



Changing practices in waste collection

The separate collection of plastic waste in
the Netherlands

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| Date: | 01-03-2012 |

Abstract

Since 1 January 2010 the separate collection of plastic waste is obligated in the Netherlands. All Dutch municipalities are obligated to provide the facilities which enable their households to collect plastic waste of separately. It turns out that the separate collection is quite successful. This is remarkable, since it is for the households voluntary and it asks a change in the daily practices of households. In literature on sustainable development the notion of transition is very often used. But this has in many cases led to a strong focus on technology and an ignorance of the role of everyday's life, routines and practices in changes of socio-technical systems. This research focuses on the changing practices. Important in this context is the theory of practices, which sees practices as combinations of three elements, namely image, competence and artefact. This research has conducted 24 interviews with important actors involved in the separate collection of plastic waste. These interviews were necessary in order to identify all the views, opinions, images, routines and behaviours of households, but also the stories of the authorities that are involved. The conclusion is that the separate collection of plastic waste can be seen as a new combination of mainly already existing elements, like environment is important, similar competences and artefacts combined with a number of new elements. This new combination resulted in a new practice. Without the one of these elements, it is very likely that there would have been another outcome, since these three elements really form this new practice.

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1. Introduction

Since in 1987 the World Commission on Environment and Development (WCED), headed by Gro Harlem Brundtland published its report *Our Common Future*, sustainable development is a subject which cannot be ignored anymore. It became also clear that sustainable development needs "...long-term and far-reaching changes of technologies, infrastructure, life-styles and institutions" (Rennings 1998, pp. 2). There are many efforts by governments and other organisations in order to reduce greenhouse gas emissions, energy consumption and waste production. In order to deal with these sustainability issues, a widespread belief is that technological innovation is necessary (Coad, de Haan et al. 2009). Therefore the focus is often on technological innovation in order to improve the technical efficiency, as Gram-Hansen (2010) illustrated with the case of the reduction of energy consumption in households. However the focus should not only be on technological innovations, but also on the everyday behaviour and practices of households (Gram-Hanssen 2010). Therefore governments should try to influence the behaviour of the households. Four different policy instruments can be distinguished. These are first information, like media campaigns and labelling, second economic instruments, like subsidies, taxing and pricing, third administrative instruments, like norms, permits, prohibitions and legislated regulations and fourth physical instruments, like the construction of facilities with the intention to facilitate a new behaviour (Lindén, Carlsson-Kanyama 2002). However these policy instruments are no guarantee for a change in the behaviour of people into a more sustainable behaviour, since these policy instruments have a top-down perspective, which often does not result in a change of behaviour and routines on the long term (Lindén (1994) in Lindén, Carlsson-Kanyama 2002).

As mentioned before one of the sustainability issues is the production of waste. All households together in the Netherlands produce a large amount of waste every year (CBS 2010). For years on end this amount increased annually, but in 2008 and 2009 there was a small decrease. In 2009 the total waste production was over 9 million tons of waste, which results in a waste production per capita of 549 kilograms (CBS 2010). About half of the total waste production in 2009 was collected separately. Examples are paper, glass and metal, which are collected separately in order to recycle these materials. Recycling is one of three main objectives of the waste policy, which Leroy and Wiering (2007) mention, namely promoting the recycling of waste. These objectives are based on the 'Ladder of Lansink', which is named after Member of Parliament Lansink (Leroy, Wiering 2007). This ladder consists of the following steps: prevention, reuse, recycling, incineration and landfill, where landfill has the lowest priority and prevention the highest. Waste policy is based on these steps and it should be focused on the ones with the highest priority. The separate collection fits well within this policy.

Since 1 January 2010 the separate collection of plastic waste is obligated in the Netherlands. All Dutch municipalities are obligated to collect plastic waste of their households separately (Rijksoverheid 2010). However, in 2009 there were already over 300 municipalities which collected plastic waste separately (Nedvang 2010). This collection resulted in over 25 kilotons of plastic waste coming from households (CBS 2010, Nedvang 2010). This meant a big increase compared to 2008, when this was only 8 kilotons (CBS 2010). But this does not represent the total amount of plastic waste which is disposed by households, since there is also plastic waste disposed via the mixed waste collection. Every year, the Dutch agency Agentschap NL analyses the composition of the mixed waste collected from households. In 2009 this contained over 15% of plastic waste (Agentschap NL 2011), which is not collected separately and recycled.

The Dutch government has established a number of targets on how much plastic waste of households and firms should be recycled (Nedvang 2010, VROM-inspectie 2010). These targets are per 1 January 2009 32%, per 1 January 2010 38% and per 1 January 2012 42% of all forms of plastic

packaging. According to Nedvang (2010), already in 2009 38% of the plastic waste was recycled, which is more than the target of 32%. In 2010 this percentage is even increased to 48% (Nedvang 2011). Also Agentschap NL (2011) shows that this measure has effect. Their analysis of the composition of the mixed waste collected from households shows a decrease of the percentage of plastic waste, which is not collected separately. As mentioned before this percentage was over 15 % in 2009 and in 2010 this was decreased to 9.2%. According to Agentschap NL this decrease can be explained by the large scale introduction of separate collection of plastic waste in 2010. The achievement of the recycling target in 2009 and the decrease of percentage of plastic waste which is not recycled, indicates a relatively successful implementation of the separate collection of plastic in the Netherlands.

The municipalities are allowed to collect plastic waste of households in three different ways (Plastic Heroes 2011). First, the Waste Collection Authorities may collect plastic waste directly at the kerbside. The households have to sort their waste themselves and have to separate the plastic waste from the rest. A special plastic bag is provided by the Waste Collection Authorities, which the households can use to store the plastic waste separately. A second way is special collection locations throughout the municipality. The households again have to sort and separate their plastic waste, but now they have to bring it to special containers in their neighbourhood. These containers are often found at the same locations where glass and paper are also collected. The third manner does not require any contribution from the households, because the Waste Collection Authorities separate the plastic waste from the household waste stream themselves after the collection of the mixed waste.

If a municipality chooses for one of the first two options, the introduction of the separate collection of plastic waste will have an effect on the everyday practices of households. As Chappels and Shove (1999) have shown in their study, the dustbin has evolved from an ash pit to a large wheelie bin, which has intensified also of the waste stream of the households. Furthermore it started the practice of throwing things away easily, quickly and out of sight. The trend which they foresee is the arrival of a large amount of recycle bins in different colours and shapes, which are not out of sight but for example in your kitchen. It is remarkable to see that this development is actually happening, with the separate collection of plastic waste as the latest example, because households have to change their everyday practices of throwing things away. For separate collection, new practices are needed, like sorting the waste and keeping for example the plastic waste separate. So this means that the households have to change their practices from only throwing waste away to sorting and separating waste.

This research focuses on these changing practices. Important in this context is the theory of practices. This theory sees practices as combinations of three elements, namely image, competence and artefact (Shove, Pantzar 2005, Pantzar, Shove 2010). Changing practices therefore can be seen as new combinations or reconfigurations of these elements (Pantzar, Shove 2010). Using a new case, namely the separate plastic waste collection in the Netherlands, should provide another example of how new combinations or reconfigurations of image, competence and artefact results in new practices. An extra case therefore should give more strength to the theory of practices, which is relevant for literature.

Shove and Walker (2007) argue in their article that the 'idea of transition' is very attractive for those who are concerned with sustainability. Transition management could help to steer, shape or manage today's and future developments in such a way that they become less environmentally harmful (Shove, Walker 2007). The notion of transition management is mainly influenced by Rip and Kemp's (1998) 'multi-level' model of innovation, consisting of three levels namely the socio-technical landscape, the regime and the niche (Shove, Walker 2007). This results in a strong focus on technical innovation and in ignoring the everyday's life, routines and practices (Shove, Walker 2007). These cannot be changed so easily and as Shove and Walker (2007) also argue is that there will occur new practices, initiated by people themselves, which does not fit in the transition. Their main message is that it is important to loosen "the intellectual grip of 'innovation studies', for backing off from the

nested, hierarchical multi-level model as the *only* model in town, and for exploring other social scientific, but also systemic theories of change” (Shove, Walker 2007). This research does focus on the everyday’s life and especially the everyday’s practices and therefore could provide some insights in the role of them in dealing with sustainability issues.

This indicates that there should be more focus on the behaviour of households in order to implement sustainable innovations. As described before there are several policy instruments which have the intention to influence the behaviour of the households. But since they have a top-down perspective, they often do not have the desired effect. However the implementation of the separate collection of plastic waste in the Netherlands does have effect. This is remarkable, since the separate collection is for the households voluntary and the organization behind the separate collection, Nedvang, only is trying to influence the households with the national campaign ‘Plastic Heroes’. Furthermore it asks from households a change in their daily practices as described before. Somehow the separate collection fits within the daily life of households. Therefore this research looks into the everyday practices of the households. This research is aimed at gaining more insights in how the relative success of the separate collection of plastic waste in the Netherlands can be explained while using the theory of practices. Therefore the research question will be:

How can the relative success of the separate collection of plastic waste in the Netherlands be explained while using the theory of practices?

Furthermore, in the relation to the preceding, the insights from this study will also have some social relevance. An explanation of how the separate plastics collection is included in daily life with quite some success, provides another view on how new sustainable innovations are taken up by households. This view, which sees changing practices as a new combination or a reconfiguration of three elements may give more insights for policy makers in how to stimulate sustainable behaviour, which might influence the policy instruments used. This may also result in a lesser focus on technical innovation and in a stronger focus on practices.

2. Theoretical background

The previous section already discussed that the theory of practices is used in this research. This theory is very useful in the context of changing practices. This section will discuss the theory of practices in more detail and why it is important. In this context it is necessary to first discuss literature on transitions.

2.1. Transition literature

As mentioned before sustainable development needs long-term and far-reaching changes in technologies, infrastructure, life-styles and institutions (Rennings 1998). Van den Bergh et al. (2011) argue that there is a need for radical, large-scale and integrated socio-technical changes which are even well beyond the traditional policy approaches in order to solve the environmental problems. Furthermore, the technical innovations that can contribute to the solution of these environmental problems are peculiar and need parallel, fundamental changes in economic and wider social-cultural conditions (Bergh van den, Truffer et al. 2011). The notion of transition, so the substantial change and movement from one state to another state is very attractive in this relation (Shove, Walker 2007). According to Shove and Walker (2007), this notion is “firmly rooted in traditions system thinking” (pp. 2). This system thinking emphasizes the co-evolution of social and technical aspects and tries to understand and analyze the socio-technical systems (Shove, Walker 2007). According to Shove and Walker (2007) it even could be possible to transform the environment into a better and more sustainable place to be in case there is a possibility to steer change, shape future development and manage movement in desired directions of sustainability (Shove, Walker 2007).

It is possible to identify two different branches of research on transitions (Genus, Coles 2008) (Shove, Walker 2007). These are (1) systems in transition and (2) transition management. The first branch is aimed at conceptualizing the system dynamics of socio-technical systems (Shove, Walker 2007). Often, this is done by a retrospective analysis of cases that show the rise and fall of these systems (See for examples of cases (Genus, Coles 2008, Shove, Walker 2007). So scholars in this field have tried to explain processes of radical innovations which led to a new set of socio-technical relations as a replacement of the existing general social practice (Genus, Coles 2008). An important difference between the two branches is that the literature on systems in transition does not contain an assumption that a better understanding of the system dynamics will enhance the capacity to manage a transition (Shove, Walker 2007). In contrast to the systems in transition research, the transition management literature represents an analytical approach that tries to explain how it is possible to actively steer the technological change in a desired direction (Genus, Coles 2008). This is contrary to the historically descriptive approaches of the former branch. Shove and Walker (2007) show that there are different opinions on how to actively steer change, but that the main idea is that in order to pursue specific goals, such as those of sustainability deliberate intervention is possible and even potentially effective.

Contributors of both branches of research on transitions have often used a multi-level perspective (Genus, Coles 2008). This perspective distinguishes three analytical and heuristic levels: a micro, a meso and a macro level (Geels 2005). The first lowest level or micro level is formed by technological niches, which could have the form of small market niches and acts as incubation rooms for radical novelties (Geels 2005). These novelties are in this way protected from the mainstream market selection. Socio-technical regimes form the meso level which represents the dynamic stability of socio-technical systems (Geels 2005). This means that there only occur incremental innovation that lead to trajectories and path dependencies. Highest level is the macro level which is formed by the socio-technical landscape which refers to aspects, like macro-economics, deep cultural patterns and macro-political developments (Geels 2005). Changes at this level take place very slowly and it is not possible for individual actors to influence these changes. The two branches have used this perspective on multiple levels in different ways. In the first branch, the analysis of the transitions,

which are already happened at the same micro, meso and macro level (Genus, Coles 2008). Transition management have used the multi-level perspective “to inform and to improve understanding of how niches may or may not ‘seed’ change, to refine the concept of transitions and develop a more robust framework for their analysis” (Genus, Coles 2008).

Some limitations and cautions can be identified regarding the multi-level perspective (Genus, Coles 2008) (Shove, Walker 2007). Both articles give an overview of these limitations and cautions. Genus and Coles (2008) indicate that within the branch of systems in transition, research has not been systematic in applying the multi-level perspective. Research within this branch has often emphasized the ‘needs’ of technologies. This resulted in a linear analysis focusing on ‘winning’ technologies in sympathy with ideas like path dependency and technological trajectory (Genus, Coles 2008). Also the role of agency and politics are often undervalued. Genus and Coles (2008) also indicate that within the branch of systems in transition it appears that methodological issues concerning the multi-level perspective and badly performed historical case studies have been undervalued. They are concerned that these ideas could seep into the policy making domain, which could results in a false dominant interpretation of the multi-level perspective within policy making.

Regarding to the research on transition management, Genus and Coles (2008) are afraid that the capability of transition managers to make improvements by design is overstated or that the politics of transitions are glossed over in case there is not paid more attention to the identity, activities and effect of supposed transition managers (Genus, Coles 2008). Also Shove and Walker (2007) stress that one should be more aware these concerns related to transition managers and the politics of transitions. They also argue that within the transition management literature important types and agents of change are missing. They mention innovations that do not fit and even are the complete opposite of the pathways of change which are expected and desired by transition managers (Shove, Walker 2007). But also trajectories of, what they call fossilisation and decay, so in case established socio-technical systems are abandoned in favour of new systems, and fundamental transformations in the ordinary routines of daily life are aspects that are missing within the transition management literature, according to Shove and Walker (2007). From the aforementioned, it shows that the literature on transitions has a strong focus on technical innovation and the role of transition managers. However, less attention is paid to other important aspects that contradict this certain pathways of transitions.

Smith et al. (2005) indicate that “the essence of sustainability lies in the recognition of agency in social choices about technological futures” (pp. 1508). Also Shove and Walker (2010) suggest that “there is more at stake than the ‘vertical’ relation between emerging niches and incumbent regimes” (pp. 474), which is central in the multi-level perspective. They also suggest to investigate the range of elements that are horizontally in circulation in any society, like the material, the meaning, but also the skill and procedure. This is also indicated by their message that it is important to loosen “the intellectual grip of ‘innovation studies’, for backing off from the nested, hierarchical multi-level model as the *only* model in town, and for exploring other social scientific, but also systemic theories of change” (Shove, Walker 2007). It seems that the role of everyday’s life, routines and practices in changes of socio-technical systems are to a great extent ignored in the research on sustainability. This research therefore focuses in order to provide some insights in the role of everyday’s life and especially the everyday’s practices regarding sustainability issues.

2.2. Theory of practices

So there should be more focus on the everyday’s practices. In the case of the separate collection of plastic waste, it seems that the everyday’s practices of households are changed. Therefore the theory of practices is interesting to use. The use of this theory will give insights in how practices change. Elements of a theory of social practices can be discovered in the work of a large amount of social theorists in the last third of the twentieth century, like Bourdieu, Giddens, Butler, Garfinkel, Taylor,

Schatzki and Foucault (Reckwitz 2002, Gram-Hanssen 2010). According to Shove et al. (2007), Reckwitz (2002) and Schatzki (1996) have derived the outlines of a coherent approach to the analysis of practice from the ideas of those theorists.

According to Shove et al. (2007), it is a misleadingly simplistic interpretation to equate practices with 'what people do'. Shove et al. (2007) are strengthened by the distinction between two different meanings of the term practice, which Schatzki (1996) uses. The first meaning is: "...practice as a temporally unfolding and spatially dispersed nexus of doings and sayings" (Schatzki 1996). As examples, he uses cooking practices, voting practices, industrial practices, recreational practices and correctional practices. The second meaning is the practice as a performance (Shove, Watson et al. 2007). "This notion denotes the do-ing, the actual activity or energization, at the heart of action" (Schatzki 1996). As Shove et al. (2007) illustrate, a practice-as-entity is sustained, reproduced and even changed by the active process of doing. The practice-as-entity exists across the actual and potential performances. However "its existence depends upon the recurrent performance by real-life practitioners" (Schatzki 1996). So the practitioners are sustaining, reproducing or changing the practices or are not performing them anymore.

The existence of a practice does not depend only on the performance of practitioners, also the interconnection of elements is important (Reckwitz 2002). These elements are forms of bodily knowledge, forms of mental activities, things and their use (Pantzar, Shove 2010). A practice cannot be reduced to one of these three elements, but it is the presence and the specific interconnectedness of these three elements that shapes the practice (Reckwitz 2002). Empirical research on practices should therefore not only focus on one of these elements, but also on the relations between those elements. Research by Shove and Pantzar (2005, 2010) on the Nordic walking stick is good example. They see practice as combinations of three elements; meaning/image, competence/skill and artefacts/objects. Pantzar and Shove (2010) argue that these elements can be expected to be somehow 'out there' in the world and that they are 'waiting' to be linked to other elements, which then will result in a practice. However if this is true, then this would also mean that the three elements survive beyond the 'life' of the practices (Pantzar, Shove 2010, Pantzar, Shove 2010). Considering the interconnection of elements, they identify three possible formulations. First the elements that constitute the practice are 'out there', but are not connected with each other yet. In the second formulation, the elements are also connected and constitute a practice. In the last situation the links between the elements are no longer made. In this context, it is also possible that new combinations of new elements are made or that the elements are reconfigured. These new combinations or reconfigurations of the elements mean the occurrence of new practices.

Also the separate collection of plastic waste can thus be seen as a practice or a combination of more practices, where its existence depends on the practitioners performing them. Separate collection consists of practices like sorting the waste and storing the plastic waste separate from the rest of the waste produced by the household. These practices are new in the sense that in the past households threw every type of waste away without sorting. Nowadays plastic waste is not the only type of waste which is collected separately, other waste streams like glass or paper are also collected separately. This indicates that the separate collection of plastic waste may be a new combination or reconfiguration of images, competences and artefacts. This research will use "image" as a concept for the associations which the households hold regarding the practice, the meaning which the practice has for the households and the message which the households want to convey. The images will also determine the type of people performing the practice and the ideology which sustains the practice (Shove, Pantzar 2005). "Competence" represents what skills and/or activities a household member has to know in order to perform the practice. Shove and Pantzar (2005) for example found the activity 'walking for fun' as a competence in the Nordic walking case. The last important concept, "artefact" represents the material facilities which are essential for performing the practice. So these are those objects without which it is not possible to perform the practice. Besides these three

elements, it will also be important to consider the relationship between these elements (Shove, Pantzar 2005). The elements do not act separately, but are heavily connected with and influencing each other.

3. Methodology

This research is aimed at gathering insight in how the everyday practices of the households in the Netherlands have changed because of the separate collection of plastic and is based on the theory of practices. The investigation of three elements, image, competence and artefacts, but also the relations between them, is important in this context. This research is about getting a good picture of the plastic waste collection practices in households. It is therefore important to include the stories of several different households and not to focus only on one household. It is necessary to describe and identify all the views, opinions, images, routines and behaviours of households. Therefore this research used a qualitative survey-research method, which includes several households. Interviews are important in order to gain the necessary information from the households.

These interviews have been conducted with the main actors, which are involved in this development. This results in the following list of interviewees. First of all the members of the households are included in this research. This research is about their daily life and so they are the primary source. Several different groups of households can be distinguished. First, since the collection of plastic waste can be organised in different ways, it is imaginable that the stories of households will differ with the different collection methods. Therefore I have chosen to conduct interviews with households from municipalities that work with the special plastic bag and with households from municipalities that work with the special collection containers. Since separating the plastic waste after collecting the mixed waste does not need a change of practices by the households, municipalities using this way of separation are not examined here. Second, it is imaginable that there will be households which are willing to participate and thus collect plastic waste separately, but there will also be households which are not participating. Of course, the former will be interviewed for this research, but also the latter could have some importance. Therefore a number of households that do not collect their plastic waste separately is included in this research as well.

Second actor which is included in this research is the organisation Nedvang, which is responsible for the media campaign for the separate collection of plastic waste (Plastic Heroes). This media campaign is aimed at convincing the public of the importance of the separate collection of plastic waste. It tried therefore to influence the behaviour of the households. A third actor which is related to this as well, is the Dutch department of infrastructure and environment. This department is responsible for policy regarding the waste production. Last important actor is the municipality, which is responsible for and obligated to offering the separate collection facilities. They had to decide how to implement the separate waste collection within their municipality and therefore they are responsible for the material facilities.

Table 1 shows the list of the actors which have been interviewed. In case of the organizations the position of the person which is interviewed is also listed. And the last column shows for all actors the amounts of interviews which have been conducted.

Table 1: List of actors

| Actor | Position of interviewee | Amount of interviews |
|--|--|----------------------|
| Households | -- | 20 |
| Nedvang | Advisor municipalities | 1 |
| Department of infrastructure and environment | The official responsible for the policy regarding the waste production | 1 |
| Municipalities | The official responsible for the implementation of the separate collection in his municipality | 2 |

As table 1 shows, this research has conducted interviews with the officials of two municipalities that are responsible for the separate collection. Because of the same reasons which are described for the households two different municipalities are included, one municipality that works with the special plastic bag and one that works with the special collection containers. The first municipality wanted to remain anonymous, therefore this municipality is called in this research municipality One. Municipality One collects plastic waste with the special collection container. The second municipality is Veenendaal and collects plastic waste with the special plastic bag at the kerbside.

Furthermore, twenty interviews have been conducted with households. Fifteen of these twenty interviews were conducted with households that collect their plastic waste separately. There are two different way of collecting plastic waste, so 10 interviews were conducted with households in a municipality which is using the special plastic bags and 5 interviews with households in municipalities that are using the special containers. Table 2 shows in which municipality these interviews have been conducted:

Table 2: List of municipalities for the interviews with households that collect their plastic waste separately

| Municipality | Way of collecting | Amount of interviews |
|---|---|----------------------|
| Veenendaal | Special bag | 10 |
| Overbetuwe (Zetten, Heteren and Elst, Gld.) | Special collection container in combination with a Diftar system. | 3 |
| Leusden | Special collection container | 1 |
| Utrechtse Heuvelrug (Driebergen) | Special collection container | 1 |
| Total | | 15 |

The other 5 interviews were conducted with households that do not plastic waste separately. Table 3 shows in which municipality these interviews have been conducted:

Table 3: List of municipalities for the interviews with households that do not collect their plastic waste separately

| Municipality | Way of collecting | Amount of interviews |
|-------------------------|-------------------|----------------------|
| Veenendaal | Special bag | 2 |
| Bergambacht (Ammerstol) | Special bag | 1 |
| Putten | Special bag | 1 |
| Ede | Special bag | 1 |
| Total | | 5 |

In several ways this research have contacted and asked these households for an interview. This is done by putting interview requests in the mailboxes of the households in these municipalities. In case of municipalities that work with the special collection containers, it was also possible to contact households by asking people personally at the sites where the special containers are. Because of low response, also acquaintances of households which already were interviewed are contacted. The households still are selected on the basis of different characteristic, like age, family composition, type of dwelling and Diftar system (a Diftar system means that households have to pay each time their container is emptied) in order to get as much different stories as possible.

As described before the necessary data are obtained by performing a total of 24 interviews with the main actors in this field. This research used semi-structured interviews. So there was a list of topics which are needed to know from the households; a interview protocol. This means that there was no list with precisely formulated questions. This is done in order to prevent to steer the answers and the stories of the households and other actors too much. Consequence of this approach is that this

research gathered a large amount of only qualitative data. In order to analyze this data, all the interviews are recorded with a tape recorder and transcribed afterwards. These transcriptions are added as appendices (See appendix 2). In order to get a better overview of the necessary information these transcriptions are coded. The codes were related to the three elements, image, competence and artefact, but also to the other opinions or remarks of the respondents. By using these codes for each interview a mind map is made which summarizes the important information. By comparing these mind maps on similarities and differences a number of groups are formed. For the households in those groups the narratives are very similar. In chapter 4 these stories are described for each group. Here, this section also gives an overview of the interviews with the authorities which are also included in this research. In chapter 5 the three elements, image, competence and artefacts are described that can be distinguished from the stories of the households. This information is used to derive conclusions in order to answer the research question.

4. Results

This research has conducted 24 interviews with important actors in the field of the separate collection of plastic waste. These interviews are necessary in order to identify all the views, opinions, images, routines and behaviours of households, but also the stories of the authorities that are involved. Therefore this section will describe these stories.

4.1. Interviews with the authorities

Four interviews were conducted with authorities that are involved in separate plastic waste collection. The interviewed authorities are: two municipalities, the Dutch department of infrastructure and environment and Nedvang. Nedvang represents the Dutch packaging industry. These interviews were used to give an impression on how the separate collection was set up and which choices were important in this context.

All authorities indicated that the separate collection of plastic waste is a result of obligatory legislation that originated from the European Union. The officials from the department of infrastructure and environment indicated that research already had shown that plastic is a material that has a large impact on the environment. Therefore it would be interesting to collect it separately. A waste framework directive from European Union (nr. 2004/12/EG) obliges the Netherlands to ensure that a number of waste streams are collected separately and recycled. Recently this is also become the case for plastic. In the Netherlands this European legislation is translated into so-called a 'producer responsibility', which is based on the idea that the polluter pays. This means that in this case the Dutch producers of plastic packaging are responsible for the disposal phase of their products. So they are responsible for the organization of the treatment of the waste that their products cause, but they also have to pay packaging taxes which is used as funding. According to Nedvang, this was agreed in a framework agreement between the Dutch government and the packaging industry with help of the Dutch municipalities. Nedvang executes the commitments made in this agreement on behalf of the Dutch packaging industry. Therefore Nedvang is the moving force behind the introduction of the separate collection of plastic waste. It also means that the department stands more on the sidelines, but according to its officials the department and more specific the Dutch government remains responsible in the eyes of the European Union. For this reason the 'VROM inspectie' monitors and checks the compliance with the commitments made on behalf of the department

As mentioned before, Nedvang is the moving force behind the introduction of the separate plastic waste collection. The adviser of Nedvang indicated how Nedvang approached the introduction. He remarked that the Netherlands had no experience with the separate collection of plastic waste. Therefore the first step was to investigate how other countries, like Germany and Belgium have organized the collection. The results of this investigation were discussed with actors like the VNG, the association of Dutch municipalities. So the first step consisted mainly of the exploration of the field of separate plastic waste collection. The second step was aimed at gaining own practical experiences. Nedvang has organized, supported and financed several pilots in a number of municipalities. With these pilots Nedvang gathered many insights on how the collection in Netherlands would work in practice. These pilots have looked at the factors influencing the response rates, the experiences of the waste collection authorities, the amount of collected waste per household and if people did not mix their plastic waste with other materials. The results were presented in a report¹ and were a reason for the Minister at that time to broaden the targets from only plastic bottles to all plastic packaging. The pilots and a number of workshops resulted in a consensus about two useful methods for separate collection by the households:

1. Collection at the kerbside with the special bag.

¹ See report Onderzoek gemeentelijke inzameling kunststof verpakkingen (2008) research institute K+V.

2. Collection with special containers in the neighbourhood.

The next step was to take care of the main facilities behind the separate collection of plastic waste. For example sorting installations and storage sites were needed to deal with the stream of plastic waste before the real collection could start. When this was all arranged, the next step was to get the Dutch households started with the separate collection. This was the main aim of the Plastic Heroes campaign. This campaign was built up as follows: first posters were hung by Nedvang at bus stops throughout the country. The posters showed the plastic hero (the orange man) with texts like: I'm in your pen. The adviser of Nedvang indicated that for many people these posters were not clear and they also did not understand the meaning of these posters. But this was intended, because it would attract the attention of the households for the campaign. After this, they would explain the actual message the posters wanted to carry out. This message was that households are not aware of the fact that there is a lot of plastic in their daily life which can be recycled. Furthermore, this phase of the campaign was aimed at the awareness of households that it is not good to throw their plastic waste away, but that they have to collect it separately, because in this case it can get a second, third or even fourth life. Finally, the campaign was aimed at informing the households on how they should treat plastic waste. With help of the municipalities every household received a starter's kit with the necessary instructions. In the municipalities working with the special bag, the households even received a number of bags in their starter's kit. These Plastic Heroes bags are specially designed for the separate collection of plastic waste. But the adviser of Nedvang indicated that these bags are not necessary for the collection itself, but that they are distributed in order to make it easier for the households. Households could also use own bags. After the first wave of enthusiastic municipalities starting with the collection, a number of municipalities still saw some barriers. The adviser and his colleagues visited these municipalities to discuss these barriers. Eventually, almost all municipalities have started with the separate collection of plastic waste.

The introduction of separate plastic waste collection included several choices that had to be made. The first choice was: who will separate the plastic waste from the rest of the waste. Should households do this themselves or should the Waste Collection Authorities separate the plastic waste from the household waste stream after the collection of the mixed waste. The most authorities indicated that the first option is the best, because it results in the largest yield and the best quality of plastic waste. Nedvang also indicated that this system fits well with the standard in the Netherlands. Households are used to collect waste separately. The second choice that had to be made was which system the municipalities would implement. As the officials of the department indicated this choice had to be made by the municipalities themselves, because they knew what the households in the households in their town are capable of. Furthermore, the municipalities should also look at the systems that are already present for other waste streams, because the households are used to these systems. Nedvang also thinks that tailor-made solutions are necessary and gave the municipalities the advise to keep this in mind and to keep it easy accessible. The municipalities indicated that they think a combination of both systems is the best way of organizing the collection. For municipality One which uses the special collection containers, this was not possible because of budgetary reasons. They wanted that the collection would be budget neutral, so that the collection would not cost the households extra taxes. The official also indicated that there was great uncertainty about the funding of the collection, but also the continued existence of the collection itself. Therefore municipality One chose a system which was reversible and not permanently. This is done by using contracts with individual companies for the collection containers and for emptying these containers. Therefore municipality One is able to quit instantly with the collection, in case this is necessary. The official also indicated that the alderman did not want the use of the special bag for plastic. The municipality just abolished the use of a plastic garbage bag. The containers are placed on special 'waste islands' together with the containers for other waste streams in the neighbourhood of the shops. The municipality of Veenendaal did choose for the combination of systems, so the collection at the kerbside for the houses and the collection with the special container for the flats. They believe that the easier it is made, the more households are willing to collect their plastic waste separately.

Veenendaal also wanted that the collection would be budget neutral, but the collection should also fit the composition of the population and their daily life. The official doubted if aspects like the space it costs and the bad smell are taken sufficiently into account. Both municipalities indicated that the collection of plastic waste is not something completely new or different than the collection of other waste streams, but that it means an extra organizational structure besides the already existing structures. But they also indicated that the short-term agreements on the funding caused some caution in decision making. Both municipalities did not want to take too much risk which effects the implementation of the separate plastic waste collection. .

All authorities are satisfied with the Plastic Heroes campaign in their own way. The department indicated that they do not have a real opinion about it. They think that the campaign really convinced many households to start collecting. Therefore they are satisfied with the campaign. Nedvang is of course the creator behind this campaign, so they are satisfied. The municipalities are satisfied with the way it motivated the households, but they are less satisfied with the information that is given regarding to the treatment of the plastic waste which is collected. They think that there is some uncertainty about the treatment. The campaign should have paid more attention on explaining this, because this uncertainty is disastrous for the public support. Also the department indicated that it is important to continue explaining what happens with the plastic waste. According to the department the treatment happens as is agreed on and the 'VROM inspectie' monitors this, but it is a technical story that is difficult to explain to a broad public.

Both the Nedvang and the department of infrastructure and environment are very satisfied with the results of the separate plastic waste collection. The targets are more than achieved. Also municipality One indicated that the success is overwhelming. Very quickly after the introduction, they had to make extra arrangements, like an increased frequency on which the collection containers are emptied, but also the installation of bigger containers. Only Veenendaal is not satisfied with its own results. Per capita there is 12 kilos of plastic waste collected separately instead of the target of 16 kilos per capita, which is set by the government. Also still 50 to 60 % of the waste of the households consists of the recyclable waste streams biodegradable municipal waste, glass and plastic.

The authorities did not mention many ideas about what the separate collection really means for the daily life of the households. The adviser of Nedvang indicated that he thinks that the Dutch population is a nation which often is at the start very critical, but their complaints often fade away slowly until almost no one mentions it anymore. He thinks it is more important to retain this success by continuing the Plastic Heroes campaign, because the Dutch people fall back quickly into old habits. Municipality One indicated that collecting waste separately is not new. It also means that no new routines are needed, but only extra routines and facilities are needed. The only new routine that could be distinguished is recognizing plastic waste. The municipality of Veenendaal is now trying to pay more attention to this subject by forming an advisory board consisting of citizens. The enthusiasm for the initiative is very low, considering the fact that only 8 people answered the appeal of the municipality.

The authorities all mentioned that households collect their plastic waste separately because of environmental motives. All authorities recognized a more general development that the households nowadays have become much more aware of the consequences of waste on the environment. The households are aware that it is not good to deplete the resources of the earth and that it is desirable to recycle and reuse as much as possible. Waste is not seen as waste anymore, but as a new resource. This idea is not something completely new, but this development is already been underway for some years. Therefore collecting waste separately is seen as something completely normal. It is also mentioned that the attention for the separate collection of plastic waste has a reflection on the separate collection of other waste streams. They collect these waste streams also better separately. Another new development that is mentioned as an option by all authorities is that the waste

collection authorities will only take trouble for recyclable waste streams and that it will become more difficult for households to get rid of the rest of their waste.

By many authorities another development is mentioned. The agreement between the Dutch government and the packaging industry ends on January 1, 2013. Therefore a new agreement is needed after this date, but the negotiations continue painfully. Most important negotiating point is the funding of the collection, because the government wants to cut down on the waste fund, which consists of the package tax that is paid by the packaging industry. Especially the municipalities are worried about this development, because discontinuing of this policy could be disastrous for the public support that is built up for the separate collection in general until now.

4.2. Interviews with households

Besides the interviews with the authorities, 24 interviews have been conducted with households that do or do not collect their plastic waste separately. The transcriptions of these interviews are coded in relation to the three elements, image, competence and artefact, but also to the opinions of the respondents. These codes are used to make a figure for each interview that summarizes their story in relation to the separate collection of plastic waste. By comparing these figures on similarities and differences a number of groups are formed. This section describes these stories for each group while using these figures.

4.2.1. Households that are worried about the treatment of plastic waste

The first group of households that can be categorized consists of seven interviews of the ten interviews with households which use the special Plastic Heroes bag. The interviewees are mostly a bit older than the rest of the interviewees. Most of the households live in a house with a garden, except for one which lives in an apartment. The separate collection of plastic waste is related to a number of images they have. First they are aware of big environmental problems. They have heard all kinds of worrying stories about the environment on the news or from other media sources. These stories list many things that are not going well and this makes them worried. Sometimes these stories are also based on own experiences like a couple that went to Suriname a few years ago. There they saw that all the sewers were clogged with plastic waste and what consequences this had. The respondents are aware of these environmental problems and think that they themselves have to do something as well. Question is what and how they can do something about it.

The respondents indicated their concerns about the large amounts of plastic which are consumed by the households. They think that the use of plastic is unnecessary and disproportional. Vegetables like cucumber, carrot and bell pepper are mentioned as examples of things that are very often packed in plastic, which they think is not necessary at all. Furthermore they think that one layer of packaging is more than enough instead of the multiple layers they often see while going shopping. Also they indicate that many packaging is of a very good quality and that it will last for many years:

'...those bottles and packaging that almost look like a Tupperware product, where they can so to speak give ten years of guarantee for.' (Interview 4)

They are aware of the large amount of plastic waste this causes, which is not always necessary. Two couples have seen the large piles of plastic waste which are lying at the processing plants. They see this development as a problem for the environment. If it is not collected and treated properly, it roams in the environment for a long time, since plastic does not dissolve in the environment. For some households this generates some aversion to plastic. One man called plastic even a bad invention. Some households mentioned that they therefore already collected plastic bags and reused them until they are really broken. Other households indicated that despite these problems, plastic is a good material and also a necessity, especially for the storage life of food.

The separate collection of plastic waste is according to the respondents a good solution for these developments. One couple had already seen the separate collection of plastic abroad on a vacation in Germany, Belgium and Luxemburg. Collecting waste separately is generally seen as a good thing and therefore other waste is also collected separately by these households. But a number of respondents also indicate that preventing the use of plastic is much better. According to the respondents fewer resources are needed because of the separate collection. Furthermore it prevents plastic to end up in the environment where it does not dissolve. Therefore a good treatment of the plastic waste is a good idea. The respondents indicated that if they can help this process, they will help by collecting their plastic waste separately. Also because they are asked to do so by the municipality. But some see their contribution as a drop in the ocean and doubt if this has an effect.

These doubts are mainly related to the question if the plastic waste which is collected separately by these households stays separate during the treatment process of the plastic waste. They are afraid that it ends up with the rest of their waste in the incinerator and that it is not recycled as it is claimed by the authorities. They think that separate collection of plastic waste is only good and makes sense if the plastic waste is recycled and reused. A couple mentioned that the separate collection of glass as a good example. They believe that glass is no problem at all, because it is completely reusable. One woman also doubted if this way of plastic collection is the most efficient one. One respondent indicated that these doubts do not motivate him to collect his plastic waste separately, but none of the interviewees indicated that this is a reason to quit collecting. For one couple this was also because of religious reasons, as the man told:

'I think it is from our responsibility and that is also religiously determined, where we are on earth, appointed also as a steward over what the Lord has given us, in his creation, to take care of this as good as possible and it is my, our responsibility [he and his wife] if there is a possibility for keeping this nasty plastic as much as possible outside our environment [...] that this is our duty to do so.' (Interview 5)

He sees it as his responsibility and duty to do those things he is capable of doing, but he also indicated that this only applies to the things he can influence. Collecting his plastic waste separately is something he is capable of doing. Others also indicate that quitting will give them no positive feeling. It goes against their conscience to continue throwing their plastic waste away and not to collect it separately.

The respondents think that the authorities and the campaign Plastic Heroes did not pay enough attention to their doubts. There should be more attention to the treatment of the plastic waste because now there has risen a lot of uncertainty surrounding the separate collection of plastic waste. Furthermore they indicate that the campaign was unclear and not convincing. They did not understand the meaning of the little orange man which is used in the campaign. At the start of the campaign they wondered what this was and it is still not clear to them. Others indicate that the campaign was carried out too early, because the collection had not been implemented at that moment.

The separate collection of plastic waste is also seen as something that saves space by several respondents. As described earlier there is a large amount of plastic in circulation. The respondents experience this themselves too. Some respondents are even shocked by this amount of plastic waste. By collecting their plastic waste separately, they discover that the waste which a household produces largely consists of plastic waste. They indicate that it saves a large amount of space in their waste container. Several respondents saw this as an advantage. When for example they clean up the house they have more room in their waste container. Besides the space saving aspect, the separate collection of plastic waste also costs space. They indicate that since their plastic waste is not collected in their waste container anymore, they have to store a large amount of plastic waste

elsewhere. This costs a lot of space in their garden or apartment. One couple told that they flatten their plastic waste before they put it in the plastic bag. For many respondents this space issue is not a very big problem, because they have a garden. But for one couple that lives in an apartment this is a problem. This is related to the amount of times the waste collection authorities collect plastic waste per month. Many interviewees think that one time per month is not sufficient and this should be increased to two times per month.

As described above, all respondents indicated that the environment was important in relation to collecting their plastic waste separately. The respondents indicated that the environment is important for them. They are aware of the environment and they are trying to pay some attention to it with their activities. But as some emphasize that the environment does not dominate their lives and that they are no 'environment freaks'. Some respondents called their behaviour environmental friendly, but other respondents think that they are not. They indicated that they act normal and that they have a realistic view on paying attention to the environment.

For all the households the routines look quite similar and differed only in small details. For almost all respondents, the kitchen plays an important role in the separate collection. This is mainly because many plastic is entering the house via the kitchen like many food products, which often contain a lot of plastic packaging. Since these products are used in the kitchen, most plastic waste occurs here as well. This makes the kitchen also the central collecting spot within the house. One man indicated even that plastic waste on the first floor is not collected separately.

The separate collection of plastic waste starts with the identification of plastic waste in their daily waste. Some respondents indicated that everything is clear and that they have no problems with recognizing plastic waste, since the information which was provided was sufficient. Others found this identification difficult, since there are many forms of plastic. The households are not allowed to collect some of these forms. The respondents found it difficult to make this difference. Therefore some interviewees throw all forms of plastic in the Plastic Heroes bag. Others throw it away in the normal waste container instead of the Plastic Heroes bag in case they doubt.

The cleaning of plastic waste before keeping it separately is something on which the interviewees think differently. Some respondents are strongly against cleaning, because a lot of water and gas is wasted. This contradicts their idea that they have to help the environment. So they do not clean it and put it in the Plastic Heroes bag while it is dirty. This results in a bad smell and the plastic waste becomes also more attractive for unwanted animals. Other respondents think that the smell and the unwanted animals are good reasons to clean it anyway or even in some cases when it is very dirty to throw it away in the normal waste container instead of the Plastic Heroes bag.

As described earlier the respondents keep plastic shopping bags separate in order to reuse them. Many respondents keep such a shopping bag in the kitchen and put all the plastic waste which they collect in these bags. The respondents use these smaller shopping bags to collect their plastic waste within their house, because they do not want store the Plastic Heroes bag indoors. Often on a daily basis the respondents throw these bags away in the Plastic Heroes plastic bag which is often outdoors, for example in the garden or garage. In this way they 'reuse' the plastic bags as a sort of a garbage bin.

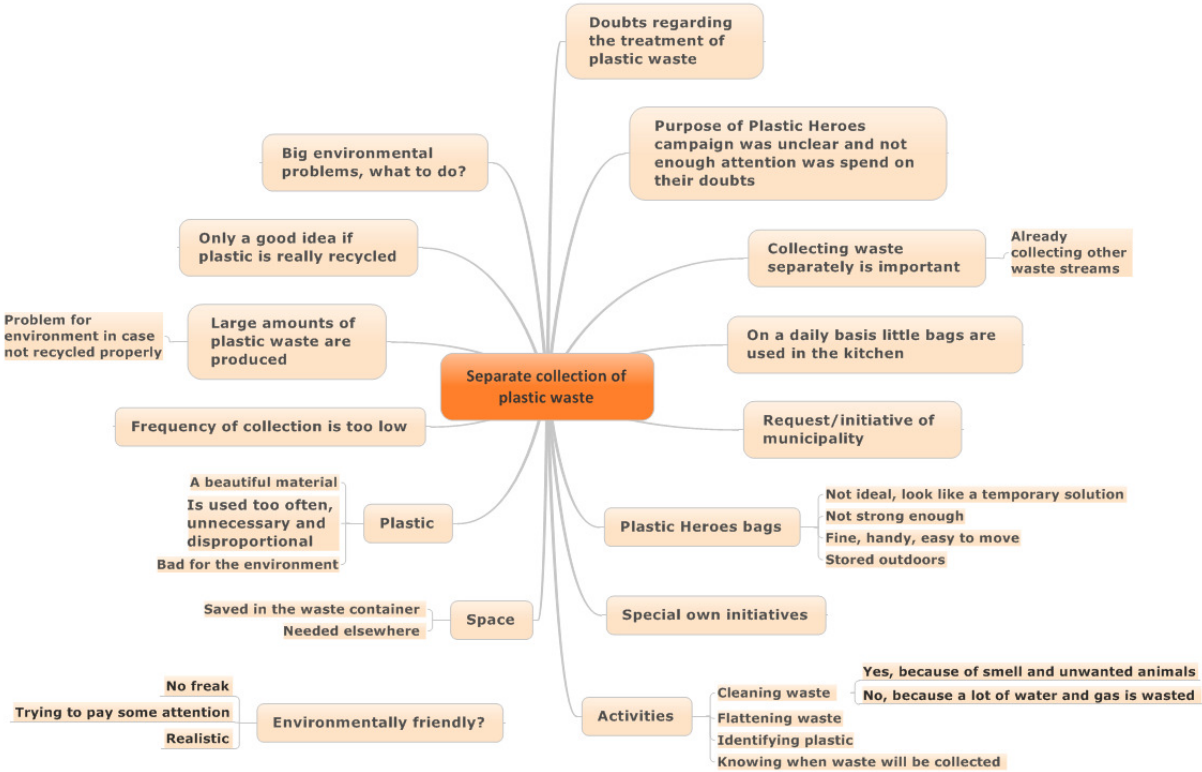
Some respondents put their plastic waste directly in the Plastic Heroes bag. This is because they keep the Plastic Heroes plastic bag just outside the kitchen besides the back door or in a storage room in case of an apartment and therefore they do not need a second bag in the kitchen

Some respondents indicated that it is important to know when plastic will be collected. They tell that they still do not know when to put the Plastic Heroes bag at the curbside. This is especially problematic when they have collected more than one bag. In case they miss the collection day, they

have to wait another month before the waste collection authorities collect the bags again. As described earlier, the collection is seen as very space consuming, therefore this could cause problems for those households. Therefore some interviewees indicated that it is sometimes necessary to bring the bags themselves to the civic amenity site. This is mostly due to misinformation, because they received the wrong garbage calendar.

The opinions on the Plastic Heroes bag differ for the interviewees. Some respondents think the bag is nice, strong and handy, since it is easy to move. They even prefer it over an extra container for plastic. Others see it as not ideal and as not strong, because it tears easily. One couple saw it even as a temporary solution, which is still existing. Some respondents have created creative solutions to store the Plastic Heroes bag. One man puts the bag in an old container which he did not use anymore. Another woman bought an antique garbage bin and placed it outside beside the backdoor. One couple made special hooks in the organic waste container. They also have a compost bin, so they do not use the container the whole year. But when they do need it, they also have a special standard for the Plastic Heroes bag. Figure 1 shows a summary of the main characteristics of this group, including the three elements.

Figure 1: Mindmap group 1



4.2.2. Households that do not have concerns about what happens with plastic

The second group consists of three interviews of the ten interviews with households which use the special Plastic Heroes bag. Figure 2 shows the main characteristics of this group and there are great similarities with the previous group. However there is one major difference, the households in this group do not have doubts regarding the treatment of plastic waste.

The respondents indicated that the main reason for collecting plastic waste separately is the environment. They have the idea that collecting waste separately is generally better for the environment:

'I think in any case it is better that we [...] separate what you can separate. (Interview 10)

They have the idea that it is in this way much easier to treat and recycle plastic waste, which is important, because plastic does not dissolve in the environment. By collecting plastic waste they can help the environment. One man remarks that he does not know if recycling is really better for the environment, but that it is stated that this is the case. Therefore he makes the assumption that it contributes to the environment. The respondents indicated that they see this contribution to the environment as an advantage, but they cannot mention any benefits the collection has for them personally.

So they think that the environment is important, but they do not think that they are environmentally friendly. One mother of two little daughters told that she thinks that the environment is important, because of the future of their children. She thinks that it must be possible for their children to live on a healthy earth as well. The respondents are trying to pay attention to the environment, but not in an extreme way.

The opinions on plastic are similar to those that are described for the first group. One man thinks it is an easy material for packaging. Another respondent indicated that plastic does not have an environmentally friendly image to him, because it is obtained from crude oil. They all agree that plastic is widely used and two of them indicated that they think this is unnecessary and disproportional. But two respondents indicated that in case it is recycled properly, this is not a very big problem. They all have the idea and therefore they differ from the previous group, that plastic is treated separately and eventually recycled. They did not indicate that they have their doubts about if this is really the case. However they do not know the precise technical story, but as one respondent told, she is also not interested in it.

Another reason that is given by the two respondents is that the municipality made it possible to collect plastic waste separately. They already knew that it was better and now they have the facilities which enable them to do it. Without this initiative of the municipality they still would not collect at this moment. The other respondent indicated that his mother was an important reason why he collects his plastic waste separately. He had moved from his parental house a few months earlier. There, all the waste already was collected separately and so he was used to collect it. He thinks it is normal to do it. The respondents all indicated that the Plastic Heroes campaign did not influence them in their choice to start with the separate collection. One respondent even did not know the campaign at all. The two other respondents that did know the campaign thought it was unclear or thought it did not convince her to start with the separate collection.

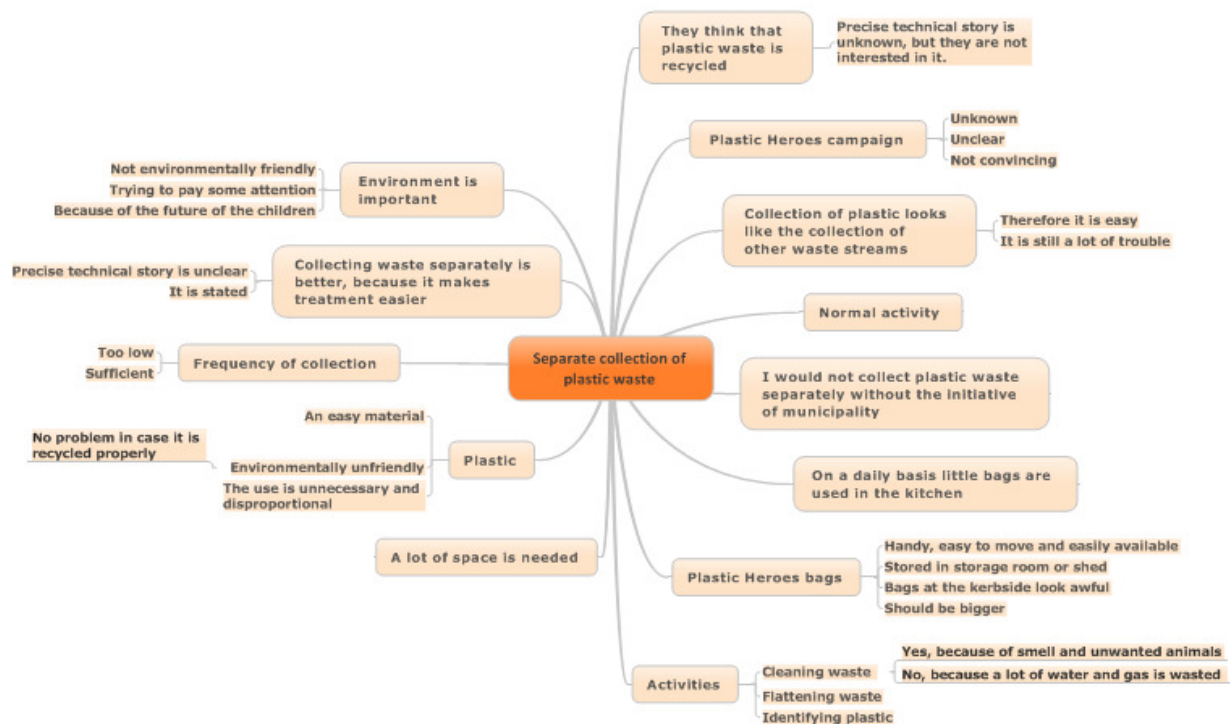
Again, the separate collection of plastic waste starts with the identification of plastic waste in their daily waste. And again for some respondents this is not a problem, but others indicate that they do have problems with it, because it is sometimes not clear. One respondent even told that she also put old toys in the Plastic Heroes bag. She was not aware that only plastic packaging material is allowed. Most respondents think that the collection of plastic waste looks very similar to the collection of other waste streams and that it is therefore quite easy. For one man it is however still a lot of trouble despite the fact that the collection of plastic waste looks very similar.

The cleaning of plastic waste before keeping it separately is also something on which the interviewees think similar to the interviewees from the previous group. So one throws everything in the Plastic Heroes bag, one cleans everything and one throws it in the normal waste container instead of the Plastic Heroes bag in case it is very dirty. But for these respondents the environment does not play a role in this story. The main reasons are: it costs too much time; it results in a bad smell and unwanted animals.

For all the three respondents the actual separation takes place in the kitchen. Here, two of them collect their plastic waste separately in a small bag. The other respondents keeps it there only for a

short time. All respondents bring the plastic waste to the Plastic Heroes bag, which is placed in the storage room, shed or garden afterwards. They indicated that this costs a lot of room, which is no problem, for those with a big shed and which is a problem for those living in an apartment. Once per month the Plastic Heroes bag is collected at the kerbside by the waste collection authorities. One man remarks that he thinks it looks terrible all those bags on the sidewalks. He also indicated that he thinks that the bags should be collected at the kerbside more often, since he collects a lot of plastic. For the same reason he thinks that the Plastic Heroes bag should be bigger. For the others, this frequency is sufficient and they think that the bag is easy to use, handy and easily available.

Figure 2: Mindmap group 2



4.2.3. Households which have a financial stimulus

There are also households with another reason than the environment to start with collecting their plastic waste separately, namely the financial advantage which these households have. The main characteristics of this group are shown in figure 3. In three of the five interviews, which have been conducted in municipalities where households have to bring their plastic waste to a centrally placed container, this financial advantage is mentioned as an important stimulus to start with the separate collection of their plastic waste. One respondent indicated:

For us this is very simple. It saves us a lot of money. (Interview 12)

The three households are situated in the same municipality, but in different municipal districts. This municipality has implemented a so-called Diftar-system. For these households it means that they have to pay each time their container is emptied by the Waste Collection Authorities. On the contrary it is free of charge to bring waste like glass, paper and plastic to the special containers in their neighbourhood. So it saves them money when they collect waste separately because it saves space in the container. This results in a reduction of the number of times that the container has to be emptied. One respondent showed how much he saves by showing the bills for the last three years:

'... And so with the gray [container] we were already careful and here you see fourteen, but now we manage it with ten per year. [...] because as you see: ten times emptying the

container costs sixty Euros, so each time that gray container is at the kerbside, this is six Euros, so this is quite worthy to say: ...okay we are going to do something about it.' (Interview 12)

One respondent lives next to his daughter and her family. By collecting plastic waste separately they did not need two containers anymore. This saves him the rental costs for his container. These three respondents indicated that this financial advantage creates a big incentive for them to start with collecting their plastic waste separately. All three interviewees indicated that they know it is important for the environment as well. But only one respondent admitted that if this financial incentive was not provided by the authorities, he would not be so precise with collecting separately. He also admitted that in that case more plastic would end up in his normal gray container. For the other two respondents this was not the case. One respondent told that since he had children he became more environmentally aware and that he would therefore also collect his plastic waste separately when there would be no financial incentive. Furthermore all three indicate that they do not think they are environmentally friendly.

The respondents see plastic as a good, handy or even great material. One respondent immediately makes the addition that this is only the case when it is reused. They agree that the use of plastic is immense. One respondent wonders if it is not possible to reduce the amount, partly because the plastic is of very good quality. The others do not think this is a problem in case it is reused. The interviewees indicate that they are not able to control if this is the case. They do not know exactly what happens with their plastic waste. One respondent hopes that the authorities will recycle it, because otherwise it will mean a loss of his efforts. The other two respondents do not doubt that it is recycled. The respondents indicate that it would be nice if they get some information about the treatment of their plastic waste. They ask us to collect, so it would be interesting to read something about it. This is not a necessity.

Related to this is the campaign of Plastic Heroes. For one respondent this campaign was unknown. It did not attract his attention at all. He indicated that collecting waste separately was not new to him. He already collected waste separately for a long time, so he did not need a campaign. The others indicated that they have seen it, but that did not impress them or influence them in any way. One respondent told that he lived in Houten first and that there was a pilot in this municipality. Back then he was asked to start with the collection and he did. He could not tell what his motives were at that time, but he never stopped since. The campaign occurred much later in the media.

The respondents indicated that they do not see the collection as much trouble to do. They do think that reuse and recycle is important and therefore they already collected other waste for a longer period. The collection of plastic looks quite the same to the collection of other waste according to them. It is something what can be done at the same time. They indicated that they are used to do it and therefore it is no problem. One respondent thinks that it nevertheless costs a lot of space.

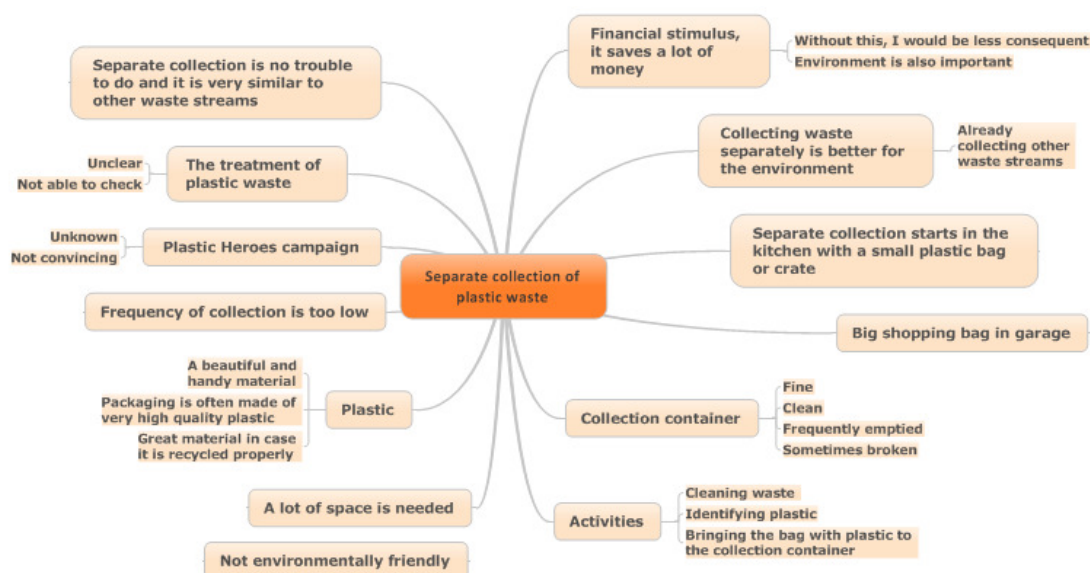
Again the separate collection of plastic waste starts with the identification of plastic waste. The respondent indicated that it is clear to them which plastic can be collected. The older respondent who lives next to his daughter must admit that he still makes a mistake sometimes. But this is corrected by his daughter or his grandchildren. Another respondent told that his son is not as precise as he and his wife. Therefore sometimes he has to pick up some plastic waste from his sons trash bin.

Only one respondent told that his grandchildren wash all the plastic waste that they collect. Main reason is that it will otherwise stink. This is because they collect plastic waste separately in their kitchen. In their kitchen they have a rack with crates. Each waste stream which is collected separately has its own crate. When they go shopping, they take these crates with them. The crates are emptied in the underground containers at the supermarket.

The other two respondents also collect their plastic waste in the kitchen. But they keep a small shopping bag in the kitchen or collect it on the doormat. On a daily basis the respondents bring the waste that is collected to their garage. Here they store the plastic waste in a bigger shopping bag. They gain these bags while shopping and reuse them in this way. During the weekly shopping they bring these bags with plastic waste together with other waste to the underground containers. They indicated that the collection of plastic waste is very similar to the collection of other waste. Therefore the respondents think that it is no trouble to do and that it is something that can be done at the same time.

The respondents are pleased with the underground containers for the collection of plastic waste. They think that they are a good solution and that they are working fine. One respondent thinks also that the containers remain clean. Furthermore, the respondents agree about the frequency that these containers are emptied. They think that the waste collection authority is doing this well. One remark is that the containers are sometimes broken because the system which should flatten the waste does not work anymore. But most of the time this is fixed very quickly.

Figure 3: Mindmap group 3



4.2.4. Households that are less motivated because of the doubts about the treatment of plastic

This group consists of two of the five households which have to bring their plastic waste to the special container. The first difference with the other three households that do this also, is that they do not have a financial stimulus like the other three households. In their municipalities there is no Diftar-system. Second, they have concerns about the treatment of plastic. Because of these doubts, they are less motivated which even has effect on the way they collect plastic waste.

They indicated that they think that collecting waste separately is useful and important. One interviewee told that she once saw a big field of plastic waste floating at sea and think that she had to do something about it herself. They both do not call themselves environmentally friendly, but they are trying to pay attention to the environment. But they do collect other waste, like biodegradable municipal waste, glass, paper and batteries as well. They collect plastic now as well, because the municipality asked to do it or made the collection possible. One respondent thinks that if it is asked, you should do it. The Plastic Heroes Campaign did not play a role in their decision to start with the

collection. One woman indicated that she still thought it funny. The other interviewee thinks it is childish and primitive.

Their opinions about plastic differ. One interviewee thinks that plastic is a beautiful product and that the world as it is nowadays cannot exist without plastic. The other respondent thinks that plastic is used too often. Nowadays almost everything is packed in plastic, especially the products that are sold in the supermarket. He indicated that in the past other materials, like paper were used as packaging. He thinks that there should be done something about it. He mentioned the possibility of biodegradable plastic that dissolves very quickly.

Like the first group of households, these respondents have many concerns which are related to the treatment of the plastic waste that is collected separately. One respondent indicated that his idea is that plastic is recycled, but that still many plastic ends up in the incinerator. The other told:

'Yes, I know that not much is done with it, so that is my big dilemma what I have with it. [...] So I simply know that not much is done with it, that it proceeds on one big pile.' (Interview 15)

She also wonders whether it makes sense to collect her waste separately. They both think that the Plastic Heroes campaign should have paid more attention to what really happen with the plastic waste that is collected separately. These doubts now have an effect on the way they collect, because these concerns do not motivate them. One respondent indicated that he always collects his plastic waste. But sometimes when his normal garbage bag is not full yet, he puts his plastic in this bag:

'...therefore I occasionally think: oh, my garbage bin; bag is not full yet and I still have some plastic, I throw it in it. Is it gone anyway.' (Interview 11)

The other respondent told that she only collects the big plastic packaging, like milk bottles. Smaller packaging, like the plastic film around a cucumber often ends up in the normal waste container. She still does not want to quit collecting completely, because she want to send the municipality a message that there are still people who think it is important to collect plastic waste separately.

Both respondents indicated that they think collecting plastic waste separately is difficult. One man thinks that the collection costs a lot of space. Not all waste should be collected separately according to him, because in that case it will become too much and also very troublesome for him. The other interviewee indicated that she thinks that she has to do everything herself and that she does not get enough support from the municipality. The municipality has only provided the container, but no facilities and equipment at home. For example, she has to take care for the collection bag herself. They both also indicated that they often forget to take their plastic to the container when they go shopping.

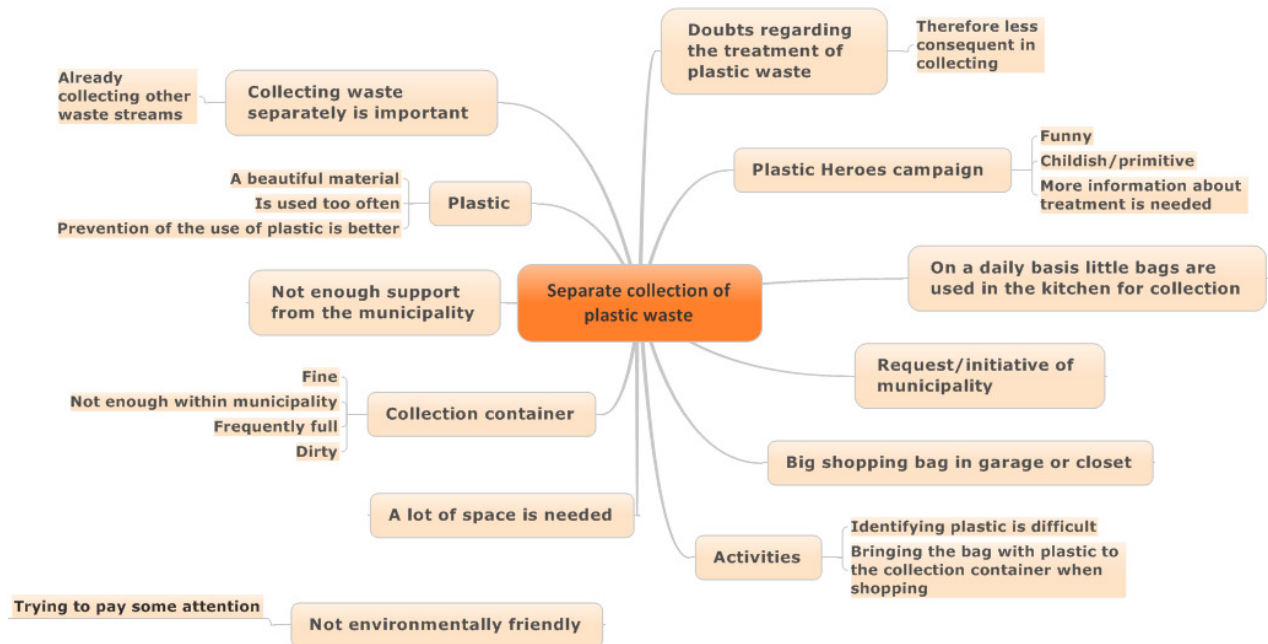
The two respondents collect their plastic waste both directly in a big shopping bag. So they do not use a small plastic bag in the kitchen, like the other groups. The man stores it in a closet, which causes a bad smell and the woman stores it in the garage. The woman indicated that the distance between the kitchen and the bag in her garage is a problem, because the collection of plastic often happens during cooking, therefore the bag is too far away. The shopping bag is also placed in a special box that stays in her garage when the bag is full. Often during the shopping they bring these bags with plastic waste together with other waste to the underground containers.

The identification of plastic waste is sometimes a problem for the respondents. They think it is sometimes difficult to decide if something is really plastic that is allowed to collect. One interviewee indicated that in case of doubt this plastic will end up in the normal garbage bin.

The two respondents do not agree about the special collection containers. The woman thinks it is fine, but that there are not enough containers in her municipality. The man thinks that the containers are dirty and often full. Also the gaps in the container are too small according to him.

Figure 4 shows that very similar to group 1, but the doubts regarding the treatment of plastic waste have in case of group 4 consequences for the willingness to collect plastic waste separately.

Figure 4: Mindmap group 4



4.2.5. Households that do not collect because of practical/logistic reasons.

There are also five households interviewed that do not collect their plastic waste separately. These households can be divided into two groups. The first group consists of four of the five households.

These respondents do not think that they are very environmentally friendly, but they also did not indicate that they are environmentally unfriendly. Some indicated that they to a greater or lesser extent try to pay attention to the environment and that they are environmentally aware. One respondent indicated:

'I am aware of the fact that certain things I do or we do as a family have consequences for the environment.' (interview 16)

Some indicated that they try to prevent the use of too much plastic or that they turn off the lights when they are not in the room or to turn the heater on a lower temperature. But this is not applicable for every respondent in this group. One respondent indicated that he does not pay any attention to the environment in daily life.

All respondents think that there is a relation between waste and the environment. The most commonly heard idea is that a lot of waste is not good for the environment. One respondent even called it naive to think that the waste you produced will simply dissolve. In relation to this, they are also positive about the recycling of waste, since there are fewer resources necessary. One even called it essential for the future in relation to non-renewable resources. Prevention of the use of plastic is mentioned as something that is maybe even more important than recycling by one of the respondents. Another interviewee also called the reuse of existing products important.

Their opinions about the material plastic are quite similar to those of households which do collect their plastic waste separately. The amount of plastic used is very big and sometimes disproportional. Very often plastic is used as packaging or plastic shopping bags are provided by shops. They think that very often this is not necessary. One respondent indicated that plastic often is mentioned in one breath with waste. It is also mentioned that the waste which a household produces largely consists of plastic waste. On the other side plastic is seen as a practical and handy material which is easily used to produce many things. But maybe plastic is not a good idea for disposable packaging, as one respondent indicated. The respondent thinks that biodegradable plastic and paper are maybe better alternatives.

Most of the respondents indicated that they think that plastic is recycled after it is collected separately by the households. Some also indicated that this is the only legitimate reason to ask the households doing it and therefore they hope that it is really recycled. This is something they cannot check. Most respondents are also not interested in the precise technical details. Only one respondent thought it would be nice to know what happens with it. Perhaps this will motivate him as well.

All respondents indicated that they are not unwilling towards collecting plastic waste separately. Many of them also collect other waste, like glass and paper separately. They are willing to do this for plastic too and often they know broadly how the collection is organized in their municipality, but they still do not do it because of practical reasons. Three of the respondents indicated that they do not know some important details of the separate collection which are crucial:

'I actually do not know where to bring it.' (Interview 17)

'I would not know where to go with it.' (Interview 19)

'[...] because in the beginning I wanted to do it, but then I thought: where do I have to drop the bag, because I could not find this.' (Interview 20)

Therefore they decided not collect it, because they do not have this information. The respondents also indicated that they are not unwilling to do it. But as long as this information is not clear to them, they are not able to collect their plastic waste separately.

One respondent told that it was because of, as he called it: logistic reasons. He lives in a house where the living room and the kitchen are on the first floor of the house. On the ground floor there are the garage and his office. There was no backyard. This lay-out of his house is the reason why he does not collect plastic waste separately. For the same reason they also are not very consequent with the collection of biodegradable municipal waste. He also indicated that:

'It is certainly not that we are unwilling to do so or that we are not aware of it, but it is just pure unhandy.' (Interview 16)

He indicated that the separate collection of plastic waste is very voluminous and that it needs a lot of space in the kitchen. But they already have little space for their kitchen items. Therefore they have only space for one big garbage bin and they do not want a second bin for plastic in their kitchen (this is something others also mentioned). They also do not see bringing their plastic waste on a daily basis via their living room downstairs to a bag, box or container as an option. So this lay-out of their house makes the separate collection very impractical for them. A house with a garden and a shed or garage would be much easier for them, according to him.

One respondent also indicated that he has now only one bin that is full after one week. He thinks that he does not produce much waste. So in case he places another bin for the plastic waste besides

the normal bin, it will take longer before both the bins are full, which could result according to him in an unpleasant smell in his kitchen. He does not like the idea of that.

The Plastic Heroes campaign is not known or difficult to remind by the respondents. One respondent thinks that repetition would have motivated some households, but not herself. Another respondent indicated that he thinks that such a campaign did not influence the general public. He generally sees this kind of campaigns more as a confirmation for those which already decided to collect that they are doing the right thing. He was already aware of the fact the collection is possible and this campaign has no added value to him.

All respondents do have one garbage bin placed in their kitchen which is emptied often weekly in case it is full. This is done in the normal waste container they have themselves or have together with their neighbours. One respondent told he is used to flatten this waste in order to put as much waste as possible in the bin. Biodegradable municipality waste is often not collected separately because of logistic reasons, as described before, or because there is no container for it, in case they live in an apartment. Glass, paper and cardboard are examples of waste which is collected separately by all the respondents. The respondents indicated that they are used to this. For some it is even strange not to do it. These things are collected already for a long time and it has become a habit and they think it is very normal. Glass is collected by the respondents by putting it in bags, boxes or in the sink cabinets. When they go shopping, they take the glass with them and throw it in a container. Most respondents think that these containers are fine. The only remarks that are mentioned are about too small gaps and the loud sound of the glass breaking. Often glass is also cleaned before keeping it apart. Paper and cardboard is mostly collected in a box which they store in the storage room. The two interviewees living in an apartment have a container in the basement, where they can empty their box. In the other case it is collected by the waste collection authorities at the kerbside.

Figure 5 shows the main characteristics of group 5 which are very similar to other groups, but with one difference, that these households do not collect plastic waste separately.

Figure 5: Mindmap group 5



4.2.6. Households which do not collect, because of laziness.

The last group consists of one of the five households that do not collect their plastic waste separately. The main ideas of this single respondent are summarized in figure 6. This respondent does not think he is environmentally friendly. Sometimes he thinks about the environment and the separation collection of plastic waste, especially when he again received a letter from his municipality about the collection. But he still does not collect plastic waste separately. His idea about the relation between waste and the environment is mainly about street litter. He thinks that it is the streets and the environment should be free of litter, because he thinks this environmentally unfriendly and annoying. In case he finds litter near his home, he will pick it up and throw it away.

He likes the idea of recycling plastic waste very much, but he also indicated that he is not convinced yet:

'...they still are not able to give me that proof.' (Interview 18)

He has often heard stories about waste that before it is treated or recycled it eventually still ends up on one pile and that it is not recycled at all. He has heard these stories for example from the cleaner at work who told that the little plastic coffee cups which his company collects separately also end with the rest of the normal waste. These stories also do not motivate him to start with the separate collection of his plastic waste. He also indicated that he is really curious to what exactly happens with the plastic waste which is collected. The Plastic Heroes campaign is also unknown to him.

Like many of the other respondents, he does not understand why so much plastic is used nowadays. He mentioned that there is a sheet of plastic between each slice of meat he buys. Another example are the teabags which are packed in both plastic bags and cartons. He thinks it is unnecessary to use this much plastic.

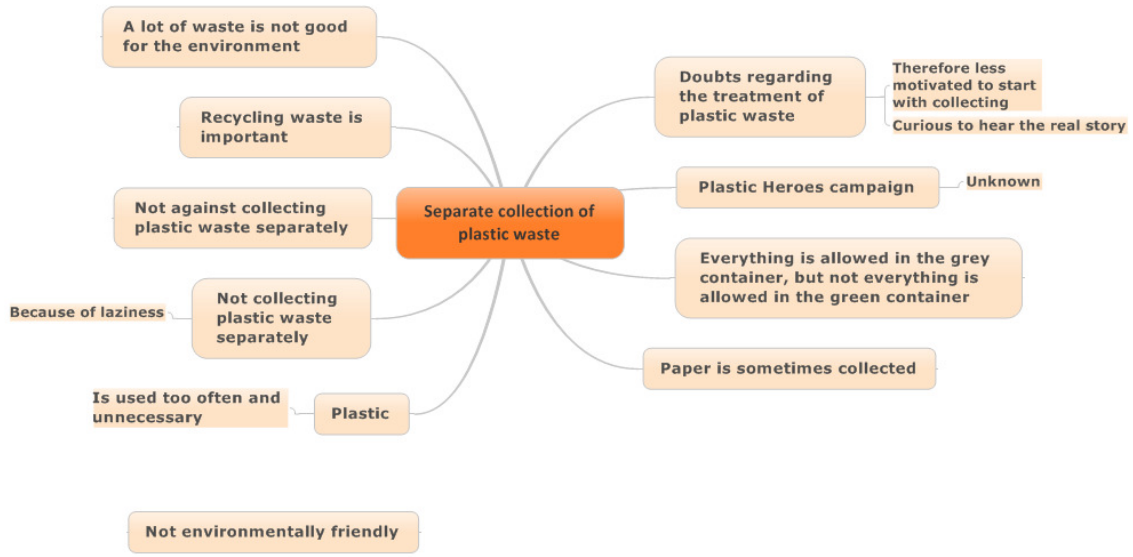
Although he knows how the separate collection of plastic waste is organized and even thinks this is a good way of collecting it, he still does not do it himself. His main reason is laziness. It is a lot easier to open his normal container and throw everything in it than to collect everything separately. He also has one principle:

'Everything is allowed in the grey one [normal waste container], but not everything is allowed in the green one [biodegradable municipal waste container].' (Interview 18)

This means that almost everything, like normal waste, plastic, glass, paper and even biodegradable municipal waste is thrown away in his normal waste container, but not everything is thrown away in his green waste container. It also means that he does not collect glass, paper and plastic on a regular basis. He also indicated that he does not have much glass to collect. He only collects paper when the music club comes and collects his paper. His biodegradable municipal waste sometimes ends up in his normal container, because he has a little green container which is full very quickly after a day of gardening in his big garden. Besides that he thinks it is a lot easier for him to throw everything in his grey container. He also does not want all kinds of different bins in his garage for glass, paper and plastic.

On the question what should change before he is willing to collect his plastic waste separately, he answered that he has to turn the switch in his head and to place four boxes in his garage for paper, glass, plastic and the rest and to start with collecting all waste separately. It is a matter of just doing it, but a good campaign about what happens with the plastic waste that is collected separately will help. He mentioned the collection of paper as an example of how this should be done. For this collection he can imagine how this process is working.

Figure 6: Mindmap group 6



5. Analysis

This research has used the theory of practices as theoretical background to investigate the separate collection of plastic waste. This theory sees a practice as a combination of three elements; image, competence and artefacts. In the previous section the stories of six different groups were described. These stories contain the three elements and in this section these elements are discussed. Since it is possible to make a distinction between existing or new elements this same distinction is used in this section.

5.1. Image

First element which is distinguished by the theory of practices is image. As described before this research sees this concept as: the associations which households hold regarding the practice, the meaning which the practice has for the households and the message they want to convey. Most images that can be identified in case of the separate plastic waste collection are related to two main themes. These themes are the environment and plastic as material.

A large number of images are related to the environment. First, the respondents indicated that they are aware of big environmental problems and they are wondering what they can do about it. Often this image is based on stories from the media or from own experiences. So the households are aware of problems and try to find ways to do something about it themselves. Often this should not be too much trouble. This also shows a second underlying image that the environment is important. Every household thinks this is the case, where it does not matter whether the households collect plastic waste separately or do not. They also agree on the fact that recycling of waste is important in order to save the environment. Furthermore households think that collecting waste separately is a normal activity to do and something you should or even must do. This image is often based on many years of experience with other the waste streams, religious reasons or because the authorities ask households to collect. These images are not new for the separate collection of plastic waste and already exist for other the practices, like the separate collection of other waste streams.

The second theme is plastic as material. The interviews with the households reveal that plastic has two faces. On the one hand, they see plastic as something positive. It is a beautiful material which it is very handy and easy to use as packaging material. But on the other hand, plastic does have a negative and environmentally unfriendly image. They agree on the fact that plastic nowadays is used very frequently. In the eyes of the households this is done too often. They think that the use of plastic often is unnecessary and disproportional. It is not always necessary to pack everything in plastic and disposable packaging often is made of too high quality as well. They think the large amounts of plastic waste that are produced are a very bad development. Therefore they see plastic as a problem for the environment in case plastic waste is not recycled and treated properly. Some also think that collecting plastic waste separately is only good option in case plastic is really recycled and treated.

It is remarkable to see that almost every interviewee agree on the images related to these two themes. Still, there are five interviewees which do not collect their plastic waste separately. So although they agree on these images, there are other reasons not to collect plastic waste separately. For these households these reasons are of practical or logistical nature.

Although the households think that it is important that plastic waste is recycled and treated properly after it is collected separately, it turns out that the treatment of plastic waste is unclear and uncertain for them. Many households have doubts about what is really happening with plastic waste. They are afraid that the plastic waste does not remain separate, but that it ends up in the incinerator together with other residential waste. These doubts are mainly based on stories that come from the media or for example the cleaner at work. Other households do think that plastic waste is treated

separately and recycled after collection. They do not see reason to doubt the treatment of plastic waste, but they do not know how this process really happens either.

For some households in municipalities that employ a Diftar-system, there also is another image. They see collecting waste separately as something which is financially attractive. Since they have to pay each time their waste container is emptied, it saves a lot of money in case they collect their plastic waste separately. This is not only the case for plastic waste, but also for other waste streams, like glass and paper.

Table 4 shows an overview of the images that can be identified in the case of the separate collection of plastic waste.

Table 4: List of existing and new images

| Existing images | New images |
|---|---|
| Big environmental problems. How can you do something about it yourself? | Plastic is a beautiful, easy and handy material for packaging |
| Environment is important | Plastic is used too much, unnecessary and disproportional |
| Collecting waste separately and recycling waste are both good for the environment | Large amounts of plastic waste are produced, which is a bad development |
| Collecting waste separately is a normal activity to do | Plastic is a problem for the environment if it is not recycled and treated properly |
| Collecting waste separately is financially attractive | Collecting plastic waste separately is only good if it is really recycled |
| | The treatment of plastic waste is unclear and uncertain. |

5.2. Competence

This second concept represents the skills and/or activities a household member has to know in order to perform the practice. Also in this case several skills and/or activities can be distinguished that are necessary .

The main activity related to the separate collection of plastic waste is separating recyclable waste streams from the rest of the waste. Households already do this for several other waste streams like biodegradable municipal waste, glass and paper and cardboard. Therefore this competence is not unfamiliar to the households. A skill which is new for the households is identifying the types of plastic waste that are allowed to collect separately. Sometimes it is not easy for the households to completely grasp which packaging is made of recyclable plastic and which is not, since in the eyes of the households the differences between these packaging are small.

Other activities which can be identified are flattening and cleaning plastic waste. This does not apply for every household, but some households mention these activities. Because of the large amounts of plastic waste that the households produce, some households think it is necessary to flatten it, so that everything fits into the bag. Also cleaning waste is an activity which some households do, because dirty plastic causes a bad smell and visits of unwanted animals. However there are also households which are strongly against cleaning plastic waste, because a lot of water and energy is wasted in this case. Both activities are not new, since other waste streams already know these activities as well.

Often plastic waste is first collected in small bags in the kitchen, but the next step is to bring it to the Plastic Heroes bag or other bigger bags. These bags often are placed in the garden, garage, shed or storage room in case of an apartment. Although this activity is new for the waste stream plastic,

households are used to do this already for other waste streams, like (biodegradable municipal waste and residential waste). The next step differs for the two different ways of collecting waste separately. Some households have to put their special Plastic Heroes bag on the kerbside. Therefore it is also important for them to know when and where precisely this should be done. Other households have to take their plastic waste to special collection containers when they for example go shopping. These activities are both not new activities, but both exist for other waste streams.

Another new activity that can be identified is keeping plastic shopping bag separate so that these bags can be used as collection bags within their kitchen. Also storing plastic waste until it is collected at the kerbside is a new activity. Many households indicated that the frequency of collecting the Plastic Heroes bag at the kerbside is too low and since a household produces a large amount of plastic waste, households are forced to store full Plastic Heroes bags for several weeks at home. Some households even bring those bags themselves to the civic amenity site.

It shows that many competences that are necessary for the separate collection of plastic waste are already present since they are necessary for other waste stream as well. The stories of the households that do not collect their plastic waste separately confirm this.

Table 5 shows an overview of the competences that can be identified in the case of the separate collection of plastic waste.

Table 5: List of existing and new competences

| Existing competences | New competences |
|--|---|
| Separating recyclable waste streams from rest of the waste | Identifying only plastic types that is allowed to collect separately |
| Flattening of waste | Keeping plastic (shopping) bags separate in order to use them as collection bags. |
| Cleaning of waste | Storing plastic waste until it is collected at the kerbside. |
| Bringing waste to special bags outside the house | |
| Putting the Plastic Heroes bag on the kerbside | |
| Bringing waste to the collection container | |
| Knowing on which day and where waste is collected | |

5.3. Artefact

Finally, the theory of practices distinguishes the material facilities which are essential for performing the practice. These facilities are represented by the concept of artefact.

In order to be able to collect plastic waste separately it is necessary that households have access to a number of material facilities. First of all it is good to mention that the kitchen plays an important role in the separate collection of plastic waste. Since food products are often packed in plastic, a lot of plastic is entering and leaving the house via the kitchen. The kitchen has become the central collection spot within the house.

The first artefact which can be identified is the Plastic Heroes bag. This is only for the municipalities that collect plastic waste at the kerbside. This bag is specially designed for the separate collection of plastic waste and is clearly recognizable because of an imprint of the Plastic Hero. Also a list is printed on the bag of the plastic items that are allowed to collect. The bags also have a little cord at the top by which the bag can be closed easily. Although households might use own bags, the Plastic Heroes bag are distributed in order to make it easier for the households. To make it even more

easily, the bags are available for free at local shops, like supermarkets. Since the bag is specially designed for the separate collection, it is a new artefact which was not known yet before the possibility of collecting plastic waste separately.

The special Plastic Heroes bag cannot be identified as an artefact for all municipalities, since some municipalities do not use it. For these municipalities another artefact can be identified. This is the special collection container. These containers are often placed in the neighbourhood of the shops together with the containers for other waste streams. Since these containers already exist for a longer period, households are very familiar with the artefact collection container. Therefore the collection container should be seen as an existing artefact. Since these municipalities do not provide the special Plastic Heroes bag, the households have to find an alternative themselves. They still need something in which plastic waste can be kept separate. Many households use a big bag or shopping bag which they have to arrange themselves.

Many households do not store the Plastic Heroes bag or big (shopping) bag in their houses. Therefore they place a smaller bag in their kitchen in which plastic waste can be collected. Often on a daily basis these bags are thrown away in the bigger bags which are placed in the garden, garage, shed or storage room in case of an apartment. Since in the old situation all waste is thrown away in a garbage bin, this smaller bag can be identified as a new artefact which is necessary for the separate collection of plastic waste.

Some households also came up with own special initiatives in order to make it easier to store the Plastic Heroes bag or the big shopping bags. Artefacts, like a special holder, crates, plastic boxes, an antique garbage bin or old waste container are mentioned by the respondents. These already existing artefacts have gotten a new purpose.

Table 6 shows an overview of the artefacts that can be identified in the case of the separate collection of plastic waste.

Table 6: List of existing and new artefacts

| Existing artefacts | New artefacts |
|------------------------------------|--|
| Kitchen as central collection spot | The Plastic Heroes bag or big (shopping) bag |
| The collection container | Small (shopping) bags within kitchen |
| | Special own initiatives |

6. Conclusion

This research investigated the separate collection of plastic waste in the Netherlands. As discussed before, it is remarkable that the separate collection of plastic waste is quite successful in the Netherlands. The separate collection is voluntary and it asks a change in the household's daily practices. This research was aimed to gain more insights in how the relative success of the separate collection of plastic waste in the Netherlands can be explained while focusing on the daily life of households. This is done by using the theory of practices, which sees practices as new combinations or reconfigurations of three elements; image, competence and artefacts. This led to the following research question:

How can the relative success of the separate collection of plastic waste in the Netherlands be explained while using the theory of practices?

In order to answer this question, this research has conducted 24 interviews. Four of these interviews were conducted with the main authorities who are related to the separate collection of plastic waste. These interviews were aimed at getting an impression on how the separate collection was set up in the Netherlands and which choices were important in this context. It turns out that the Dutch department of infrastructure and environment stands more on a sideline. The separate collection of plastic waste is a result of obligatory EU legislation, which is translated into a so-called 'producer responsibility'. This translation made the producers of packaging material responsible for the disposal phase of the plastic packaging. The department did not pay a lot of attention the consequences on the behaviour of households and let the Dutch packaging industry do the work. But the eyes of the European Union, they still are responsible for the separate collection of plastic waste in the Netherlands. Therefore the 'VROM inspectie' monitors and checks the compliance with the commitments that are made. On behalf of the Dutch packaging industry, Nedvang is the moving force behind the separate collection of plastic waste. Nedvang has prepared the complete introduction of the separate collection. This introduction included a number of pilots in different municipalities. The results of these pilots gave insight into the influence of factors like having a Diftar-system, the type of collection system, the amount of communication and the degree of urbanization on the response rates. The report also came up with two ways of collecting plastic waste which should be preferred. Since the actual implementation of the separate collection was a responsibility of the municipality, it had to choose which way of collecting plastic waste was most suitable for their households. The department and Nedvang agree on the fact that tailor-made solutions are necessary in this case. It turns out that these choices are often made by the municipalities that are interviewed on the basis of financial considerations instead of looking at the behaviour of the households. The authorities agree on the general statement that the easier it is made, the more households are willing to collect their plastic waste separately. It can be concluded that the authorities at the introduction paid little attention to the consequences of the collection on the behaviour of households.

Beside the interviews with the authorities, this research also conducted twenty interviews with households that collect their plastic waste separately and with households that do not collect their plastic waste separately. Within the stories of the households a number of images, competences and artefacts can be identified. The households think that the environment is important, but that there are big environmental problems. They see collecting waste separately and recycling waste as a good solution for these problems. Nowadays collecting waste separately is also seen as a normal activity to do. This is also confirmed by the idea mentioned by all authorities that the households nowadays have become much more aware of the consequences of waste on the environment. These existing images are combined with new images about plastic. They think that plastic is used too much, unnecessary and disproportional, which results in large amounts of plastic waste. This is a big

problem for the environment if plastic waste is not recycled and treated properly. It is remarkable to see that the image of an unclear and uncertain treatment of plastic waste has little influence on the behaviour of many households. Although some households do have doubts about the treatment, they still are willing to collect their plastic waste separately.

For the competences, it is true that a lot of existing elements are necessary for the separate collection of plastic waste. Many competences that are necessary for the separate collection of plastic waste were already known by the households since these competences are also necessary for other waste streams (see table 5 for examples). This makes the process of collecting plastic waste very similar to what one is used to do for other waste streams. However, it is for some households still difficult to recognize only those plastic types that are allowed in the separate collection.

The households only needed the extra material facilities. Since 2010 these are provided by the authorities. Examples are the Plastic Heroes bag and the special collection container. Existing artefacts, like the container were already well-known and combined with new artefacts. These new artefacts were not difficult to understand, since it does not involve high tech solutions.

So to conclude, how can the relative success of the separate collection be explained? As discussed before, it is possible to see new practices as new combination or reconfiguration of existing and new elements. Pantzar and Shove (2010) argue that the existing elements are 'out there' in the world, 'waiting' to be linked to other elements. The image that collecting waste separately helps the environment and the image that the environment is threatened from various directions are examples of already existing and well-known images which were 'out there'. These existing images are combined with the new image that plastic is also a threat. This results in the willingness of households to collect their plastic waste separately. Also a large amount of competences already were 'out there' which are also combined with several new competences. Although it also applies for the artefacts that existing and new artefacts are combined, there was one extra condition before the link between the artefacts and the other two elements really was possible. The artefacts were not available for the separate collection of plastic waste yet. And since the material facilities are now provided by the authorities, many households began with the separate collection of plastic waste. The separate collection of plastic waste can be seen as a new combination of mainly already existing elements combined with a number of new elements. This new combination resulted in a new practice. Without the one of these elements, it is very likely that there would have been another outcome, since these three elements really form this new practice.

The theory of practice seems to be a suitable method to investigate the case of the separate plastic waste collection. Like the case of bathing which is discussed by Shove and Walker (2010) the separate collection is not a usual topic for transition literature. It does not fit the scheme of the multi-level perspective, like bathing. Following the ideas of Shove and Walker (2010), the separate collection was not developed within a protected niche while "strategically managed by promoters seeking to establish this practice against the flow of an incumbent regime" (Shove, Walker 2010) and nor there was a battle between the separate collection and a competing socio-technical configuration. None of the struggles which one might expect from the multi-level perspective are found (Shove, Walker 2010). This shows that it could be very useful in research on sustainable transitions that ask for changes in everyday's life to focus more on the notion of practices. In this case it turns out that although the authorities have paid little attention to these three elements, the practice of collecting plastic waste separately emerged quite simply. However it could be very attractive to investigate the three elements, image, competence and artefact in the future in order to get an overview which existing images, competences and artefacts are out there already. This could make it easier to predict future outcomes of transitions. Therefore a recommendation that can be made is to look to a greater extent at the everyday's life of the users and also to involve the users in the transition process.

7. Discussion

This section will discuss the issues that occurred during the research process and how this research attempted to deal with these issues.

First phase of the research process was the data collection. For the data collection twenty interviews with the households were necessary. After interviewing the first ten households in the municipality of Veenendaal, it seems that the stories of the households looked very similar. The intention was to interview another ten households which lives in municipalities that are working with the special collection container. But in order to increase the likelihood of obtaining different stories I have decided to include five interviews with households that do not collected their plastic waste separately and to conduct only five interviews with households using the special collection container instead of ten which was intended. The idea was that these households only would differ from the first ten households in the elements, competence and artefact. The image would be very similar. Therefore, also households were contacted that live in municipalities that have implemented a Diftar-system.

This research is aimed at getting insight in the everyday's life of households, especially the plastic waste collection practices in households. Therefore it was important to include the stories of several different households and not to focus only on one household and to describe and identify all the views, opinions, images, routines and behaviours of households. It does not mean that this research is representative for all households in the Netherlands. An attempt was made to include as many different households as possible. So households with different characteristics like age, gender, number of members, type of dwelling, method of collecting and Diftar system or not, are included to increase the likelihood of obtaining different narratives. In order to make a representative sample, the sample should be much bigger. Because of practical reasons, it is not possible to interview such a large sample. Therefore a questionnaire would be a more realistic option in this context. But it is not possible to obtain the same information with a questionnaire as with an interview. And since this research focused on the stories of the households a questionnaire was no option for this research.

These households are contacted and asked for an interview in several ways. However it resulted in low response rates of households that were willing to cooperate. Therefore also acquaintances of households which already were interviewed are contacted. However, it was important that the households are not too much alike. Therefore it still was necessary to look carefully at the characteristics of the different households in order to obtain as many different narratives as possible.

This research used semi-structured interviews. So there was an interview protocol that consisted of a list of topics which are needed to know from the households. This means that there was no list with precisely formulated questions. It turned out that for some households it was difficult to articulate their story of the separate collection of plastic waste. They were even surprised to hear that this research was about the separate collection. Therefore in these cases it was difficult to get the information which was needed and extra questions were necessary. It still was necessary to prevent to steer the answers and the stories of the households too much. Other households were pleased to tell their story.

8. References

- AGENTSCHAP NL, 2011. *Samenstelling van het huishoudelijk restafval, resultaten sorteeranalyses 2010*. Report 1AFVA1101. Utrecht: Agentschap NL.
- BERGH VAN DEN, J., TRUFFER, B. and KALLIS, G., 2011. Environmental innovation and societal transitions: introduction and overview. *Environment innovation and societal transitions*, **1**, pp. 1-23.
- CBS, S., 06-12-2010, 2010-last update, Gemeentelijke afvalstoffen; hoeveelheden [Homepage of CBS], [Online]. Available: <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=7467&D1=1,91&D2=0&D3=7-16&HDR=G2&STB=T,G1&VW=T> [03-18, 2011].
- CHAPPELLS, H. and SHOVE, E., 1999. The Dustbin: A Study of Domestic Waste, Household Practices and Utility Services. *International Planning Studies*, **4**(2), pp. 267-280.
- COAD, A., DE HAAN, P. and WOERSDORFER, J.S., 2009. Consumer support for environmental policies: An application to purchases of green cars. *Ecological Economics*, **68**(7), pp. 2078-2086.
- GEELS, F., 2005. Co-evolution of technology and society: The transition in water supply and personal hygiene in the Netherlands (1850–1930)—a case study in multi-level perspective. *Technology in Society*, **27**, pp. 363-397.
- GENUS, A. and COLES, A.-M., 2008. Rethinking the multi-level perspective of technological transitions. *Research Policy*, **37**, pp. 1436-1445.
- GRAM-HANSEN, K., 2010. Standby consumption in households analyzed with a practice theory approach. *Journal of Industrial Ecology*, **14**(1), pp. 150-165.
- LEROY, P. and WIERING, M., 2007. Inhoudelijke ontwikkelingen, doelstellingen en uitgangspunten van het milieubeleid. In: P. DRIESSEN and P. LEROY, eds, *Milieubeleid, analyse en perspectief*. Bussum: Uitgeverij Coutinho, pp. 75-99.
- LINDÉN, A. and CARLSSON-KANYAMA, A., 2002. Voluntary agreements—a measure for energy-efficiency in industry? Lessons from a Swedish programme. *Energy Policy*, **30**(10), pp. 897-905.
- NEDVANG, 2011. *Monitoring verpakkingen. Resultaten 2010*. Version 7 September 2011. Nedvang.
- NEDVANG, 2010. *Monitoring verpakkingen. Resultaten 2009*. Version 28 October 2010. Nedvang.
- PANTZAR, M. and SHOVE, E., 2010. Understanding innovation in practice: A discussion of the production and re-production of nordic walking. *Technology Analysis and Strategic Management*, **22**(4), pp. 447-461.
- PLASTIC HEROES, 2011-last update, Waar moet ik het aanbieden? [Homepage of Stichting Nedvang], [Online]. Available: <http://www.plasticheroes.nl/recyclen/contents/waar-moet-ik-het-aanbieden%3F.php> [03-08, 2011].
- RECKWITZ, A., 2002. Toward a theory of social practices. *European journal of social theory*, **5**(2), pp. 243-263.

RENNINGS, K., 1998. *Towards a Theory and Policy of Eco-Innovation - Neoclassical and (Co-)Evolutionary Perspectives*. ZEW Discussion Paper 98-24. Berkeley: Center for European Economic Research (ZEW).

RIJKSOVERHEID, 20-04-2010, 2010-last update, Huizinga lanceert Plastic Power [Homepage of Rijksoverheid], [Online]. Available: <http://www.rijksoverheid.nl/nieuws/2010/04/20/huizinga-lanceert-plastic-power%5B2%5D.html> [03-08, 2011].

SCHATZKI, T., 1996. *Social practices: a Wittgensteinian approach to human activity and the social*. First edn. Cambridge: Cambridge University Press.

SHOVE, E. and PANTZAR, M., 2005. Consumers, producers and practices: Understanding the invention and reinvention of Nordic walking. *Journal of Consumer Culture*, **5**(1), pp. 43-64.

SHOVE, E. and WALKER, G., 2010. Governing transitions in the sustainability of everyday life. *Research Policy*, **39**, pp. 471-476.

SHOVE, E. and WALKER, G., 2007. CAUTION! Transitions ahead: politics, practice and sustainable transition management. *Environment and Planning A*, **39**(4), pp. 763-770.

SHOVE, E., WATSON, M., HAND, M. and INGRAM, J., 2007. *The design of everyday life*. Illustrated edn. Oxford: Berg Publishers.

SMITH, A., STIRLING, A. and BERKHOUT, F., 2005. The governance of sustainable socio-technical transitions. *Research Policy*, **34**, pp. 1491-1510.

VROM-INSPECTIE, 2010. *Recycling kunststofverpakkingen. Op weg naar een volwaardige kunststofrecycling*. Report 0098. Den Haag: VROM-inspectie.

9. Appendix

Appendix 1

Interview

- 4 Original quote:
'...die flesjes en verpakkingen die bijna op een tupperware product lijken, waar ze bij wijze van spreken gewoon tien jaar garantie op kunnen geven.'
Translation:
'...those bottles and packaging that almost look like a Tupperware product, where they can so to speak give ten years of guarantee for.'
- 5 Original quote:
'Ik vind het vanuit onze verantwoordelijkheid en dat is ook religieus bepaald, waar wij op aarde zijn, gesteld ook als rentmeester over datgene wat de Heere ons gegeven heeft, in zijn schepping, om daar zo goed mogelijk mee om te gaan en dan is het mijn; onze verantwoordelijkheid om als er een mogelijkheid is om dat smerige plastic...zoveel mogelijk buiten het milieu te houden [...] dat dat onze plicht is om dat te doen'
Translation:
'I think it is from our responsibility and that is also religiously determined, where we are on earth, appointed also as a steward over what the Lord has given us, in his creation, to take care of this as good as possible and it is my, our responsibility [he and his wife] if there is a possibility for keeping this nasty plastic as much as possible outside our environment [...] that this is our duty to do so.'
- 10 Original quote:
'Ik denk dat het sowieso beter is dat wij [...] scheiden wat je kan scheiden.'
Translation:
'I think in any case it is better that we [...] separate what you can separate.'
- 11 Original quote:
'...daarom heb ik wel af en toe van: oh mijn vuilnisbak; zak is nog leeg en ik heb nog plastic liggen, ik gooi het er maar in. Is het toch weg.'
Translation:
'...therefore I occasionally think: oh, my garbage bin; bag is not full yet and I still have some plastic, I throw it in it. Is it gone anyway.'
- 12 Original quote:
'Dat is bij ons heel simpel. Dat bespaart ons heel veel geld.'
Translation:
'For us this is very simple. It saves us a lot of money.'
- 12 Original quote:
'En...dus met de grijze waren we dus ook al voorzichtig en daar zie je veertien, maar nu halen we het met tien, per jaar. [...] want je ziet: tien van die inleveringen kost zestig euro, dus per keer dat die grijze aan de straat staat, is het zes euro, dus dat is best wel de moeite om te zeggen van: ...oké hier gaan we wat aan doen.'
Translation:
... And so with the gray [container] we were already careful and here you see fourteen, but now we manage it with ten per year. [...] because as you see: ten times emptying the container costs sixty Euros, so each time that gray container is at the kerbside, this is six

Euros, so this is quite worthy to say: ...okay we are going to do something about it.

- 15 Original quote:
'Ja, ik weet dat er niet veel mee gebeurd, dus dat is mijn grote dilemma er ook in. [...] Dus ik weet gewoon dat er niet veel mee gebeurd, dat het weer op één grote hoop verder gaat.'
Translation:
'Yes, I know that not much is done with it, so that is my big dilemma what I have with it. [...] So I simply know that not much is done with it, that it proceeds on one big pile.'
- 16 Original quote:
'Ik ben me wel bewust van het feit dat bepaalde dingen die ik doe of wij als gezin doen dat het gevolgen heeft voor het milieu.'
Translation:
'I am aware of the fact that certain things I do or we do as a family have consequences for the environment.'
- 16 Original quote:
'Het is zeker niet zo dat we niet bereid zijn om het te doen of dat we ons er niet bewust van zijn, maar het is gewoon puur onhandig.'
Translation:
'It is certainly not that we are unwilling to do so or that we are not aware of it, but it is just pure unhandy.'
- 17 Original quote:
'Ik weet eigenlijk niet waar ik het naar toe moet brengen.'
Translation:
'I actually do not know where to bring it.'
- 18 Original quote:
'...en dat bewijs hebben ze mij nog steeds niet kunnen geven.'
Translation:
'...they still are not able to give me that proof.'
- 18 Original quote:
'Alles mag wel in de grijze, maar niet alles mag in de groene.'
Translation:
'Everything is allowed in the grey one [normal waste container], but not everything is allowed in the green one [biodegradable municipal waste container].'
- 19 Original quote:
'Ik zou niet weten waar ik er mee heen moet.'
Translation:
'I would not know where to go with it.'
- 20 Original quote:
'[...] want in het begin wilde ik het wel doen, maar toen dacht ik van: ja waar moet ik nou die zak neerzetten, want dat kon ik nergens vinden.'
Translation:
'[...] because in the beginning I wanted to do it, but then I thought: where do I have to drop the bag, because I could not find this.'

Appendix 2 Transcriptions of interviews

Note:

The transcriptions of the interviews were provided as hard-copy to the supervisor and the second reader. But on request of the supervisor they are not included in this file.