity to develop appropriate and sustainable crystallising agents and clearly defined and communicated expectations of utility of certain policies or actions.

With these theoretical guidelines in mind, Niessen (Interview, May 22, 2014) proposes a practical way to generate more integration:

> *The Wageningen approach still has to be fulfilled. People need to look beyond borders and that is very difficult. (…) Steered spontaneous encounters, like in Impulse, we should get more and then hopefully we get some more interaction.*

Steered or 'planned' encounters might be a promising option to generate more cross-pollination between disciplines and hence a good tool to find 'crystallizing agents'.

Wageningen University could play an important role in the transition towards more integration, by educating a new generation in an interdisciplinary way in order to get graduates that are more familiar and might even be better able to work with an interdisciplinary approach. In this way integration in education could be enhanced, which might contribute to integration in science indirectly. Van Boekel (Interview, June 4, 2014) is not sure what exactly the role of Wageningen University should be though:

*Yes, that is why I'm trying to find out, what that role is. What do you need to facilitate? What can you actually teach people and what do you have to accept that they cannot learn? I do not know.*

The strength of Wageningen University's education is that it *offers* many different disciplines to students, between which they can easily 'shop' and exchange. As a result, the interdisciplinary approach, Vink argues, might be present most strongly in students (Interview, April 16, 2014):

*So what we have achieved here together is that combination and that might especially be present within the students, so the training, the choice and the drive.*

However, Although Wageningen UR offers the opportunity to 'shop' courses in and between many different programs, the average student probably experiences the frames of their own program. Vink's argument is therefore questionable.

Mol (Interview, May 21, 2014) argues that if you want to set up a new integrative MSc program you partly take away the integration that lies with the student, since that student is actually the integrative engine, who chooses his own path. All disciplines are indeed present, but a student should be around at Wageningen UR for a while and should be critical and be able to find his or her way in order to get a holistic approach in education. This can be difficult, especially for students from abroad. There are probably few students who are consciously finding their own way through Wageningen UR. As a student, one slowly becomes aware of the different ideas and disciplines present at Wageningen UR.

Also in Wageningen UR's education there are challenges when trying to integrate more. The willingness or ability of people to work in a more disciplinary way and the balance between integration and in depth disciplinary knowledge are important challenges. Van Boekel (Interview, June 4, 2014) addresses them:

*In my experience with interdisciplinary PhD projects I have also learned that some teachers can't or do not want to collaborate and so you really have to look for people who do want that and want to pursue a quest with together.(…) I also think a complicating factor as to translate this back into education is that the people who would have to educate are still searching themselves.(...) It is certainly necessary to have a place in education where there is room for more integration. What I did always struggle with is: at what point can you start to integrate? Because you still need a certain disciplinary knowledge level to be able to integrate. And that's always a very big dilemma we are constantly struggling with, even for the regular study programs.*

Van Boekel (Interview, June 4, 2014) discusses these two challenges into more detail. Firstly, he believes that not everyone is suitable for the interdisciplinary approach:

> *You need a certain way of thinking that can be learned in a sense, but I think it also has to do with how your mind works and if you are able to think broadly or not. I've also seen people who are disciplinarily really, really good and who ought to be able to think broadly and integrate, but just do not want to do so. I think we should keep that in mind as well, that it is about a certain kind of people (Tiny van Boekel, interview, June 4, 2014).*

Secondly, Van Boekel (Interview, June 4, 2014) elaborates on the dilemma of stimulating integration in practice in Wageningen UR's education, while keeping the levels of disciplinary knowledge high:

> *Too early is not right, but too late is neither right. (..) In my opinion, therefore, the integration should be brought in at a later stage, but what you could perhaps do is to give you some hint, even in the first year already, emphasizing the importance of 'interdisciplinarity'. (…) I also strongly suspect that you have to build up and that you should not start with a very broad BSc programme right away. (…) I just think that such an inter-specialization programme might work. Because you still apply a certain structure and give suggestions on how it could be. That could – especially for students from abroad – certainly help indeed discover what's available and then still give the freedom to adjust it yourself. At the same time it is also such a broad theme [i.e. food security] that I even think you can't catch it in one inter-specialization, you might need to have more inter-specializations. (...) What has particularly surprised me pleasantly was that we started with an honours program this year, which we had set up very broadly: that has been a great success and has actually attracted people that are looking for that broadness. So there it actually does work (Tiny van Boekel, interview, June 4, 2014).*

The crux here is that not everyone has to necessarily work inter-, trans- and multi-disciplinary. The important thing is that specifically those who work mainly mono-disciplinary do understand each other and are able to communicate and maybe even complement each other's work. Collaboration and integration are both necessary, however it is important to keep the balance between the two.

### *The case of more integration between nutrition and food*

An interesting example of the general fragmentation at Wageningen UR that relates to the topic of GFS is the case of nutrition and food. In this case more collaboration would be insufficient, as food is a complex web that covers many different fields. Especially in education it is essential to create more links and to address food more like a web than as silos of disciplines. In Wageningen UR's GFS main frame nutrition and food are treated as separate topics. On the research and results page of

Wageningen UR's website, the themes: Food production and Nutrition related to MSc programmes are displayed. For each theme four study programmes related to the topic are listed under the header: 'Want to study something with Food production/ Nutrition? Here, the clear distinction between food and nutrition becomes clear. Tiny van Boekel, director of the education institute recognizes this:

> *Something that has bothered me personally is the separation between food and nutrition in Wageningen that has always been very big.(…) I think that as Wageningen, we look at that in a too fragmented way (Tiny van Boekel, interview, June 4, 2014).*

Wilk (2012) calls this fragmentation 'topical butchery': "Different portions of the topic of food have been divided up and distributed to different fields in a way which may have deep historical roots, but which is otherwise almost impossible to justify"[2] (Wilk 2012, p.474). At Wageningen UR it now happens that in the Nutrition and Health courses students are taught how healthy fish is, while animal science students get to hear that fish stocks are almost completely depleted. In this way the approach stays fragmented and Wageningen UR hence runs the risk of failing to make use of the full range of GFS solutions available, as it asks for integrated approaches.

Changes here are now happening though. At the 95th anniversary of Wageningen UR, the 'Dies Natalis' in 2013 rector Martin Kropff introduced the term *nutrition security* in Wageningen UR's external message, thereby addressing the importance of not only quantity of food, but also quality:

> *Now in Wageningen we use to summarize the challenge as two times more production, with two times less inputs. I would like to add another component: it also has to be two times better nutrition. These two billion people with malnutrition, we have to address that as well. It's not just food, it's not just the environment. But it's also the **nutrition** and **health** of people. So, not just calories with less inputs, but a **healthy diet**. For each **individual** on earth and that's really a big challenge (…).This is beyond, I would say, food security and therefore we are using the term: nutrition security. It's all the way from food to nutrition (Kropff 2013).*

This seems like a good attempt to include a broader range of aspects of GFS. With the term nutrition security a link with people is made. Nutrition security mainly focuses on health  and on the individual, bodily level though, using framing such as *health*, *healthy diet and individual*. It is hence a fairly medicalized approach and still doesn't really address social aspects of GFS. It is hence not really integrating yet.  Moreover, it is to a strongly aligned with industrial food production.

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[2] For an engaging explanation of this concept, using the metaphor of a family dinner, see Wilk 2012, p.474

Wilk (2012) argues that  success in the future of holistic food studies:

*Will require the production of meta-rules or meta-paradigms that challenge fundamental assumptions. We also will need to include scholars working on all stages of the production, transportation, marketing, consumption, and disposal of food, and build institutional structures that promote such research and education.*

Recruitment of women might help to increase interdisciplinary activities, while attracting staff from outside academia may increase the propensity of interdisciplinary collaborations (van Rijnsoever & Hessels 2011).

To conclude: many challenges today are, such as GFS are multidimensional issues, which cross disciplinary borders. An integrated approach is therefore necessary. This means that both multiple perspectives on food as well as the links between these multiple perspectives as to treat food studies more like a web, should be introduced more. In order to adequately address an issues such as GFS it is hence important to improve integration between different disciplines at Wageningen UR. Especially in education a contribution to this integration process can be made, by teaching students in a more interdisciplinary way in order to create more familiarity with the approach and with different disciplines. The crux here is that not everyone has to necessarily work inter-, trans- and multi-disciplinary. More important is that specifically those who work mainly mono-disciplinary do understand each other and are able to communicate and maybe even complement each other's work.

## 6.3    More than technology

Wageningen UR has a strong focus on technology. In the communication about science this technology focus is present. Science is often associated with technological breakthroughs: 'silver bullets'. On the website of Wageningen UR this focus is clearly present:

*With the extra people and all their activities there is also extra need to use all available space and further pressure is put on nature, climate and the environment. This is a huge challenge. One that can only be met with the help of* **breakthroughs in science and technology** *(Wageningen UR 2014a).*

Another clear example of this technology focus is the following quote from spokesperson Simon Vink:

> *We are in the Netherlands able to get 80 kilos of tomatoes from one square meter, from the top of my head. In Spain it's 10 kilos a square meter in the open field. The tomatoes here are produced with less water: almost two litres of water per kilo of tomatoes produced. In the open field that is almost 40 litres of water, due to evaporation of course (Simon Vink, interview, April 16, 2014).*

The most typical example of this focus though is the search for new genes, beautifully demonstrated by the CAB-13 tomato gene that was discovered by Velez-Ramirez et al. (2014). This gene enables the tomato plant to grow 24 hours a day under continuous light conditions.

These examples hint that there might exists an implicit focus on the development and production of physical products.

Also for the future, Wageningen UR seems to be investing in more technological science themes:

> *The rapid developments in our environment force us to make difficult choices within the work fields of expertise in which we invest. For the period 2011–2014, the next social queries we will be focussing on are:*
>
> - *Sustainable and smart food supply*
> - *Customised nutrition*
> - *Coastal and marine resources*
> - *Biorefinery (Wageningen UR 2014a)*
>
> *We also invest further in the following scientific themes (emerging science):*
>
> - *System biology*
>
> - *Information, guidance and behaviour*
>
> - *Adaptability of complex systems (Wageningen UR 2014a)*

This focus on technology limits Wageningen UR to take advantage of the full range of solutions available for GFS. It is therefore important that it is balanced with a more sociocratic focus. Vink recognizes this:

> *We [as Wageningen UR] know that you can't just use a technical approach. You need people like Arthur Mol [professor of the Environmental Policy Group] and market experts besides the*

*technical work, preferably with interaction, to get results that you can use in practice (Simon Vink, interview, April 16, 2014).*

In Section 5.3 the need for an emphasis on socio-cultural aspects has been discussed. This is not only necessary for addressing GFS. A general more sociocratic focus in research and education at Wageningen UR is necessary to balance the technological focus.

## 6.4    More collaboration with society

Wageningen UR does not only consider integration within its organization important, also collaboration with the outside world is. The following quote demonstrates clearly how Wageningen UR sees this collaboration:

*(…) we cherish the close collaboration that exists between the natural and social sciences at Wageningen UR. But we also look beyond our own domain, by **applying our developed knowledge** in the domain of 'healthy food and living conditions' **elsewhere** as well (Wageningen UR 2014a).*

Collaboration actually seems to be mainly about applying and it seems to work mostly one way, as framing devices such as *applying our developed knowledge elsewhere* show. The idea seems to be that first knowledge is developed within Wageningen UR, while afterwards this knowledge is brought into society. The reasoning devices from the same framing are demonstrated by spokesperson Vink. He (Interview, April 16, 2014)  argues that:

***We are the party that gives tentative solutions, that brings knowledge**, that educates young people who can then do something with that knowledge in practice. Either in their own country or in the Netherlands. That knowledge must **be turned into value and function in society** by parties such as businesses: small businesses. That is the philosophy of the golden triangle, as we currently use it very successfully in the Netherlands. And you can see that it is going to be used, or at least it is viewed with great interest, abroad. Wageningen UR is a university that works with business and governments **to ensure that the knowledge we have can be used by a company or a party and can be transformed into a product, that you can use**.*

There hence seems to exist a strong believe that Wageningen UR brings the knowledge and the solutions, which society can then do something with.

A second aspect present in Vink's quote is the link to practice, which Wageningen UR proclaims to be very important. This link is often filled in by the collaboration with businesses. The collaboration model used at Wageningen UR is the so-called 'golden triangle' (Figure 11). Sikkema (2011) explains about the golden triangle: "Knowledge institutions, government and the business world must join forces to generate more innovation. That, essentially, is what the 'golden triangle' is all about".
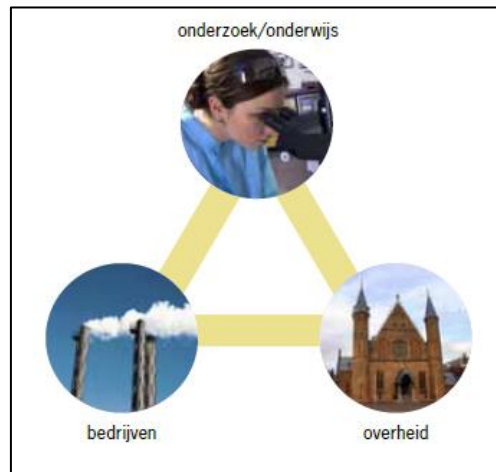


*Figure 11 The golden triangle: a collaboration between research/education (onderzoek/ onderwijs), business (bedrijven) and the government (overheid)*

Collaboration with governmental organizations is also referred to in Wageningen UR's discourse, although to a lesser extent. The next quote, from Wageningen UR's website demonstrates this:

> *In the coming years we want to further expand our leading position in this field. We want to do this in close collaboration with governmental organisations, commercial businesses, fellow institutions and universities at home and abroad (Wageningen UR 2014a).*

NGO's, society or civilians are not mentioned.

Although the golden triangle is hence a very appealing and a proudly used tool, it is incomplete. Important groups, such as citizens and NGO's seem to be left out in this golden triangle. Van Veluw (Interview, May 30, 2014) notices this:

> *In the golden triangle I miss the farmers and the NGOs. It is a missed opportunity for that triangle that we don't use the diamond and then also include citizens and NGO's. With that triangle we actually don't take the citizens and the NGOs seriously and those are extremely important.*

The golden triangle is hence a good start, but could be extended. It would be good if Wageningen UR included society more clearly in a collaborative model. Another possible model in this context for

instance is the diamond model, or the Dutch 5 O's model of governance (*overheid*), societal context (*omgeving*), entrepreneurs (*ondernemers*), education (*onderwijs*) and research (*onderzoek*). This model has as an important extra group the '*omgeving*', a Dutch word that refers to the context.

Another way to use the golden triangle is to picture the triangle in a circle, where the circle displays civil society. In this way the golden triangle is embedded in society, whereas if society would be displayed as a fourth pillar or as a fourth and fifth pillar, society would become a separate, detached pillar (Huub Löffler, Field notes, September 10, 2014). The construction of the golden triangle embedded in the circle of civil society is a construction Wageningen UR is now starting to use more. This usage of the golden triangle is more inclusive towards society and hence a more appropriate model.

Hadly et al. (2013) argue that:

> *The chasm between science and society is wide and deep (…). Scientists tend to blame it on society, but scientists also share the blame. It is thus essential that the scientific community— and scientists as individuals—begin to re-think our approach to doing science.*

Changing the societal collaboration model at Wageningen UR is hence a necessary step in order to bridge the current gap between science and society. As Hadly et al. (2013) argue*: Scientists tend to blame it on society, but scientists also share the blame*. Hadly et al. (2013) speculate scientists can be held responsible for distancing themselves from society in four ways, sometimes inadvertently, sometimes intentionally:

> *First, they tend to pursue a research agenda they are passionate about, often without thinking about how the energy devoted to a particular project serves society. Second, most scientists regard their job as finished when they report their results in a specialized research journal, adding a notch to their publication count. Third, scientists counsel that advocating for a particular societal position compromises their scientific credibility (…). And finally, many scientists feel that dealing with societal issues is some other profession's problem, something that requires too much time and for which they have little support or expertise.*

In order to civilly collaborate more with society it is crucial to be aware of these four ways in order to take active measures to improve them. Not only should Wageningen UR and science in general engage society more, it should also listen to it. And not only is it important to implement research results well in society, society should also be more engaged in the research itself, even at the start of the research process. Wageningen UR president Louise Fresco (2014) also addressed this in her

opening speech of the academic year. Assistant Professor at the Health & Society group: Laura Bouwman (2014), might have put it even better by arguing that there will only be enlightenment when society enlightens science just as much as science enlightens society.

The balance between being a high quality institute with high quality research and education and 'academic elitism' is very delicate. Wageningen UR is internationally recognised in the area of life sciences and its research and education are of high quality. The idea that ideas and products are produced at Wageningen UR and in the Netherlands and that those should subsequently be spread and implemented around the world is also present. This message is particularly visible on Wageningen UR's website and in rationales of the (former) Executive Board members (Kropff and Dijkhuizen).

On the Wageningen UR website the excellent status of Wageningen UR is demonstrated: "The scientific quality of Wageningen UR is affirmed by the prominent position we occupy in international rankings and citation indexes" (Wageningen UR 2014a). Former chairman Dijkhuizen takes it a step further though when he argues about sustainable intensification. The thin line between responsibility and paternalism is clearly demonstrated by Dijkhuizen:

> *The Dutch efficiency and innovation power are most suitable. It's for a reason that they come from near and far to see how we produce that much on such a small piece of land. (…) We are the Usain Bolt in nutrition. Soon, the world will look like the Netherlands (Vré 2012).*

Van Veluw (Interview, May 30, 2014) argues that behind this 'responsibility' and the 'expertise of Wageningen UR' lies a strong paternalism:

> *What we do in Wageningen remains very reductionist and paternalistic. The idea that we as Netherlands and Wageningen have to feed the world, though I understand also that we feel responsible to feed the rest of the world: there is of course nothing wrong with that. But it's too paternalistic, it's just not right.*

Van Veluw feels that Wageningen UR could be a little more humble and sees it as an important challenge to take the integrity of the world seriously: "The challenge is to take the integrity of the world seriously and adapt your worldview to it" (Kees Van Veluw, interview, May 30, 2014).

In order to stay in touch with society increasing the collaboration with society in hence necessary.

## 6.5   More than quantifiability

Alongside with the focus on technology, there is an emphasis on measurable and more specifically quantifiable results at Wageningen UR. The clearest example is Wageningen UR's motto: "Two times

more with two times less". This motto refers to the aim of producing two times more food, while using two times less resources. Although rector Martin Kropff has added "two times better" to it (referring to two times better nutrition), it remains predominantly a quantitative motto.

Spokesperson Vink demonstrates the reasoning behind this focus on measurability and calculability in the following quote:

> ***The premise is that what we do has to be measurable and verifiable***. *Unless you're a philosopher, then you have a different background. But even in the social sciences, which you are talking about, you should be able to publish and that should then belong in a social science journal. So it's not bias, it's who we are and what we do, wherever you are. (…) And then you're talking about verifiable,* ***calculable,*** *transparent* ***data*** *(Simon Vink, interview, April 16, 2014).*

"The premise is that what we do has to be measurable and verifiable" is the reasoning device used by Vink. This premise is that science should be objective and transparent. Measurable and calculable data are seen as to ensure this. Vink (Interview, April 16, 2014) does not see this as a bias towards measurable data. He rather sees it as the way to keep science objective and transparent. Niessen (Interview, May 22, 2014) continues along the same line of thinking. The following quote demonstrates the believe in measurability in science:

> *Yes, some things are hard to express in numbers, that's true. Most research however, is expressed in numbers, since everything is measured. Also for social sciences you need to develop the best ways possible to make results measurable. I think a lot is very reasonably measurable, in different ways. Researchers are always looking for the best ways to measure (Jac Niessen, interview, May 22, 2014).*

Measurability is not the same quantifiability. Mol (Interview, May 21, 2014) argues that at Wageningen UR, often measurability is set equal to quantifiability though and he argues this is too narrow:

> *I always find it annoying that measurable is narrowed down to quantifiable and is based on models. The concept of science goes a little further than that. Sometimes this narrowing is disadvantageous for the social sciences.*

Wageningen UR's focus on quantitative results, hints to 'quantitative fallacy' or 'McNamara fallacy'. Quantitative fallacy is the idea that quantitative data are the most important and most reliable data, since other observations often cannot be proven. Quantitative fallacy assumes that facts are important in proportion to their susceptibility to quantification, in other words: the facts which count

best count most (Fischer 1970, p.90). This idea is called a fallacy, since there are many significant things in the world that are not (easily) measurable. Moreover, numbers are easily manipulated.

These statements also hint to a concept related to quantitative fallacy, called: 'scientism'. Scientism has been defined as: "the view that the characteristic inductive methods of the natural sciences are the only source of genuine factual knowledge and, in particular, that they alone can yield true knowledge about man and society" (Bullock & Trombley 1999, p.775).

Scientism can hence be seen as resting on an incoherent epistemological foundation, that leads to an inadequate metanarrative (or: an all-embracing view of reality), resulting in the marginalization of other voices (Leffel, 2000).

As Van Veluw (Interview, May 30, 2014) for example points out:

> *When making a choice there's always an emotional part involved, that is scientifically supported. You don't need to study that gutfeeling, but you do need to aware of it and take it seriously. (…) If you measure everything that's possible to measure, how much of reality is that? You can't say that.*

In his quote Van Veluw also touches upon the emphasis on the empirical in western science. "If you measure everything that's possible to measure, how much of reality is that?" (Kees Van Veluw, interview, May 30, 2014). This is indeed a good question that goes against the idea that everything is measurable and hence against scientism.

Landscape quality, cultural identity, biodiversity, liveability and environmental value are just some examples of topics that are difficult to measure. These types of topics though, might contribute greatly to finding solutions for global challenges, such as GFS. It would be unfortunate if topics are not investigated, because they are measure in quantitative terms. It is hence important to broaden the scope and emphasize other forms of science more, starting with qualitative research. Moreover, more methodological pluralism is therefore necessary.

Science can be understood as the pursuit of objectivity. This is an unattainable goal, since scientists are human beings that can never be completely objective. They tend to create hypotheses that fit their own cognitive biases for instance. Nevertheless pursuing objectivity is worthwhile, because of the many findings that that are revealed along the way.

Scientific objectivity is an extremely important value for Wageningen UR. Science is considered to be an objective tool to inform society. No position should be taken in science and Wageningen UR is hence an objective party in the debate of GFS as Niessen (Interview, May 22, 2014) explains:

*The university supplies objective knowledge for the discussion, but she doesn't take a position in the debate. Researchers don't take a position, they give numbers and facts. And those should be talked about, not about opinions.*

Vink (Interview, April 16, 2014) adds to this:

*We hence consider the issue of Global Food Security, the global food question, a knowledge issue. That is what it is for us. In that sense, Wageningen University and Wageningen UR are amoral, a non-committed party, since the issue is a knowledge issue. In the depths of our organization we are convinced that, to solve this global food problem, in a sustainable way — because there is no other way —, if you do the maths, there are simply not enough resources: phosphate, water and perhaps nitrate, you need to come up with solutions in a sustainable way. Those are very knowledge-intensive and knowledge-based and they require new social arrangements that you need to study. (…) Again, we basically take no position in that debate as an organization. Again: because if you do that, from the social approach you might get different results or opinions than on the other hand from what I call 'hard science', which is actually quite simply: doing calculations. It is complex, it's a big complex system, but we can calculate properly all together. (…) Hence, you won't see a mission of Wageningen UR saying: 'let's do it this specific way', but rather: 'science generates solutions'.*

It is hence important lead the focus in research and education beyond the quantifiable in order broaden the scope of Wageningen UR.

# Intermezzo: Wageningen UR under the leadership of Louise O. Fresco

The period in which this thesis was written is an interesting period. After twelve years, Aalt Dijkhuizen resigned as the chairman of Wageningen UR's Executive Board. The newly appointed chairwoman is Louise Fresco. In this thesis Louise Fresco was not interviewed, neither were her speeches or publications used in the analyses, since she only took on her new position in July 2014. As Vink (Interview, April 16, 2014) explains, the direction of Wageningen UR also depends on its' people:

> *Aalt Dijkhuizen is an economist, Martin Kropff is a plant system biologist. Tijs Breukink doesn't talk much about the content, so that's easier, but he is a business economist again. In that sense, there is always the bias from their own premises. And I think in that sense in the next three or four years, Louise Fresco, who roughly takes the same position in the debate on the content as Aalt Dijkhuizen, will involve much more cultural aspects and cultural - psychological aspects. So it's partly in the people: they are not institutions, they are also people.*

Although Wageningen UR uses one corporate message, the message differs per spokesperson. The external message is partly linked to the chairman of the board of the university. As Niessen (Interview, May 22, 2014) states: "With every new chairman of the board you will get a new line".

It is therefore possible that with Louise Fresco as the new president of Wageningen UR, the main GFS frame will be (partly) reframed. At the time of this thesis it was not possible to determine exactly in which direction Louise Fresco is going lead Wageningen UR. There are some speculations though:

> *[I think that] in the next three or four years, Louise Fresco, who roughly takes the same position in the debate on the content as Aalt Dijkhuizen, will involve much more cultural aspects and cultural - psychological aspects. (…) The focus on secondary aspects of nutrition in a highly civilized, wealthy society that we are, she acknowledges much more than Aalt does (Simon Vink, interview, April 16, 2014).*

As Vink (Interview, April 16, 2014) stated: Fresco doesn't have very different idea's than Aalt Dijkhuizen, her thinking has its roots in the same productionist paradigm, although it could be argued that her thinking lies more in the Life Sciences Integrated paradigm. It is expected that she will use a more 'human' approach, through addressing culture and emotions, especially in western societies.

Fresco comes from the same school of thought as Aalt Dijkhuizen. In her discourse, she usually sketches a linear agricultural development from poor and hungry societies, with no technology in the past to rich and well-fed societies with technology in the future. In this way one cannot oppose her statements, since it would be immoral for people to remain poor and to let them do hard labour on the land under harsh conditions. The danger in Fresco's reasoning is that she leaves no room for multiplicity and hence dangerously simplifies the world food problem. Moreover, Fresco is very critical about the (western) consumer: she argues that the consumer romanticizes traditional farming systems and often labels the western consumer as irrational. Michiel Korthals states:

> *Fresco tries to parry criticism of the current agricultural and food sciences by describing it as an emotional, nostalgic and spoiled response, and defends science from the perspective of reason (Korthals 2013).*

Moreover, ethics are not part of Fresco's discourse (Korthals 2013). She is very critical about consumers and although referring to science when talking about agriculture, when talking about consumers she does not do the same. Fresco thus refines things, but only selectively. As Van der Meulen (2012) states: "The refining of Fresco urgently needs refining".

With the main points of Fresco's arguments in mind, the most important indication of the approach at Wageningen UR in the coming years, might have come from Fresco herself in her opening speech of the academic year. In her opening speech of the academic year 2014-2015 Fresco addressed the importance of society and bridging the gap between science and society (Fresco 2014). The so-needed shift in emphasis towards the socio-cultural aspects in Wageningen UR's frame might be moving in the right direction under Fresco's leadership.

# 7 Conclusions and recommendations for further research

This thesis aimed to investigate how GFS is framed in external communication and in education at Wageningen UR, in order to determine if this frame is adequate for addressing GFS or if reframing is needed. The main research question was: how is Wageningen UR's framing of Global Food Security (GFS) affecting its ability to address GFS adequately? In order to answer this question five sub questions were used:

1.      **What is Wageningen UR's corporate main frame for GFS?**

2.      **How does this main frame relate to internal GFS frames used in current BSc and MSc programs at Wageningen University?**

3.      **Is there a gap between Wageningen UR's frames and current debates on GFS?**

4.      **How could GFS be reframed at Wageningen UR?**

5.      **What is necessary to adequately address GFS at Wageningen UR?**

In this chapter the research questions will be answered, recommendations for further research will be made and reflections on this study are presented.

## 7.1    Conclusions

**Conclusion 1: Where we are now: What's in a frame?**

*RQ: 1. What is Wageningen UR's corporate main frame for GFS?*

It would be wrong to state that Wageningen UR merely frames GFS as a productionist challenge for increasing yields per hectare. This is not the case. Wageningen UR's main GFS frame takes many different aspects into account that are also considered important in literature in order to address GFS. For example: socio-economic aspects and governance aspects. Framing is about emphasis and nuances though. Here lies the crux of Wageningen UR's GFS main frame. While accessibility and utilization aspects of GFS are mentioned, the *emphasis*, lies on the availability component. The main frame could be considered to belong to the 'Life Sciences Integrated paradigm', being in favour of the application of modern biological technologies to food production. The legacy of the productionist paradigm is still clearly present though. The emphasis in Wageningen UR's main frame lies on GFS as

a future challenge of increasing the primary production of adequate and sustainable land-based food. A challenge which is framed to require an approach of science and technology, focusing primarily on the 'smaller level' of products, organisms, cells and molecules in the natural sciences.

**Conclusion 2: Where we are now: The internal diversity**

*RQ: 2. How does this main frame relate to internal GFS frames used in current BSc and MSc programs at Wageningen University?*

In the external communication of Wageningen UR predominantly one main GFS frame is used: the frame with an emphasis on GFS as a future quantitative challenge for increasing primary production of adequate and sustainable food land-based. A challenge which is framed to be needing an approach of science and technology, primarily focusing on the 'smaller level' of organisms, cells and molecules in the natural sciences.

Internally at Wageningen UR however, there exists a great diversity of frames and different ideas and messages exist. This is not surprising, since Wageningen UR has almost a hundred different chair groups and over ten different research institutes. The GFS main frame however is dominant and resonates in many places within Wageningen UR. Although the different frames hence coexist, to the outside, only the main frame which is very consistent, is brought.

To proclaim one view as the corporate view of Wageningen UR undermines the importance of the diversity in views at a university and research institute. Moreover, the corporate frame of Wageningen UR is too narrow for addressing GFS and Wageningen UR hence fails to make use of the full range of solutions available to ensure GFS.

**Conclusion 3: Where we need to go: Literature versus the Wageningen UR frame**

*RQ: 3. Is there a gap between Wageningen UR's frames and current debates on GFS?*

From literature it became clear that the most important reasons for global food insecurity are poverty and inequality. Wageningen UR acknowledges these factors too, however it does no put the focus on them in its main frame. Therefore, there are several important opportunities for Wageningen UR. These opportunities form  the gap between Wageningen UR's main frame and literature on GFS. An example is the area of food policy. Between Wageningen UR's framing and the literature there hence does exist a gap.

**Conclusion 4: Where do we need to go: Reframing**

*RQ: How could GFS be reframed at Wageningen UR?*

Wageningen UR's GFS main frame currently limits its ability to take advantage of the full range of solutions available in addressing GFS. Shifting the emphasis by reframing GFS at Wageningen UR is therefore important. All interviewees and literature expressed that GFS is about more than producing more food. In defining what exactly the 'more' in 'more to more' is, lies a variety of opinions. The question: "if we have sufficient food right know, why do people go hungry?" should be addressed more, which would bring the emphasis of GFS more towards two main categories that can be considered to form this 'more'. These categories are: the sociocultural opportunities and the agroecological opportunities. This would hence lead Wageningen UR to include the 'Ecologically Integrated paradigm'.

**Conclusion 5: How to do it: Integration, collaboration with society and a balance between technological and social**

*RQ: What is necessary to adequately adress GFS solutions at Wageningen UR?*

In order to bring a (new) frame into practice several general aspects that are important for Wageningen UR's education and research structure were identified. These are: more integration, more than technology, more collaboration with society and more than quantifiability. The strength of Wageningen UR is the combination of social and natural sciences in one faculty. However, the collaboration between different disciplines can be improved, There's a need for more integration and interdisciplinary sciences. Wageningen UR also has a strong technological focus, it is therefore important to emphasize the social sciences more. The biggest challenge lies in how to use the strengths of different views on GFS instead of emphasizing the differences and conflicting each other. This is not just about a tension between social and technological/natural, but about different worldviews. Wageningen UR uses the model of the golden triangle: government, research/education and business. Society and societal organizations are underrepresented in this model. Increasing collaboration with society is therefore necessary.

**7.2   Recommendations**

**Recommendation 1: Do not aim to think alike, but do aim to understand each other's worldviews.**

> *Like the other day with Joel Sallatin, the whole room was full for two-thirds and it was also*
> *full during the farewell ceremony of Aalt Dijkhuizen. The frames that were present however,*

*are polar opposites and there's no overlap. We hence live on different frequencies and feel*

*that as a threat for each other* (Kees Van Veluw, interview, May 30, 2014).

This quote of Van Veluw demonstrates the main limitations in addressing GFS and finding solutions to achieve it. He adds: "You should ask every researcher or every lecturer or every student in the first place: what is your worldview: how do you see the world?" (Kees Van Veluw, interview, May 30, 2014). Working interdisciplinary and even transdisciplinary is therefore crucial. Creating a space for integration and dialogue is therefore important. This can be a physical space or a non-physical space in order to stimulate integration and interaction between different people from different disciplines. As Jac Niessen (Interview, May 22, 2014) argues: "steered spontaneous encounters, like in Impulse [meeting centre at Wageningen UR campus], we should get more and then hopefully we get some more interaction". Van Veluw points out why this is necessary: "it is [about] an integration of world views and ideas and ways of communicating" (Kees Van Veluw, interview, May 30, 2014).

**Recommendation 2: Change the emphasis in Wageningen UR's main frame and emphasize variety of frames present at Wageningen UR**

The findings of this thesis have shown that there are many opportunities for Wageningen UR. The emphasis should be moved more towards the 'more' to more aspects: accessibility, utilization and stability. The socio-cultural and socio-ecological should get a more prominent place is the frame, which should be more holistic (treating food as a web rather than as silos) as opposed to fragmented.

**Recommendation 3: Further investigate demand and possibility of introducing a new holistic MSc program that addresses GFS.**

This thesis started with from the idea of investigating the demands and the opportunities for a new MSc program that would uniquely combine and integrate natural and social sciences, to address GFS. The findings of this thesis show that this is certainly a possibility that should be investigated more. As the next quote of Van Veluw (Interview, May 30, 2014) demonstrates:

*A new master that combines social and natural sciences around a theme is totally necessary.(…) That is absolutely necessary and we should not only keep it within the Wageningen.*

The success of integrative programmes such as the Future Planet Studies BSc programme at the University of Amsterdam suggest that there might be a student demand for a new integrative MSc GFS programme at Wageningen UR. It is therefore especially important to investigate student

demand. A way to start and a need for research is suggested by Van Boekel. He articulates about a possible new MSc program 'Food security':

*I am not unsympathetic to it, but try it with an inter-specialisation first. Try to link a number of courses for people who can then follow a more or less elaborated path in which this broadness can be found. Hence: a collaboration between two or more existing MSc programs. I would certainly be in favour of that, because that fits well within Wageningen UR. My fear, although not very well founded is that if we set up such a broad MSc program, it would very quickly get the label of a repository of all sorts of things and that people would then think those are so-called 'fun packages'. Do we ever get that accredited? (…) I think the honours program is the first try to set up something like that (Tiny van Boekel, interview, June 4, 2014).*

Van Boekel (Interview, June 4, 2014) argues that it is very well possible that an honours program is a starting point for a holistic MSc programme. However, he also expresses a fear:

*I don't think we can agree on a starting point for a new MSc program 'Food security'. That's why I would think more of different ways to compose a program that also anticipates on the different backgrounds of people (Tiny van Boekel, interview, June 4, 2014).*

### 7.3    Research reflections

An important finding in this thesis was that more integration is necessary at Wageningen. Several challenges in order to bring this into practice were identified. Integration is not only a challenge at Wageningen UR. Throughout the process of this thesis it has been a major challenge to keep the balance between integration and dividing topics into categories for clarity. It proved especially challenging to bring in the categorization while also keeping the links between topics in Chapter 5 as well as in Chapter 6. Moreover, not only within these two chapters, but also between them this was a challenge, since many topics of Chapter 5 have roots in Chapter 6. The general features described in Chapter 6 were often visible in the sections of Chapter 5. Making a distinction between more specific topics and general features, while not creating too much overlap, but acknowledging that they were intertwined, rather than standing on their own, was the main challenge of this thesis.

In this study a frame analysis was conducted. Therefore different data sources were used. This made the research more holistic, but also prevented it from studying one or more data sources into more depth. A big challenge in this research therefore was to find the right balance between a holistic analysis and an in depth analysis. It would have been interesting to study the separate data sources into more detail and interview for example more key informants. Since it proved difficult to separate

the topics of communication and education and since the topic of education was very large, especially education has been studied into less depth. This thesis does therefore not include an in depth analysis, where also the opinion of students is investigated. It would be interesting to conduct such an analysis in the future.

Since GFS is such a broad and much debated subject, limits had to be set to the topics treated in this thesis. Therefore it was not possible to discuss all related themes into depth. An important example is that in this thesis interviewees were not given the opportunity to respond to the researcher's interpretation of their statements. Giving interviewees the opportunity to respond to the researcher's interpretation would have been a good way to strengthen the arguments made in this thesis as it could have validated the way these statements were used. For future research this is important to incorporate into the methodology.

The prominent interpretive role of the researcher remains a key limitation of framing analysis. Especially in interviews the interpretation of the researcher is crucial and it is hence impossible to avoid a certain degree of subjectivity. Although it was aimed to use the data from the interviews according to the interviewees' intentions, it is essential to keep in mind that there is a certain level of the researcher's own interpretation. There is therefore a risk of socially desirable and politically correct answers in this thesis.

It was beyond the scope of this research to investigate into detail what the research projects related to GFS at Wageningen UR are about and what framing is used in these research projects. It is important though to investigate this in future research. These research projects namely are the science-policy interface. Where the course analysis gave more insight into the framing in courses at Wageningen UR, making an analysis of research projects could do the same for research.

# 8 Personal reflections

In the starting phase of this thesis I received a call from a friend asking if I wanted to have a garden plot. This was something I had been thinking about for a long time and the wish to have my own vegetable garden got stronger. I said yes.

The same can be said about the topic of this thesis: it was developing in my head for over a year and finally I decided I had to make it happen and go for it.

The next week I encountered a mint plant growing on the side of the road (mint is a plant that grows freely almost everywhere in the fields and on riversides in the surroundings of Wageningen) and thought it would be a nice addition to my newly made garden. I dug out a little cutting and transplanted it, so it could become a nice bunch of mint. Back then, the cutting was the size of my thesis: small and lean, but with strong roots and growing fast.

Over the summer my thesis was growing bigger and bigger and so was the plant. Mint also reproduces vegetatively, meaning that its new branches spread like tentacles over the soil, creating new roots in all directions on its way. At this point my literature archive contained over 200 references on topics in many different disciplines and on many different topics, while I kept adding more. My thesis was growing the exact way the mint plant was. Things were getting a little out of hand, but it was too early to start converging the scope again instead of diverging endlessly.

In August it was time to take a break: two completely *thesis-free* and *garden-free* weeks of holiday to clear the mind. When I came back, I was full of inspiration and the mint was flowering, but huge and taking over the rest of the garden. My thesis at that point was about 80 pages flowing over with information and references. It was time to start going back to the essence and to start pruning.

Now that mint and thesis were under control, things were becoming more clear and the thesis really got shape. Although diverging the focus was important for the holistic approach that I wanted to use in this study, converging the focus again was essential to draw conclusions and to write everything down.

To conclude: keeping the balance between diverging and converging has been the biggest challenge in this thesis process. It has been very valuable to explore the global food security debate into so

much detail, however sometimes it was difficult to stay on track and not get lost in all the information and my own ambitions.

Something that has pleasantly surprised me was the sincere interest, support and enthusiasm I encountered on my way, while writing this thesis. It was particularly fantastic to experience that all interviewees were very enthusiastic and willing to share their opinions, even at the highest level of the organization.

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# Appendix

Table A.1 Word counts of different terms for courses with 'Food', 'Nutrition/Nutritional' and 'Agriculture/Agricultural' in the title*

|  | Food (N=61) | Nutrition/ Nutritional (N=29) | Agriculture/ Agricultural (N=12) | Total (N=102) |
|---|---|---|---|---|
| **Accessibility** | 1 | 0 | 0 | 1 |
| **Agricultural** | 25 | 2 | 51 | 78 |
| **Agriculture** | 9 | 0 | 24 | 33 |
| **Agroecology** | 0 | 0 | 0 | 0 |
| **Availability** | 3 | 1 | 0 | 4 |
| **Behaviour** | 20 | 21 | 0 | 41 |
| **Body** | 3 | 16 | 0 | 19 |
| **Chemical** | 37 | 13 | 0 | 50 |
| **Components** | 41 | 10 | 2 | 53 |
| **Consumption** | 16 | 12 | 1 | 29 |
| **Development** | 42 | 8 | 27 | 77 |
| **Economic** | 39 | 5 | 29 | 73 |
| **Farm** | 8 | 1 | 23 | 32 |
| **Food democracy** | 1 | 0 | 0 | 1 |
| **Food justice** | 1 | 0 | 0 | 1 |
| **Food security** | 8 | 0 | 2 | 10 |
| **Food sovereignty** | 0 | 0 | 0 | 0 |
| **Food** | 612 | 81 | 16 | 709 |
| **Global** | 24 | 1 | 1 | 26 |
| **Governance** | 7 | 0 | 1 | 8 |
| **Health** | 41 | 48 | 0 | 89 |
| **Holistic** | 0 | 0 | 0 | 0 |
| **Human** | 20 | 30 | 1 | 51 |
| **Ingredients** | 16 | 1 | 0 | 17 |
| **Integrated** | 10 | 4 | 2 | 16 |

| | | | |
|---|---|---|---|
| **Interdisciplinary** | 11 | 1 | 0 | 12 |
| **Law** | 65 | 2 | 0 | 67 |
| **Management** | 45 | 1 | 17 | 63 |
| **Metabolism** | 1 | 29 | 0 | 30 |
| **Nutrition** | 42 | 175 | 0 | 217 |
| **Nutrition security** | 10 | 9 | 0 | 19 |
| **Physiological** | 0 | 21 | 0 | 21 |
| **Physiology** | 3 | 19 | 0 | 22 |
| **Policies** | 9 | 3 | 21 | 33 |
| **Policy** | 22 | 0 | 23 | 45 |
| **Political** | 16 | 0 | 4 | 20 |
| **Politics** | 0 | 0 | 0 | 0 |
| **Processing** | 34 | 2 | 1 | 37 |
| **Product** | 41 | 12 | 11 | 64 |
| **Production** | 76 | 7 | 8 | 91 |
| **Products** | 67 | 5 | 3 | 75 |
| **Properties** | 32 | 4 | 1 | 37 |
| **Quality** | 116 | 3 | 3 | 122 |
| **Rural** | 13 | 0 | 26 | 39 |
| **Safety** | 42 | 1 | 3 | 46 |
| **Security**\*\* | 21 | 9 | 2 | 32 |
| **Social** | 20 | 6 | 1 | 27 |
| **Socio** | 18 | 4 | 3 | 25 |
| **Sustainability** | 29 | 0 | 2 | 31 |
| **Sustainable** | 12 | 0 | 2 | 14 |
| **Techno** | 39 | 1 | 5 | 45 |
| **Technology** | 22 | 1 | 2 | 25 |
| **Utilization** | 1 | 7 | 0 | 8 |
| **Waste** | 1 | 2 | 0 | 3 |

\*Wordcount also includes compound words, like seafood or foods.

\*\*Excluding nutrition security and food security

Table A.2 Total word counts*

| | | | |
|---|---|---|---|
| Food | 709 | Metabolism | 30 |
| Nutrition | 217 | Consumption | 29 |
| Quality | 122 | Social | 27 |
| Production | 91 | Global | 26 |
| Health | 89 | Socio | 25 |
| Agricultural | 78 | Technology | 25 |
| Development | 77 | Physiology | 22 |
| Products | 75 | Physiological | 21 |
| Economic | 73 | Political | 20 |
| Law | 67 | Body | 19 |
| Product | 64 | Nutrition security | 19 |
| Management | 63 | Ingredients | 17 |
| Components | 53 | Integrated | 16 |
| Human | 51 | Sustainable | 14 |
| Chemical | 50 | Interdisciplinary | 12 |
| Safety | 46 | Food security | 10 |
| Policy | 45 | Governance | 8 |
| Techno | 45 | Utilization | 8 |
| Behaviour | 41 | Availability | 4 |
| Rural | 39 | Waste | 3 |
| Processing | 37 | Accessibility | 1 |
| Properties | 37 | Food justice | 1 |
| Agriculture | 33 | Food democracy | 1 |
| Policies | 33 | Agroecology | 0 |

Table A.2 Total word counts*

| | | | |
|---|---|---|---|
| **Farm** | 32 | **Food sovereignty** | 0 |
| **Security\*\*** | 32 | **Holistic** | 0 |
| **Sustainability** | 31 | **Politics** | 0 |

\*Wordcount also includes compound words, like seafood or foods.

\*\*Excluding nutrition security and food security

Table A.3 Word counts for food related terms*

| | | | |
|---|---|---|---|
| **Food** | 612 | **Consumption** | 16 |
| **Quality** | 116 | **Ingredients** | 16 |
| **Production** | 76 | **Political** | 16 |
| **Products** | 67 | **Rural** | 13 |
| **Law** | 65 | **Sustainable** | 12 |
| **Management** | 45 | **Interdisciplinary** | 11 |
| **Development** | 42 | **Integrated** | 10 |
| **Nutrition** | 42 | **Nutrition security** | 10 |
| **Safety** | 42 | **Agriculture** | 9 |
| **Components** | 41 | **Policies** | 9 |
| **Health** | 41 | **Farm** | 8 |
| **Product** | 41 | **Food security** | 8 |
| **Economic** | 39 | **Governance** | 7 |
| **Techno** | 39 | **Availability** | 3 |
| **Chemical** | 37 | **Physiology** | 3 |
| **Processing** | 34 | **Body** | 3 |
| **Properties** | 32 | **Accessibility** | 1 |
| **Sustainability** | 29 | **Metabolism** | 1 |
| **Agricultural** | 25 | **Utilization** | 1 |
| **Global** | 24 | **Waste** | 1 |
| **Policy** | 22 | **Food justice** | 1 |
| **Technology** | 22 | **Food democracy** | 1 |
| **Security\*\*** | 21 | **Agroecology** | 0 |
| **Behaviour** | 20 | **Food sovereignty** | 0 |

| | | | |
|---|---|---|---|
| **Human** | 20 | **Holistic** | 0 |
| **Social** | 20 | **Physiological** | 0 |
| **Socio** | 18 | **Politics** | 0 |

*Wordcount also includes compound words, like seafood or foods.

**Excluding nutrition security and food security

Table A.4 Word counts for nutrition related terms*

| | | | |
|---|---|---|---|
| **Nutrition** | 175 | **Waste** | 2 |
| **Food** | 81 | **Processing** | 2 |
| **Health** | 48 | **Law** | 2 |
| **Human** | 30 | **Agricultural** | 2 |
| **Metabolism** | 29 | **Technology** | 1 |
| **Physiological** | 21 | **Techno** | 1 |
| **Behaviour** | 21 | **Safety** | 1 |
| **Physiology** | 19 | **Management** | 1 |
| **Body** | 16 | **Interdisciplinary** | 1 |
| **Chemical** | 13 | **Ingredients** | 1 |
| **Product** | 12 | **Global** | 1 |
| **Consumption** | 12 | **Farm** | 1 |
| **Components** | 10 | **Availability** | 1 |
| **Security**** | 9 | **Sustainable** | 0 |
| **Nutrition security** | 9 | **Sustainability** | 0 |
| **Development** | 8 | **Rural** | 0 |
| **Utilization** | 7 | **Politics** | 0 |
| **Production** | 7 | **Political** | 0 |
| **Social** | 6 | **Policy** | 0 |
| **Products** | 5 | **Holistic** | 0 |
| **Economic** | 5 | **Governance** | 0 |
| **Socio** | 4 | **Food sovereignty** | 0 |
| **Properties** | 4 | **Food security** | 0 |
| **Integrated** | 4 | **Agroecology** | 0 |

| | | | |
|---|---|---|---|
| **Quality** | 3 | **Agriculture** | 0 |
| **Policies** | 3 | **Accessibility** | 0 |

*Wordcount also includes compound words, like seafood or foods.

**Excluding nutrition security and food security

Table A.5 Word counts for Agriculture related terms*

| | | | |
|---|---|---|---|
| **Agricultural** | 51 | **Global** | 1 |
| **Economic** | 29 | **Governance** | 1 |
| **Development** | 27 | **Human** | 1 |
| **Rural** | 26 | **Processing** | 1 |
| **Agriculture** | 24 | **Properties** | 1 |
| **Farm** | 23 | **Social** | 1 |
| **Policy** | 23 | **Accessibility** | 0 |
| **Policies** | 21 | **Agroecology** | 0 |
| **Management** | 17 | **Availability** | 0 |
| **Food** | 16 | **Behaviour** | 0 |
| **Product** | 11 | **Body** | 0 |
| **Production** | 8 | **Chemical** | 0 |
| **Techno** | 5 | **Food sovereignty** | 0 |
| **Political** | 4 | **Health** | 0 |
| **Products** | 3 | **Holistic** | 0 |
| **Quality** | 3 | **Ingredients** | 0 |
| **Safety** | 3 | **Interdisciplinary** | 0 |
| **Socio** | 3 | **Law** | 0 |
| **Components** | 2 | **Metabolism** | 0 |
| **Food security** | 2 | **Nutrition** | 0 |
| **Integrated** | 2 | **Nutrition security** | 0 |
| **Security**** | 2 | **Physiological** | 0 |
| **Sustainability** | 2 | **Physiology** | 0 |
| **Sustainable** | 2 | **Politics** | 0 |

| | | | |
|---|---|---|---|
| **Technology** | 2 | **Utilization** | 0 |
| **Consumption** | 1 | **Waste** | 0 |

*Wordcount also includes compound words, like seafood or foods.

**Excluding nutrition security and food security