

259 Plastic-free Tourism and Hospitality on Dutch Wadden Islands: Multi-level Design Approaches and Experiences

Marcel Crul¹

¹NHL Stenden University of Applied Sciences, Research Group Open Innovation. Rengerslaan 8, 8917 DD Leeuwarden, The Netherlands. marcel.crul@nhlstenden.com

Abstract

The Dutch Wadden islands Vlieland and Terschelling, as part of the greater Waddensea area in The Netherlands, Germany and Denmark, experience conflicting interests. On the one hand, as Natura 2000 area as well as UNESCO World Heritage area, nature preservation and biodiversity are very important. On the other hand, tourism is the main source of income on both islands, which is contributing to pollution, increased traffic, building activities and disturbance on the islands. Triggered by the MSC Zoe container loss incident in 2019 which led to littering with (amongst others) plastic products, plastic beads and polystyrene packaging on the beaches and in the dunes, the topic of reduction of plastic waste is high on the agenda of tourism and hospitality stakeholders on both islands and beyond. The research group Open Innovation of NHL Stenden University, Leeuwarden, is involved in several concerted approaches and activities during 2019 – 2021 towards the goal of plastic free tourism and hospitality, often in cooperation with other research groups of NHL Stenden: 1) Plastic free Vlieland: a set of connected pilot cases with tourism and municipal actors on Vlieland 2) Plastic free Hospitality project on Terschelling: cooperation with the main hotels on the island to have plastic free terraces and reduction and circularity in their kitchen and transport plastic waste 3) Project ‘Wad of Value’ biobased product alternatives for the Wadden islands 4) participation in the national Beach clean-up tour 2021 to measure the impact of the actions taken by beach restaurants involved in the tour 5) participation in the Community Plastic-free Waddensea to communicate all results with a larger group of actors, and 6) research proposal to measure and minimize the additional use of plastics in hospitality companies due to additional hygienic measures for COVID19. This paper analysis the results of these concerted and coordinated efforts on four elements: Multi-level design, circularity strategies, stakeholders involved and actual level of achievement. First results show that there is ample room for improvement in this sector. 1) Having plastic free terraces, restaurants and rooms is relatively easy. 2) However, plastic free kitchens, cleaning and transport is much harder to attain, and a combination with reuse and recycling of plastics is

required. 3) The islands also need new dedicated systems for recycling and (more so after the transition towards biobased materials) composting. 4) More and more biobased alternatives are becoming available, whereby the total environmental footprint is often worse than that of well recycled non-degradable plastics. However, littering and potential microplastics effects are usually not part of these assessments. 5) Impact measurement, especially for littered plastics, is still cumbersome and needs to be improved. 6) And lastly, due to COVID the use of plastics in the hospitality sector has increased, and it remains to be seen what the post-COVID situation will be due to changed hygienic attitudes of customers. By performing a concerted set of multidisciplinary projects and by involving many stakeholders along the way, synergy effects between the projects have been achieved.

Keywords: Circular, Plastic-free, Tourism, Hospitality, Multi-level design

Introduction

To the North of The Netherlands the Dutch Waddensea area is located, as part of the greater Waddensea of The Netherlands, Germany and Denmark. This area is the largest unbroken system of intertidal mud and sand flats in the world, and one of the last remaining of such systems where natural processes continue to function undisturbed. Not surprisingly, it is designated as UNESCO World heritage Area (UNESCO, 2021). The Dutch Waddensea area is also designated as protected Natura 2000 area (Dutch Ministry of Agriculture, 2021). Nature preservation and sustained biodiversity are very important for this area. In the municipalities of the Dutch Wadden Islands, tourism and related hospitality are the main economic activities, next to agriculture and maritime sectors. Nature and landscape are the key pull factors for tourism on the islands, and at the same time tourism contributes to negative environmental impact because of waste production, building activities, traffic and disturbance. Therefore, tourism development and nature conservation need to be closely aligned and tourism needs to be developed sustainably (Revier, 2013).

The emerging issues of plastics pollution, including the topics of plastic soup, littering of plastics on beaches and in nature area, and microplastics pollution have been drawing attention for some years now. On the Dutch Wadden islands, the attention for these topics rose sharply after the MSC Zoe container loss incident in January 2019. A total of 3.200 Tonnes of products and materials spilled from the damaged containers ended up in the North Sea and Waddensea, and part of it washed to shore on the islands Vlieland, Terschelling, Ameland and Schiermonnikoog. Among these were plastic products, plastic beads and packaging materials such as polystyrene (Strietman

et al. 2020). Normally, beachcombing after spillage is an exciting and profitable activity for inhabitants of the islands, but the sheer size of this disaster changed their attitude into concern for the environment and critique on the risk taken by the shipping company. Policy makers, tourism companies and inhabitants on the islands were triggered by the disaster and have since then strengthened their resolve to tackle plastic waste problems, supported by regional and national organisations. Next to taking action on plastic litter found at shores and in nature areas on the island, attention is also focused on the use and waste management of plastics in tourism and hospitality companies, in the villages and in households on the islands.

Dutch policy for the transition towards a circular economy has been in place since 2016 and is aiming at a fully circular economy in 2050, with a milestone of 50% reduction in 2030 (Rijksoverheid 2016). For plastics, a National Transition Agenda has been set with the same targets (Rijksoverheid 2018). A recent study estimates that it should be feasible to at least recycle 87% of plastic materials in 2050 (TNO 2020). A national execution program with a variety of projects has been started. Emphasis in Dutch policy programmes and projects is still on recycling of plastics (Ogink and Crul 2019, Partners for Innovation 2020). Based on the general gradation of circularity strategies made in literature (Kirchherr et al. 2017) recycling is less preferred compared to for instance refuse, reduce, and reuse strategies. Specifically for packaging plastics, of which most of the plastic waste from tourism and hospitality companies consists, a framework has been developed for innovative circularity, focusing first on elimination and reuse of plastics before applying recycling approaches (Ellen McArthur Foundation 2020).

The research group Open Innovation of NHL Stenden University of Applied Sciences has been extensively involved in projects with Wadden island communities over the years, especially on the islands of Vlieland and Terschelling. Together with the research groups Circular Plastics, International Tourism, and Sustainability in Hospitality and Tourism, and with students from several educational curricula, initiatives on plastic-free and circular plastics in tourism have been executed over the last three years. Six of these initiatives have been selected for analysis in this paper. In table 1, a brief overview of these is presented.

Table 1: Plastic-free and circular initiatives on Dutch Wadden Islands

Name of initiative	period	Brief description
(1) Plastic-free Vlieland	2019	4 design pilot cases with tourism and municipality actors on the island.
(2) Plastic-free hospitality Terschelling	2020-2021	Project with main hotels on the island on plastic-free terraces and reduction and circularity of plastics 'behind the counter (kitchen, logistics)

(3) Wad of Value	2020-2022	House of Design project on developing new replacement products from locally produced biodegradable materials
(4) Beach clean-up tour	2021-2022	Information campaign for beach cafes on plastic-free terraces and circular plastics
(5) Community Waddensea Plastic-free	2019-ongoing	Community with website, regular meetings and workshops in which all actor groups around this theme are gathered.
(6) Workshops with Tourism companies	2020-2021	Workshops and meetings with Tourism companies on sustainable welcome package, and on COVID impact on plastic use

For these initiatives, this research is focused on the different levels where change and innovation are needed. For instance, to reduce the use of plastics in a tourism company, changes are needed on different levels: Change or redesign of the product itself, so by the plastic product producer, changes in the supply chain towards the tourism company, changes in the materials used by plastic supplier or other industry, changes in the waste management systems of the company, municipality and region, and other societal changes such as preferences from users (guests of the hotel) and policy incentives and regulations by local, national and European governments. As an example of the last category, the ban on certain single use plastic products as of 2021 (EU 2019) has a direct impact on the purchasing choices of individual tourism companies. The application of such a multi-level design framework is described in the methods chapter below.

Methods

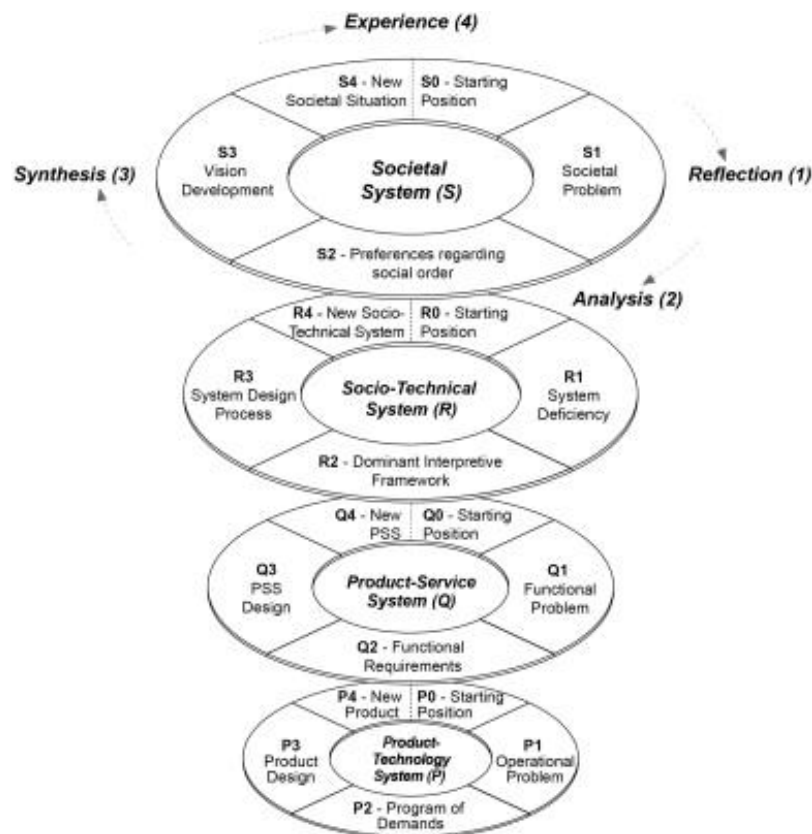
To be able to analyse the impact, effectivity, and efficiency of the presented initiatives on the circularity of plastics in the tourism sector on Dutch Wadden islands, a multi-pronged framework is developed based on the following four elements:

- Multi-level design elements used (1)
- Gradation of circularity strategies deployed (2)
- Diversity of stakeholder groups involved (3)
- Actual level (TRL estimate) of results achieved (4)

(1) For analysis of the innovation levels of the initiatives, the multi-level Design Model or MDM (Joore and Brezet 2015) will be used which was developed specifically for the analysis of complex societal transitions such as the transition to circularity, where

products, services, systems and policies have to be changed and (re)designed on all levels simultaneously. The model describes the design cycles in four different connected levels of systems, the product-technology system (P), the product-service system (Q), the broader Socio-technical system (R) and the overall societal system (S) as depicted in figure 1. For the analysis of the plastic-free initiatives, it will be identified which levels of the model were tackled.

Figure 1: Multi-level Design Model (Joore and Brezet, 2015)



(2) To determine the *strategies for circularity* that were used in the initiatives, a representation of the 9R hierarchical gradation has been adapted for circular plastics (see figure 2), allowing for replacement of plastics by biodegradable materials, now included as the fifth strategy.

Figure 2: 9R hierarchy of circular design strategies (adapted from Potting et al, 2016)

- (1) Refuse: preventing the use of raw materials;
- (2) Reduce: reducing the use of raw materials;
- (3) Reuse: product reuse (multiple use, second-hand, sharing of products);
- (4) Repair: maintenance and repair;
- (5) Replace: use alternative (biodegradable) materials

- (6) Remanufacture: creating new products from (parts of) old products;
- (7) Repurpose: product reuse for a different purpose;
- (8) Recycle: processing and reuse of materials;
- (9) Recover energy: incineration of residual flows.

(3) Since circular design in complex societal settings can only be achieved when all relevant stakeholders are involved directly in the process (Crul et al, 2019) a description of the number of relevant *stakeholder groups* is made for the initiatives, whereby the following categories are counted for each initiative: companies (F), consumers/customers (C); supply chain partners (S); researcher/designer/consultants (R); municipalities (L) , regional/national authorities (N), environmental/circularity organisations (E).

(4) Last, for each initiative the *actual realisation* is assessed. In many of the type of projects described in this paper, pilot projects are performed with companies and other stakeholders, where design processes are delivered up to a certain point, for instance the developing of a working prototype or new system. The actual introduction to the market of a product or actual implementation of a technical, logistic or social system is often not part of the project itself but left to commercial partners to follow up. To measure this, as a first estimate the TRL (Technology readiness Level) of the initiative is estimated, whereby TRL 1-3 = discovery, TRL 4-6 = development, TRL 7-8 = demonstration and TRL 9 = market deployment. In case of social or societal change, the TRL measure is used in that sense.

Results and Discussion

Narrative results

A short narrative summary of the results of each initiative is provided in box 1 – 6.

Box 1. Results Plastic-free Vlieland

Student group projects from the Master programme Design Driven Innovation and a BSc Graduation project Industrial Design were executed with various stakeholders on the island. (1) An awareness programme for children and their families on avoiding plastic waste was developed, starting with the ferry journey to the island. (2) A collection and composting system for the village was developed, anticipating the increase in biodegradable materials when substituting for plastics. (3) An entrepreneurs platform (support website and information system) for tourism companies was developed on use of and alternatives for plastic packaging (DDI 2019) (4) a new reusable transport packaging for tomatoes for hotels and restaurants was designed, avoiding single use packaging (Gort 2020). Working prototypes were developed in all these cases, no actual implementation of the systems was achieved up to date.

Box 2. Results Plastic-free Hospitality Terschelling

Eight hotels and restaurants on Terschelling joined the project to eliminate single use plastics on terraces and in the rooms, and to reduce plastics use in kitchens, maintenance, and logistics. Joint workshops were organised to exchange information and good practices. Guidelines were developed to take actions in the companies (Crul and Obinna, 2020). Actions feasible at short term were implemented, including plastic free terraces, largely required by the EU SUP directive (EU 2019). It should be noted that the paper and cardboard alternatives that are chosen often have a higher total environmental footprint than the plastic product used before. Reason for the replacement would then be the avoidance of plastic litter which is not biodegradable and the avoidance of microplastics. Plastic-free kitchens and logistics are harder to attain due to food safety and logistic requirements. A combination with transition to reusable plastic products and better recycling of the remaining materials is required. Parallel to this, workshops were organised with other stakeholders on the island on additional activities with the Tourist Information Office. A new information and awareness system was prototyped, using plastic waste from the beach for its token sign, the island's lighthouse (Dijkstra 2021). The project is still ongoing in 2021.

Box 3. Results Wad of Value

The research group is one of the partners of this project, together with other educational institutes, sector organisations, consultancies and companies, managed by House of Design. Its purpose is to develop and put on the market replacement products for plastic ones that end up in the Waddensea and on the beaches frequently. Selected products that are redesigned from biodegradable materials are fishermen's gloves and food containers. The project is ongoing. More and more of these biodegradable alternatives are becoming available. Also in this case, it is advisable to check on the total environmental footprint of the alternative and make an informed decision on its application.

Box 4. Beach Clean-up Tour

This is a yearly public clean-up event for all North Sea beaches in The Netherlands, several stages of which are at the Wadden islands (Beach clean-up tour 2021). This year it is proposed to be coupled with an information and workshop programme for beach bars and restaurants on plastic-free terraces and reduction of other plastics use. As a starting point an inventory will be made of plastic waste found at the beaches and dunes, and the impact of plastic reduction actions by beach bars will be measured. In the preliminary research, it became evident that measurement of total littering is still cumbersome and needs to be improved. This part of the project has not yet started and has no results to show yet.

Box 5. Results Community Waddensea Plastic-free

The Community is an active group of many stakeholders involved in initiatives concerning a plastic-free Waddensea. Stakeholders include knowledge institutes, local, regional and national governments, companies and consultants, societal organisations like museums and environmental/circularity groups. Next to a website, regular meetings and workshops, joint projects are developed and executed between the members (Plastic-free Wadden, 2021)

Box 6. Workshops with Tourism companies

As part of a project of the Research Group Sustainability in Hospitality and Tourism, workshops took place on plastic waste reduction and the development of a sustainable, plastic-free welcome package for tourism companies. Also, in the framework of proposal development, interviews were held on the effects of COVID19 measures on the use of plastics in the companies. There was an increase reported because of stricter hygienic measures and requests from guests, although the actual effect on prevention of virus infection because of increased packaging is not proven. This is preliminary information from interviews which is not yet substantiated by quantitative data.

Multi-level design elements used

The initiatives are analysed for the multi-level design levels included in the activities. The different levels product-technology system (P), product-service system (Q), broader Socio-technical system (R) and overall societal system (S) have been identified for each initiative. The results are presented in table 2.

Table 2. Multi-level design levels included in initiatives

Name of initiative	Multi-level design elements used P,Q,R,S
(1) Plastic-free Vlieland	P: Product development; Q: collection and composting system municipality; awareness raising campaign
(2) Plastic-free hospitality Terschelling	P: Product development; Q: Supply chain management; awareness raising campaign
(3) Wad of Value	P: Product development; Q: Supply chain management
(4) Beach clean-up tour	P: Product replacement; Q: Awareness raising campaign
(5) Community Waddensea Plastic-free	Q: project initiatives S: Overall societal system involvement and influence
(6) Workshops with Tourism companies	Q: Product-service development

As can be seen in table 2 the focus of the initiatives is on Product (P) and Product-service (Q) development (including awareness raising campaigns). The Community (5) is also touching upon the wider societal changes (S) since all relevant actor groups are involved and are exerting influence on national policy making. Missing level is the broader socio-technical system (R), which for instance would involve the overall plastics production and collection systems with the intention to divert the use to other materials and other types of product-services. This would involve an international, production and supply chain approach which is not included in the current projects that are more locally and regionally focused on the tourist companies as users of the plastic products.

Circularity strategies deployed

The initiatives are assessed for circularity strategies used by the 9R strategies system outlined in the methods section. The results are presented in table 3.

Table 3. 9R circularity strategies deployed in initiatives

Name of initiative	9R circular design strategies - see methods section
(1) Plastic-free Vlieland	(R1) single-use plastic-free terraces (R3) Reusable tomato packaging (R5) (R9) collection and composting system for biodegradable materials
(2) Plastic-free hospitality Terschelling	(R1) single-use plastic-free terraces (R2) reduction of kitchen plastics (R3) reuse of logistics plastics (R8) recycling improvement and use of recycled plastics of beach litter plastics
(3) Wad of Value	(R1) refuse of plastic products (R5) replacement by biodegradable products
(4) Beach clean-up tour	(R1) single – use plastic-free terraces (R8) collection for recycling
(5) Community Waddensea Plastic-free	Connection to all of the above projects and others on (R1) (R2) (R5) and (R8)
(6) Workshops with Tourism companies	(R1)(R3)(R5) for welcome Package; Intention to focus on (R2) reduction of use of additional packaging due to COVID hygienic measures.

A clear focus on preventing and reduction raw materials, especially for single use plastics, change-over to reusable products and replacement by biodegradable materials can be seen in the initiatives. Next to this, improvement of recycling and product from recycled materials is also part of some of the initiatives.

Stakeholders involved

The initiatives are analysed for their stakeholder groups involved, being companies (F), consumers/customers (C); supply chain partners (S); researcher/ designer/ consultants (R); municipalities (L), regional/ national authorities (N), environmental/ circularity organisations (E). The results are presented in table 4.

Table 4. Stakeholder groups involved in the initiatives

Name of initiative	Stakeholders involved
(1) Plastic-free Vlieland	(F) tourism companies (R) researcher + student groups (L) Municipality Vlieland (C) guests, tourists
(2) Plastic-free hospitality Terschelling	(F) hotels and restaurants, Jutfabriek (R) research groups + students (E) Circulair Friesland, Milieujutter
(3) Wad of Value	(F) material companies (R) research, consultants,

	education (E) Circulair Friesland
(4) Beach clean-up tour	(F) beach restaurants (S) to some extent- supply chain (C) tourists (R) researchers, consultants (L) municipalities (E) Stichting Noordzee
(5) Community Waddensea Plastic-free	Multiple (F)(R)(L)(N)(E)
(6) Workshops with Tourism companies	(F) hotels (S) supply chain (R) research groups (E) Circulair Friesland

In all initiatives combined, there is a broad involvement of all relevant stakeholder groups. Involvement of supply chains partners, which are considered relevant for structural change is limited to two initiatives.

Actual realisation

The initiatives are analysed on their actual realisation impact by means of an estimate of the TRL (Technology Readiness Level), whereby TRL 1-3 = discovery, TRL 4-6 = development, TRL 7-8 + demonstration and TRL 9 = market deployment. This is also used in the social and societal sense where applicable. The results are presented in table 5.

Table 5. Actual realisation level of initiatives by TRL stage

Name of initiative	Actual realisation level (TRL stage 1-9)
(1) Plastic-free Vlieland	TRL 5 Prototypes presented and partially tested. TRL6 working prototype for tomato packaging.
(2) Plastic-free hospitality Terschelling	TRL9 First market deployment for plastic free terraces; TRL7 Demonstration of plastic use reduction in kitchen/logistics TRL 6 Working prototype for awareness programme sign
(3) Wad of Value	TRL3-4 discovery and development of biodegradable products
(4) Beach clean-up tour	TRL9 First market deployment for plastic free terraces; TRL 5 development of alternative products
(5) Community Waddensea Plastic-free	Not applicable directly in Community work
(6) Workshops with Tourism companies	TRL 4 development welcome package TRL1-2 discovery plastic reduction COVID hygienics

In the initiatives full realisation is achieved primarily with the introduction of plastic-free terraces in tourism companies. Most other initiatives show results in development (prototypes) or early demonstration phases.

In table 6, all results on the four analytical elements are presented combined for the initiatives. Please refer to tables 2-5 for the abbreviations used.

Table 6: combined impact analysis for initiatives

Name of initiative	Multilevel	9R strategies	Stakeholders	TRL phase
(1) Plastic-free Vlieland	P,Q	R1,R3, R5,R9	F,C,R,L	TRL5 TRL6
(2) Plastic-free hospitality Terschelling	P,Q	R1,R2,R3,R8	F,R,E	TRL6 TRL7 TRL9
(3) Wad of Value	P,Q	R1,R5	F,R,E	TRL3-4
(4) Beach clean-up tour	P,Q	R1,R8	F,C,S,R,L,E	TRL5 TRL9
(5) Community Waddensea Plastic-free	Q,S	R1,R2,R5,R8	F,R,L,N,E	N A
(6) Workshops with Tourism companies	Q	R1,R2,R3,R5	F,S,R,E	TRL4, TRL1-2

The scores on the combination of initiatives shows a wide and relevant coverage for the requirements identified for different impact aspects.

Conclusions

Six initiatives on plastic-free and circular tourism companies on Dutch Wadden islands, ranging from a community of practice to implementation projects. were analysed on their joint impact on multi-level design, circularity strategies, stakeholder involvement and level of achievement. It can be concluded that for this sector, there is still ample room for improvement in this area. Plastic-free terraces, rooms and restaurants ('before the counter') are relatively easy to achieve, although the requirements for hygienic measures for COVID19 have again increased the amount of plastics used. It remains to be seen whether this is a temporary situation or hygienic attitudes of customers have changed. Plastic reduction in kitchens, maintenance, and logistics ('behind the counter') is harder to achieve but steps up in circular use of the materials is certainly possible on the short term. For all these changes, actions on all levels of the system are necessary. The projects mainly dealt with the levels of product-technology system and product-service system design. More emphasis and activities are needed on the higher levels of the broader socio-technical system and overall societal system. For this, other stakeholders need to be involved such as plastics industry, recyclers and national and European government. Up to now, a good mix of regional and local stakeholders has been involved. This has made the projects successful, but at the same time the opportunity for higher level impacts is lacking.

Circularity strategies deployed were ranging from refusal, direct reduction and reuse of plastic products to replacement by biodegradable products and recycling. The latter strategies require a good understanding of the total environmental impact of the changes made, since these alternatives or recycling systems often have a higher total impact. However, littering and potential microplastics effects are usually not part of these assessments. In general, this assessment is not considered enough. Although several of the initiatives show promising implementation of innovative measures, these are often 'low hanging fruits', and more costly and/or complex solutions are only piloted or one-time demonstrated. More follow-up projects on actual market implementation and supply chain building are necessary.

References

Beach Clean-up tour, 2021. Website of the tour <https://www.beachcleantour.nl/> (Accessed July 2021)

Crul, M., P. Joore and S. Celik, (eds.) 2019. Teaching Circular Design: Professional Development Course. Circular Design/L4IDS, EU Erasmus+ publication.

Crul, M. and U. Obinna, 2020. Guidelines on Reduction of Single Use Plastics and Circularity of Plastic Products in Hospitality and Tourism. NHL Stenden University of Applied Sciences report.

DDI, 2019. Master reports Vlieland Plastic-free. Master DDI, NHL Stenden University of Applied Sciences.

Dutch Ministry of agriculture, 2021. Natura2000 list of Dutch areas. <https://www.natura2000.nl> (Accessed July 2021).

Dijkstra, L., 2021. Zwerftoren – Terschelling Plasticvrij (In dutch). BSc Graduation Report Industrial Product Design. Hanze University of Applied Sciences, Groningen.

Ellen McArthur Foundation, 2020. Upstream Innovation: A Guide to Packaging Solutions. Ellen McArthur Foundation Report.

EU, 2019. Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment.

Gort, A., 2020. Circulaire Verpakking voor Horecaondernemers (in Dutch). BSc Graduation report Industrial Product Design. Windesheim University of Applied Sciences, Zwolle.

Joore, P., Brezet, H., 2015. A Multilevel Design Model: the mutual relationship between product-service system development and societal change processes, Journal of Cleaner Production vol 97.

Kirchherr J., D. Reike, M. Hekkert, 2017. Conceptualizing the circular economy: An analysis of 114 definitions. *Resources, conservation and recycling*, volume 127 pp 221-232.

Ogink, Judith and Marcel Crul (2019) Industrial experiences with circular product design of plastic products. ERSCP 2019 Proceedings, Barcelona.

Partners for Innovation, 2020. Actieplan Toepassen recycLaat (in Dutch). <https://partnersforinnovation.com/wp-content/uploads/2021/02/20201126-Kernboodschap-Actieplan-Toepassen-RecycLaat-definitief-002.pdf> (accessed July 2021)

Plastic-free Wadden, 2021. Website of Community Plastic-free Waddensea (In Dutch) <https://plasticvrijewadden.waddenzee.nl/> (accessed July 2021)

Potting J, Hekkert M, Worrell E and Hanemaaijer A, 2016. Circular Economy: Measuring innovation in product chains. PBL Netherlands Environmental Assessment Agency, The Hague.

Revier, H. (2013). Nature conservation and tourism development in the Dutch Wadden Sea region: a common future? In A. Postma, I. Yeoman, & J. Oskam (Eds.), *The Future of European Tourism* (pp. 177-193). Leeuwarden, the Netherlands: European Tourism Futures Institute.

Rijksoverheid, 2016. Nederland circulair in 2050 (In Dutch). <https://www.rijksoverheid.nl/onderwerpen/circulaire-economie/nederland-circulair-in-2050> (accessed July 2021)

Rijksoverheid, 2018. Transitieagenda Kunststoffen (In Dutch). <https://www.rijksoverheid.nl/documenten/rapporten/2018/01/15/bijlage-3-transitieagenda-kunststoffen> (accessed July 2021)

Strietman, W.J.; Heuvel-Greve, M.J. van den; Brink, A.M. van den; Groot, G.A. de; Skirtum, M.; Bravo Rebolledo, E.L.; Koffeman, K.J. (2020). Resultaten bronanalyse zwerfafval Griend. (In Dutch) Wageningen Economic Research rapport 2020-057 – ISBN 9789463954921 - 61

TNO, 2020. Routekaart naar Circulaire Plastics (In Dutch) <https://www.tno.nl/nl/over-tno/nieuws/2020/11/routekaart-naar-circulaire-plastics/> (Accessed July 2021)

UNESCO, 2021. World Heritage List. <https://whc.unesco.org/> (accessed July 2021).