

Feed Texel

Chapter 1: Explore the sub-system and set research objectives



Melchior Huijts

Aerospace Engineering

Maya de Groot

Architecture

Eline Degenaar

Architecture

Milan Voorhorst

Building Technology

Content

1.1	Literature study	3
1.2	Socio-technological analysis of the current system	5
1.3	Socio-technological System in future	12
1.4	The sustainability challenge of Texel	14
1.5	Bibliography	15

1.1 Literature study

The socio technical system and sustainability transitions: Introduce and discuss ideas and concepts [from literature](#), in order to apply in the following sections.

In today's society, technology plays a very large role and they have become increasingly intertwined. This is not just a one-way structure in which this happens, where technology influences society, but this goes both ways. The way a technology is implemented and or perceived is of course very much dependent on society itself and all the players that are active in this field. This structure where technology is not an individually acting power, but embedded in society, is called a socio-technical system and innovation system. If one wants to change society with technology it is therefore crucial to understand how the governance of such a change is to take place. One should know what elements form these socio-technical systems, taking into account sociocultural and economic aspects. Only then a good transition into a society that has adopted the new technology can exist.

An example that shows that technology is not acting in isolation in society is that wind turbines are not yet so largely employed that it can compete with existing fossil fuel energy sources, because people do not want them in their backyards and they can interfere with migratory bird routes. Same holds for electric cars, the technology is there, the knowledge is widely spread that it would help reduce carbon emissions, why is it not widely used yet? Because it requires many adaptations to society, large investments and certain parties do not want this change to happen or to happen too quickly.

Socio-Technical & Innovation (ST&I) systems are very complex due to all the actors of different scales, individual ones and organisational ones (non-profit and commercial). Also, the technology has to be produced, adopted, and become widely used. In order to make this possible, the infrastructure for all this should be present as well. Something that makes the problem complicated as well is the following. The way in which technology and innovation will advance is hard to predict. Combining this with an ever-changing preference and interpretation of society, makes existing technologies already unstable, but especially ones still under development.

The latter complicating factor becomes increasingly important when the technology is to change the daily life of people. All these people and all the different organisations will have different opinion about the technology due to for instance, difference previous experiences, expectations and just different preferences and needs. These needs will be different per individual and organisation depending on their respective benefits, costs which can lead to pushing in different directions and sometimes even in resistance. Two more personal factors that should not be underestimated are the cultural heritage of certain societies or groups, these can sometimes conflict very much with rational reasoning and the acceptance of change. Next to this it should also be taken into account that if the individuals or groups do not intrinsically believe in sustainability itself, so without an economic incentive, they will most likely not want to contribute to the transition.

As mentioned before, a good transition of the society is needed for a new technology to be well embedded, especially for a sustainable technology. A transition where there is "a coevolution of economic, cultural, technological, ecological, and institutional developments." [2]

Something that could help the transition is starting in a niche, trying to get success here and then scaling it up. Starting small can for instance help by overcoming the early hurdles at a small size and using the successes to convince the broader public. In history, most of the changes have started in a niche before being accepted by society as a whole and therefore were crucial for the transition.

When looking at the larger picture of transition, so beyond the niche-part, a so-called S-curve can be described. This start with the beginning of the niche-part where a start is being made with the development of the niche, so this doesn't at all yet influence society. Then when the niche starts to be succesfull, it becomes more influential and starts to be noted by society. If this starts and the technology is shaped such it can be accepted by society it will accelerate and be implemented in society on a large-scale. Finally, when the technology is embedded in society it needs to stabilize and society will have found a new equilibrium.

The stages before the acceleration are crucial. If these are not structured and well-prepared, the acceleration process has a high chance of failure. Therefore the following have to be incorporated. Expectations and visions need to be described well, they provide guidance during development, but can definitely be subject to change during the process. They are also important to external actors to get an idea of your niche/technology. Secondly, social networks and the involvement of actors will help to create widespread support and acceptance. Thirdly, the more tangible preparations need to be defined such as: “technical design, market demand and user preferences, infrastructure requirements, organizational issues and business models, policy instruments and symbolic meanings.”[2]

Summarising, if a change is to be realised in a socio-technological system, not only the technology and the infrastructure for this need to be created, but also the ones that will be influenced and will or will not be willing to adopt it have to be taken into account and need to be willing to change their behaviour (this is the case for individuals as well as organisations). Because of the uncertainty in the change, the ride will rarely be a smooth one and encounter many obstacles. In order to correctly reach everyone it is important to know all the instruments that are needed to establish the change. Starting in a niche can very much help with this, but then it is important to prepare very well for the moment that this niche will want to expand to the widespread society, is the technology to be embedded fully.

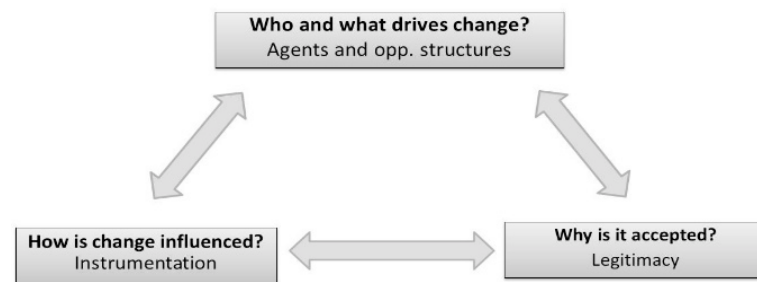


Figure 0. Visualisation of how a change is to be accomplished [1]

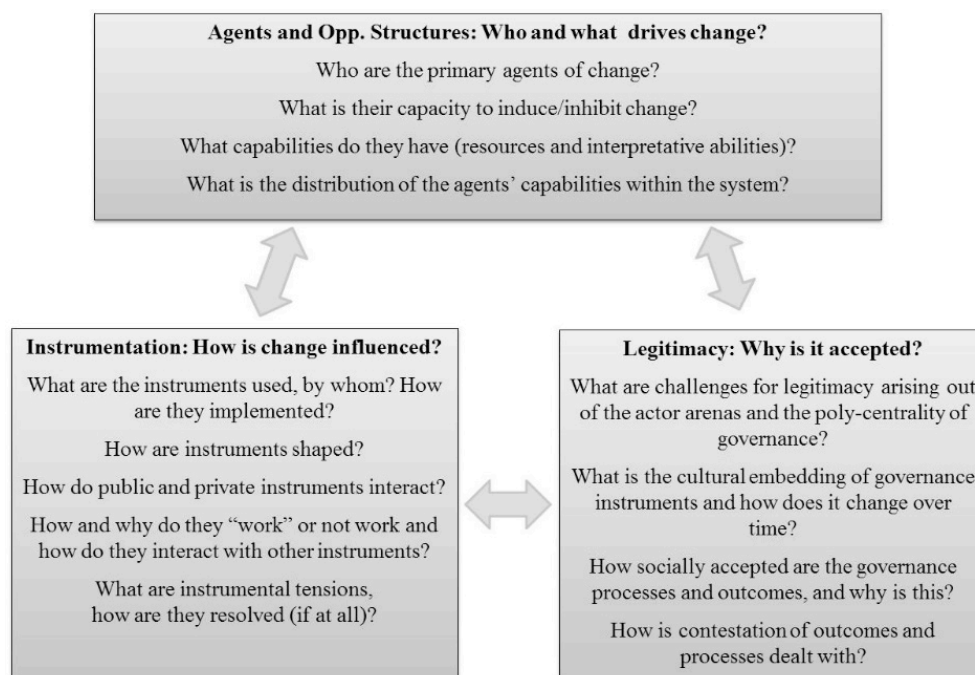


Figure 0. Questions to ask for elaborating on how a change is to be accomplished [1]

	Maya	Melchior	Eline	Milan
Socio-tech system	A system in which a technology and the corresponding social aspects work together, influence each other in a positive way. For 'Feed Texel' this could mean a system in which the farmers of the island and the locals work together to form a closed food cycle; this could mean a change in diet that focusses on only consuming which is produced locally.	A system where technology and the society with its agents and actors are intertwined and work in harmony with each other. For Texel this would mean that the farmer and the Texelaar need to adopt new habits with respect to eating and food production. In this system, the new food technologies or required diets have to be tweaked to the abilities and needs of the farmer and Texelaar as well.	Socio-technical system: an approach to complex organizational work design that recognizes the interaction between people and technology in workplaces. The term also refers to the interaction between society's complex infrastructures and human behaviour. For our project this could mean that we have to change the technology of the production of food in the workplace (Texel), and there for the human behaviour of the citizens and tourists of the workplace.	Systems which only exist because of the relation to each other. They function in a web of socio systems and technical systems.
TX food production as a ST system	The current production of food as social technical system isn't that successful on Texel; yes there are foods grown on the island, but often these need to be processed first which is done on the mainland. Besides that a lot of products, mostly luxury foods, have to be imported.	At this moment, some of the food is produced locally, but much is still imported. And many products are shipped or sold at the mainland. Even some local products are shipped and cheaper ones are imported.	Texel food production as a socio-technical system: At this moment the socio-technical system works in a way that the Texel citizen is quite dependent on the mainland's production. Since the people of Texel feel quite independent of the mainland but are in fact not, we see a mismatch in the socio-technical system.	Food production on Texel cannot be called a closed circle. Food produced on the island is exported and food which is consumed on Texel, is imported.
Sustainability transition	A transition in which society changes to accommodate technologies that provide a more sustainable living.	A transition of societal needs and every day actions to accommodate more sustainable technologies and lifestyles.	The transition from a non-sustainable product or process to a sustainable one. For 'Feed' Texel this could mean the non-sustainable process of importing a great amount of products, and exporting also a great amount of products all places in the world.	To go from a not sustainable process or product to a sustainable one. Most of the times both change in the social system as in technical system are needed.
TX sustainable food transition	To make a sustainable transition on Texel on the area of food, the locals will have to change their behaviour. They'll have to become more active in the food system, changing their diet by focussing on what is produced locally.	The transition of the Texelaar to a new locally produced diet, that of the farmer to the needs of the Texelaar and the infrastructure to accommodate these internal production and shipment needs.	A fully closed system in which TX becomes 100% self-sufficient, in which there is no need to import products.	Making the change from local food exported and 'mainland' food imported, to a closed circle on the island. Everything what is consumed on the island, has to be produced there.

Table 0. Our interpretations of the notions

1.2 Socio-technological analysis of the current system

Describe in detail the **current** sub-system as a socio technological system.

Looking at 'Food' in general or specifically at the sub-system 'Feed Texel' as a socio-technological system it might be safe to say that this is a system that probably influences the most people. Everybody has got to eat, everybody is part of this system. Especially if you're focussing on creating a closed food cycle on a smaller area such as Texel, which could be seen as an isolated area. The sub-system 'Feed Texel' can be divided into two directions; the production of food and the consumption of food. We divided the sub-system into three parts: Agriculture, fishery and cattle breeding.

1. Agriculture

Introduction

Agriculture is a big part of Texel's day to day life. According to *PR Landbouw* [3.] 15% of the inhabitants of the island is currently working in this sector, annually generating 60 million euros. 15% might not sound as much, but in comparison to the mainland it is; where only 3% of the population works in this sector. In total 8700 hectare of the island is used for agriculture; which translates into 220 companies with the following division:

- Arable farms: 38
- Horticultural: 44
- Grazing livestock: 95
- Combinations: 43

The land used for agriculture can be found around the villages and in the polders; and can be divided into two sections; 'Het Oude Land' and the 'Nieuwe Polders'. 'Het Oude Land' is the area around the village of Oosterend, the Hoge Berg and the inner edge of the island. In this area all types of agriculture can be found, whereas the arable farming is the overly represented type of agriculture in the 'Nieuwe Polders'.

To research the food production (agriculture) on Texel we have decided to divide this into three categories; arable farming, fisheries and cattle breeding (& slaughter). Each will be discussed individually for both the current situation as the future possibilities.

Arable Farming in general

The '*Landbouw Folder*' [3.] states that nearly half (3938 hectare) of the land used for agriculture is destined for arable farming. Most of this ground can be found in and around the polders of Eijerland, the North and Prince Hendrik [4.].

	Opp. cultuurgrond (ha)	Akkerbouwgewassen	Grasland	Tuinbouw	Braak
1990	8.472	3.559	4.260	586	67
2003	8.791	3.938	4.121	694	38

Regarding the techniques used for arable farming, in general the techniques used on Texel are the same as on the mainland. There is however one big difference with arable farming on the island; irrigation is prohibited [4.]. Even in dry summers no water can be added to the land.

Another noteworthy element about arable farming on Texel is the 'vollegrond-groenteteelt', this means the land is used all year long, farmers plant different vegetables in different seasons. For example, endive in spring and Brussels sprouts in the winter.

It's difficult to determine which companies produce which kind of products and by how many companies these individual products are produced, but the website does give an overview of the types of food produced in this sector (which is divided even further into; arable farming, coarse horticulture, horticulture and flower bulb production); which can be seen in the graph below [8].

	Arable Farming Total		
Arable Farming	Coarse Horticulture	Horticulture	Flower Bulb Production
barley	carrots	apples	blue grapes
wheat	chicory roots	pears	<i>narcissus</i>
oats	cauliflower	berries	<i>tulip</i>
rye	asparagus	plums	<i>lily</i>
triticale	onions	strawberries	<i>hyacinth</i>
corn		<i>dahlias</i>	<i>perennials</i>
teff		<i>perennials</i>	<i>crocus</i>
peas		<i>shrubs</i>	<i>snowdrop</i>
sugar beets			<i>fritelaria's</i>
fodder beets			<i>irises</i>
seed potatoes			<i>alliums</i>
consumption potatoes			
plant potatoes			
grass seed			
spinach seed			
mustard seed			
green manure			
poppy seed			
Cole seed			
Endive			
Brussels Sprouts			

Table 1. Different fish, caught by Texel fishermen [12] [14]

In the following part the production of some types of food will be highlighted [7].

- *Potato Production*

The highest potato production on the isle of Texel are 'seed potatoes'; this production is so high it's exported to 86 countries worldwide. The conditions for potato production on Texel are beneficial; there are more sun hours on the isle than on the mainland and due to the always present wind it's difficult for insects to transfer diseases amongst the plants. After harvesting (winter season), the potatoes are checked on quality, sorted, packaged and exported. The production of 'seed potatoes' is one of the most capital and labour intensive crops on the island.

Besides 'seed potatoes', there's also the production of 'consumption potatoes'. A part of this is destined for direct consumption, the other part is used for the production of chips and fries.

- *Sugar Beets*

Sugar Beets are mostly grown in the Northern polders, besides potatoes it's one of the most important crops produced in the island. They are harvested in the late summer or fall and are then exported to the mainland to a sugar factory. 1 square meter of sugar beets equals 1 pack of sugar. This means sugar itself will have to be imported again.

- *Grains*

One of the most important grains produced on the isle of Texel is summer barley. A significant part of this production stays on the islands and is used to make Texel's beer. The remaining part is exported to the mainland for the production of either beer or animal food.

- *Other arable crops*

Besides farming for food production a few farmers on the island focus on producing crops to generate energy. An example is oil from cole seeds which can be used as an alternative and environmentally friendly fuel for cars. Another example is wheat used to create bio-ethanol.

One farm on the island produces borage; which oil has beneficial health characteristic. It's used in pharmaceutical companies and can be bought as dietary supplements. Beekeepers on Texel use the nectar from borage to produce honey.

- *Horticulture*

A small area of the agricultural land on the island (694 hectares) is destined to horticultural production; vegetables and fruit. Winter cauliflower, carrots, onions and celeriac, white and green asparagus are an example of the vegetables produced on the island. The fruit production can be subdivided in soft (plums, strawberries, grapes and berries) and hard fruits (apples and pears), these fruits are often used in local products. Texel also has its own vine yard.

Actors involved

Arable farming is a very important part of the culture and economics of Texel and therefore a lot of different people are affected by this. In fact it's safe to say this sub-system affects everyone on the island. First and foremost the farmers themselves; 15% of the population (2046 people) are currently working in the agricultural sector; it is however very hard to compete with the agriculture production on the mainland; which means most farmers have a second job to generate a higher income. An example is turning the land into a camping during the summer season.

Besides the farmers themselves another example of involved people are those that process the products, for example bakers. Next to that are of course those working in the stores selling the local good, or restaurants using the local products. This directly involves the customers, those that buy the products or eat them in the restaurants. These customers aren't just the inhabitants of the island, during the summer period tourists have a huge impact on this sector.

This directly addresses one of the problems, the different demands for products on the island and how to supply this. During the summer the population of the island is nearly doubled, meaning a higher demand for products.

Technologies

The biggest difference between arable farming on Texel and the main land is the fact that irrigation is prohibited. No water can be added to the land, not even in extremely dry summers. This is a disadvantage for the farmers on the island and forms an economical risk in case the harvest is ruined. Another disadvantage of farming on an island is the high transportation costs as everything (import or export) needs to be shipped.

And even though the farmers use the same equipment (big machineries) as on the mainland, there is a different mind-set. The island is highly reliant on tourism, the farmers therefore are too. Since the tourists visit the island because of the nature, this directly affects the arable farming. This is translated in planting different types of flowers along the borders or letting these areas be used by animals.

Farmers are also mostly responsible for the way the nature represents itself, which is what attracts the tourists to the island. The appearance of the nature is dominated by the agricultural patches which are caused by 'ruilverkaveling'. The farmland forms an important part of the identity of the island; an example of how this is marketed to tourists is the 'Proeftuin'.

Regulations

Besides tourism, agriculture plays a big role in the economic situation of the island; but due to several regulations it's difficult to compete with the main land. The most important one is the prohibition of irrigation systems, which in dry summers can cause for a harvest to go ruined, forming an economical risk.

Besides that, the governance of the island wants at least 4000 hectares of the island to be untouched, preserved for nature [5.], which means upscaling of companies in order to secure the future of those is nearly impossible.

The group [6.] focused on food in this course last year also wrote that on top of that the municipality wants to preserve the biodiversity in the borders of the acres. This is also one of the wishes of the farmers themselves, but sometimes they have contradicting needs; for example the need for lower ground water levels while a higher level in the dunes nearby is wanted by the municipality.

Export vs. Import

As described before certain foods are produced on the island, but this of course does not come close to the amount and different types of food available in any regular grocery store on the mainland. Assuming most of the products produced on Texel are for local consumption, quite a big part is or can be covered. But luxury products are not included in this, the more processed foods such as coffee, chocolates and even though sugar beets are grown on Texel, sugar itself is produced on the mainland.

2. Fishery

Intro

On Texel, fishing has been going on for years, as to provide the inhabitants of Texel with food and to be a source of income after selling the fish on the mainland. In order to see what the status is of this food source, this section looks at the following. The fishing grounds, the sorts of fish that are being caught and types of fishing. Also it will look into all the parties that have something to say about the fishing and what the infrastructure is that is needed to fish. Also the consumption side will be highlighted and some elements that still play a role from history are discussed.

Production

Fishermen from Texel catch their fish in the North Sea and the Wadden Sea. In both seas different fish are caught as can be seen in Table 1, but the main types of fish are European plaice (schol), common sole (tong) and herring. Next to fish they also catch shrimp and mussels. It should be noted that these mussels are first to be send to the province of Sealand to mature and only then they are sold for consumption. Good to note is that the amount of plaice are at very good levels, whereas those of sole are at safe but not abundant levels yet, after lots of overfishing in the 60's and 70's. [12]

Different techniques exist for catching fish, with the most widely used and oldest one being bottom trawling. This technique requires a lot of fuel and affects the seabed badly, so fisherman are transitioning to other techniques, of which the following are used most often. Electric pulse fishing, Sumwing fishing and Jackwing fishing. These all decrease the drag on the seabed and thus reducing fuel consumption and affecting it less. [12]

Wadden Sea	North Sea	Crustacean	Shellfish	Imported
European Flounder (Bot)	European Flounder (Bot)	Shrimp (Garnalen)	Mussels (Mosselen)	Barramundi (Barramundi)
Tub Gurnard (Rode Poon)	Tub Gurnard (Rode Poon)	Crab (Krab)	Scallops (Coquilles)	Rock Gunnel (Botervis)
Common Dab (Schar)	Common Dab (Schar)	Lobster (Kreeft)	Cockles (Kokkels)	Trout (Forel)
Herring (Haring)	Herring (Haring)		Ensis (Scheermes)	Squid (Inktvis)
European Plaice (Schol)	European Plaice (Schol)			Red Snapper (Rode Snapper)

European Sprat (Sprot)	Spiny Dogfish (Doornhaai)			Tuna (Tonijn)
Mullet (Harder)	Brill (Griet)			Nile Perch (Victoriabaars)
European Eel (Paling)	Atlantic Halibut (Heilbot)			Swordfish (Zwaardvis)
	Atlantic Cod (Kabeljauw)			
	Atlantic Mackerel (Makreel)			
	Striped Red Mullet (Mul)			
	Rose Fish (Roodbaars)			
	European Anchovy (Ansjovis)			
	Haddock (Schelvis)			
	Snoekbaars (Zander)			
	Turbot (Tarbot)			
	Sole (Tong)			
	Whiting (Wijting)			
	European Seabass (Zeebaars)			
	Monkfish (Zeeduivel)			
	Wolffish (Zeewolf)			
	Garfish (Geep)			

Table 2. Different fish, caught by Texel fishermen [12] [14]

Consumption

All this fish is going to three distinguishable customers. The first one being the people of Texel, the second one being the rest of the Netherlands and the last one is the rest of the world (mostly south-European countries).

Infrastructure to make it possible

In order to make the whole fishing industry possible, the following infrastructural elements are being used. Firstly of course, there are two harbours that are mainly used: Oudeschild (Texel) and Den Helder (mainland). Where Oudeschild is the distribution centre for the rest of Texel via local restaurants and fish-shops and Den Helder is for elsewhere. [14] Then, about 19 large fishing ships, 22 smaller ones, and 4 shellfishing ships are in operation which can get repairs on a dock in Texel and Texel also has its own shop for fishing-gear for these ships.

Actors & Ones involved, their influences

From the above, the following parties can be distinguished that are all influencing the fishing industry of Texel. Firstly, the harbour of Oudeschild and Den Helder, they would like to keep this business going via them Together with them are standing the fishermen themselves, whose job it is to catch the fish and make a living out of it. The dock on Texel which would want the fishing industry to continue, although this could also be in a different form as it is now, as long as they can provide maintenance. Same holds for the fish-gear store.

One very important player in this field is the European Commission, indirectly, and the Dutch ministry of Agriculture, Nature and Food Quality, directly. They give the fishermen quota, they set a limit to the amount of fish that each fishermen is allowed to catch. Next to this, there are some environmentalist-groups who will plead for safer ways of fishing that harm the seabed less. They can lobby on a regional and sometimes also national field for their cause.

The ones that are involved in the fishing industry as well, but only from the usage side are the consumers and tourists. Consumers can be: restaurants, fish-shops, private consumers and distributors. All these four

commercial customers will be important for our cause, but in what manner, what group needs to be approached it something that will need more discussion. Lastly, the tourists are a consumer group in the sense that they can also pay for fishing trips during the high-season.

As has been stated before, new ways of cheaper and safer ways of fishing are available, but strangely enough European rules can sometimes make it hard to change towards these new techniques. The fuel savings that can be made with these techniques are significant and can therefore be very attractive for the fishermen.[12] The European commission also rules that on some grounds fishing is prohibited, making it less easy for the fishermen to go to their fishing grounds. An interesting change of the last few years is that at this moment, fishermen actually join members of the European Union on research trips when they set the quota. Lastly, it should also be said, that the main fishing season is in the summer, when the need is also the highest. In the rest of the year, less fish will have their fishing season.

Historical influences

In history, the fishing industry was much larger for Texel, however due to the government reorganisation pressure, many boats have left the field (for small sums of money). Also, due to the construction of the Afsluitdijk, the oyster-industry has disappeared because of the changing marine environment.

3. Cattle breeding

Introduction

If you type in ‘cattle breeding Texel’ on google images, your computer screen will be filled with images of the Texel’s sheep. About 26 thousand sheep’s call Texel their home, which covers 72 percent of the total cattle stock [1] The cattle breeding of sheep’s gives Texel the typical landscape of vast green fields, which flow into the sea. This image is very important to attract tourists to the area, but might soon drastically change.

Veestapel, 2010

	Texel	Noord-Holland	Nederland
Veestapel	36 796	1 622 002	122 738 971
rundvee	9 158	157 643	3 975 194
varkens	1 030	22 493	12 254 972
kippen	145	1 217 486	101 247 711
overig vee	26 463	224 380	5 261 094

Figure 3 Veestapel 2010, Source: CBS [11].

The cattle breeding of sheep’s

The Texel Sheep is brood in the 19th century. First for the wool, later in the 20th century it became a meat breed. There is great demand for Texel sheep from around the world. This is largely due to their excellent meat production characteristics and very good health status of the sheep farms. Due to the large numbers of Texel Sheeps, which are exported, the qualities of these sheep’s are known in many countries. [10]

Texel sheep’s are found every were on the island. You can find them on poor soils, where few edible grows, as in the dunes, dikes and pastures. But you van also encounter the Texel sheep on rich soil where plants grow richly. This makes the sheep an indispensable element in the landscape of Texel. [9]

Yet this presence of the sheep on the island is threatened. The meat of the Texel has lots of competition from cheaper lamb from New Zealand. Therefore the sheep tends to disappear from the island. The politics of Texel has set a limit. There must be at least 4,000 hectares of grassland on the island [9]. There is a special organization founded for the preservation of the breed on the island. It is both for the farmers and the people in the hospitality industry important that the image of greens fields with sheep keeps intact. Restaurants often have real Texel lamb on the menu.

The cattle breeding of cows

Not only sheep farmers are struggling. Also the dairy farms for cows are shrinking in numbers. In recent years, there have already stopped dozens of dairy farms for cows and some companies now have beef cows. The money that farmers receive for milk is not nearly enough to cover the production costs. That's because all sorts of amenities and transport on the island are more expensive than on the mainland. Therefore, there are quite a few sheep and dairy farms on the island switched to agriculture, outdoor vegetable cultivation or bulb cultivation.

It does not deliver enough income so farmers seek other ways to earn extra money. For example offering the possibility to camp on the farm for tourists. Farmers also receive compensation for the management and maintenance of garden walls, drinking fountains (a kind of circular ponds) and sheep sheds. Still these extra's of income are not enough to maintain the farms on the scale they are now present [9].

Environment

This table shows that Texel has a large share in the mineral secretion, which is harmful to the environment. It could be interesting for us to research why Texel has such a big share in this and what can be done to reduce this share. Known is that the waste products of the cattle breeding industry have a very large share in the environmental crisis. It is the question whether it would be better for Texel to import these products from the mainland or countries like New Seeland. These large travel distances are harming the environment even more.

Oppervlakte cultuurgrond (in are) en mineralenuitscheiding (in kg per ha cultuurgrond), 2009

	Texel	Noord-Holland	Nederland
Oppervlakte cultuurgrond	921 431	13 581 856	191 748 181
Stikstofuitscheiding	111	139	261
Fosfaatuitscheiding	35	44	94
Kali-uitscheiding	161	192	279

Figure 4 oppervlakte cultuurgrond (in are) en mineralenuitscheiding (in kg per ha cultuurgrond) 2009, Source: CBS [11].

Stakeholders involved

As explained in the precious part the reduction of cattle breeding has an impact on the whole economy of the island. Farmers are the first victims, the supply chain follows and finally the hospitality business could also suffer from the changing image of the Texel landscape.

1.3 Socio-technological system in future

Outline comparably the **future** socio-technological system (50 years, 2065) starting from the societal need or innovative technology.

In what way can the socio-technological system change to answer the societal need for a 100% self sufficient Texel?

1. Agriculture

Texel is highly dependent on tourism causing a peak demand for products. Answering this demand, besides the overall local need is challenging; especially in the case of wanting to turn this sub-system into a self-sufficient one. A logical solution would be increasing the scale of the current companies, this however isn't that easy due to the wishes of the municipality to keep 4000 hectares free for nature. Even if up scaling were possible, the disadvantages of no irrigation and high transportation costs, still make it difficult to compete with the agricultural sector of the mainland.

An opportunity however is Texel's culinary; specific types of food and flavours for which the island is famous; the type of products tourists visit the island for. Focussing on these specialty products could be a solution; this does however mean (in the case of a self-sufficient island) that the diet of the locals will be drastically changed; eliminating certain products. By focussing on local production and consumption a closed circle should be easier to create.

In light of preserving the nature of the island and still trying to close the food circle, solutions for food productions should be sought in a new or different direction that currently applied on the island. A possible solution could be found in using the square meters that have already been taken from the nature; the roofs and facades of the buildings in the villages. Green roofs and facades could be implemented and turned into small scale food productions; either the production of foods for the persons in the respective building. But it could also be turned into a bigger system. A system in which the village is divided into several sections and people work together to produce missing products, eliminating the need to import products. This could be translated in implementing green houses on top of public buildings, to turn the production into a community event. Creating awareness and jobs at the same time.

2. Fishery

On the fields of fishery the following chances lie ahead:

- A stable consumer market at Texel for the fishermen
- Development of a healthy marine-based diet
- Gaining more experience on certain ways of eco-friendly fishing, serving as an example for other countries, this could be subsidised by the government

This will require the following changes of their respective actors.

- The inhabitants will need to change to a more marine-based diet. What do they prefer? They should be helped in the kitchen as well.
- It should be made easier to change the fishing-technique, this should not be halted by the European Union legislation
- On Texel itself it should be made easier to get your fresh fish from the fishermen.
- Investigation on how to get the oyster back.
- Investigation on how to get more involved in seaweed farming, this could be used a form of marine vegetable.

- Be able to handle the large increase of consumers during summer when many tourists come to the island and need food as well. Impact here is reduced though, because in summer more fishing is done than during winter, so the supply follows the demand in a certain way.

3. Cattle breeding

Since Texel is highly demanding on tourism, it is important to maintain the green field landscape and not let it totally be taken over by agriculture. Adjoining, Texel could look for ways to continue cattle breeding on the island itself, in a way that there is no need to import cheap meat from countries far away like New Zealand. Texel could promote their sheep meat as a high-quality product, a product that is produced in a sustainable way that could attract tourists to the island, like wine attracts tourists to the Bordeaux region in France.

1.4 The sustainability challenge of Texel

A detailed description of the sustainability challenge Texel is facing with regard to the sub system

Problem statement for sustainability transition

Current System

- Production of certain foods (Texel's specialties)
- Import of luxury products
- Processing of products (sugar) takes place on the main land

Future system

- Closed circle? Eliminating import
- Self-sufficient
- Local production on existing areas..
- Community effort
- Creating a food route?
- Promote the cuisine of Texel (changed diet) is it possible to create a day to day diet with foods only produced on the island?
- Food processing on the island, new jobs?
- Export remains (income)

Differences

- Diet of the people will be changed, not all products will remain available

Sustainability criteria

- Closed loop? No import > reducing food kilometres/ environmental impact
- Preserve the nature
- Focus on specific products that are suitable for Texel
- Focus on local production and consumption.
- Should be integrated part of the tourism

Research question& design challenge

Research Question

How to make the current food system a closed loop one, which focusses on local production and consumption, but can still answer the peak demands caused by tourists?

Design Challenge

- Food route
- New places for food production?
- New techniques
- To make the residents enthusiastic for customizing their diet.

2.1 The sustainability challenge of Texel

A detailed description of the sustainability challenge Texel is facing with regard to the sub system

Bibliography

- [1] Borrás, S., & Edler, J. (2014). Introduction: on governance, systems and change. In S. Borrás & J. Edler (Eds.), *The governance of socio-technical systems* (pp. 1-2; 11-16; 23-xx). Cheltenham: Edward Elgar Publishing.
- [2] Pesch, U. (2015). Tracing discursive space: Agency and change in sustainability transitions. *Technological Forecasting and Social Change*, **90**:379-388
- [3] Beek, W. v. (s.d.). PR Landbouw. Retrieved 14-11, 2015, from <http://www.landbouwtexel.nl/>
- [4] Ecomare. Akkerbouw. Retrieved 14-11, 2015, from <http://www.ecomare.nl/ecomare-encyclopedie/gebieden/waddengebied/nederlands-waddengebied/texel/landbouw-en-visserij-op-texel/akkerbouw-op-texel/>
- [5] Ecomare. Landbouw op Texel. Retrieved 14-11, 2015, from <http://www.ecomare.nl/ecomare-encyclopedie/gebieden/waddengebied/nederlands-waddengebied/texel/landbouw-en-visserij-op-texel/>
- [6] Iris van den Brink, B., Syed Aaquib Hazari. The current agricultural sector, the relevant trends and current initiatives. Retrieved 13-11, 2015, from <http://tudelft.gingerresearch.net/page/6726/2-the-current-argicultural-sector--the-relevant-trends-and-current-initiatives>
- [7] PR Landbouw. Landbouw Folder.
- [8] PR Landbouw. Teelt op Texel. Retrieved 14-11, 2015, from <http://www.landbouwtexel.nl/over/teelt-op-texel/>
- [9] Ecomare. Veehouderij op Texel. Retrieved 15-11, 2015, from <http://www.ecomare.nl/ecomare-encyclopedie/gebieden/waddengebied/nederlands-waddengebied/texel/landbouw-en-visserij-op-texel/veehouderij-op-texel/>
- [10] Texel Sheep. Retrieved 15-11, 2015, from: <http://www.texelsheep.nl/texelaar.html>
- [11] Gemeente op maat. Texel. CBS. Retrieved 15-11, 2015, from: <http://www.cbs.nl/NR/rdonlyres/8DC1EF23-9ADA-4C3E-89DE-8FE0395DC43C/0/Texel.pdf>
- [12] <http://www.ecomare.nl/ecomare-encyclopedie/gebieden/waddengebied/nederlands-waddengebied/texel/landbouw-en-visserij-op-texel/visserij-op-texel/>
- [13] <http://www.landbouwtexel.nl/>
- [14] <http://www.deoudevismarkt.nl/>