



Getting Ahead with a Successful Chain Approach

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Section 1 Chain approach: good for both environment and industry

Over the past few years, the Ministry of Housing, Spatial Planning and the Environment (VROM), in collaboration with Agentschap NL, has gained extensive experience of a new way to apply waste policy in the Netherlands: the chain approach. The initial results are encouraging, for the environment as well as for the companies taking part.

The problem: limits of traditional waste policy

The traditional waste policy has produced many benefits for the environment during the past few decades, mainly from the separated collection of waste and from recycling. However, this traditional policy is focused largely on the final stage in a material chain, the point where a product becomes waste. Possibilities for obtaining still more benefits for the environment during this final stage are starting to become quite rare.

Moreover, the traditional policy itself has defects. It focuses on one stage in the material chain, whereas a combined approach that involves the other stages as well is often more efficient. For example, it can be considerably less costly to eliminate a particular toxic substance from the product design, early on in other words, so that this substance no longer has to be extracted with a lot of difficulty during the waste stage.

Another problem is transference, where a measure focused on one stage in the material chain sometimes adversely affects other stages. Trying to achieve the goal of 100% recycling can consume extra energy for example. Although this produces an environmental benefit in that fewer primary raw materials are needed, the benefit is partly negated because collecting and processing the material to be recycled cost energy.

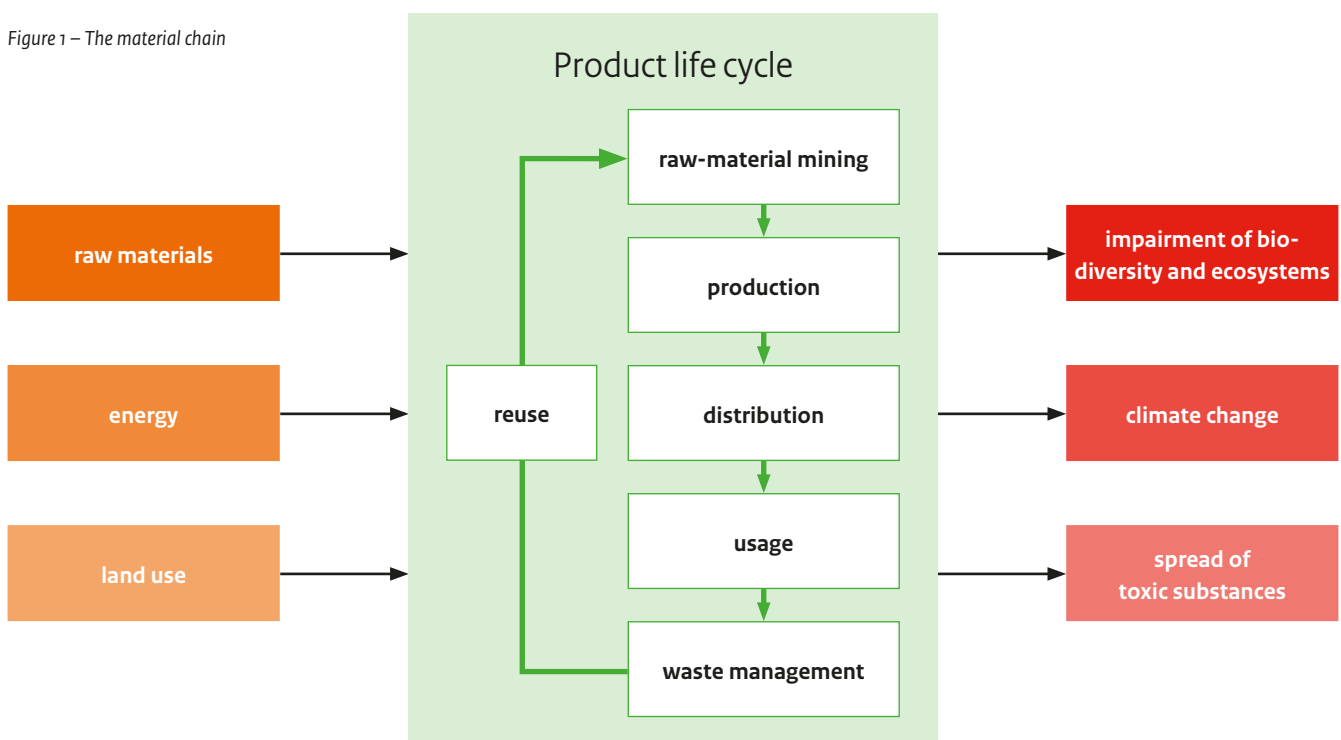
The solution is to use the entire chain as starting point

The chain approach considers the material chain as a whole, all the stages in the life cycle of a product or material. From raw-material mining, production and use, to waste and possible recycling.

The chain approach identifies the stages in the material chain where the greatest environmental benefit can be obtained efficiently and the necessary actions for realising this benefit. Of importance in this context is that the environmental benefit in one stage does not cause a higher environmental impact for another stage or another chain.

Figure 1 shows the environmental impact of a material chain. The cycle not only consumes raw materials, energy and land for the manufacture and use of a product; it also produces an

Figure 1 – The material chain



environmental impact, with adverse consequences for biodiversity and ecosystems, the greenhouse effect, and the level of manuring, acidification and toxicity.

The projects: seven material chains

Since 2009, projects have been running in seven material chains. When selecting these chains, VROM studied the environmental impact each one, the feasibility of reducing its environmental impact, and the willingness of companies in the chains to innovate and collaborate. The Ministry's aim is to realise a substantial environmental benefit by adopting the chain approach. The defining target for these material chains is a reduction of 20% in their environmental impact by 2015.

The material chains selected are:

- textiles
- paper and cardboard
- construction and demolition waste
- aluminium
- PVC
- bulk domestic waste and residues
- food

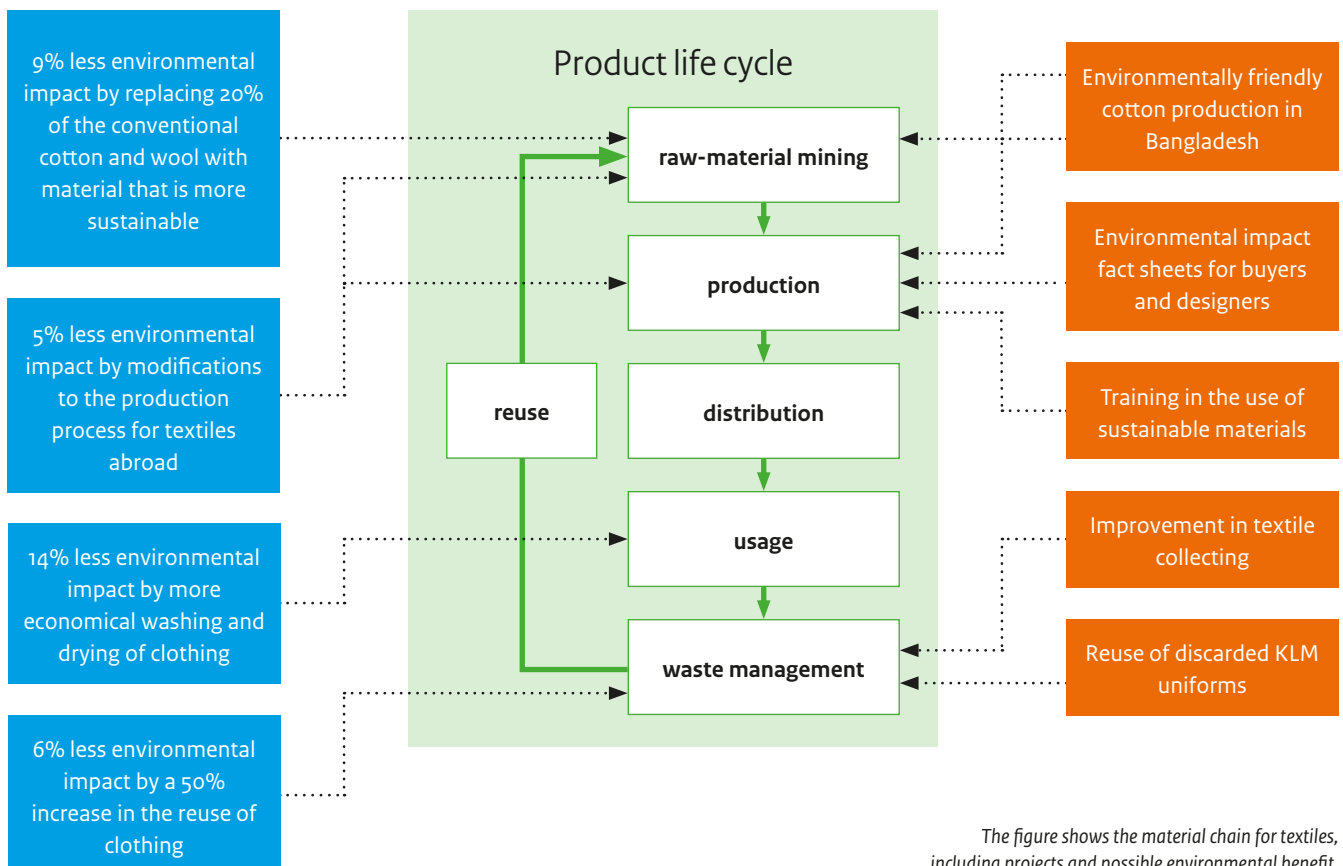
Overview of the chain approach

Traditional environmental policy mainly considers individual sectors and stages in a material or product chain.

The chain approach:

- considers the material chain as a whole
- takes into account all environmental effects of the entire chain
- increases the effectiveness of environmental policy by intervening precisely where the most environmental benefit can be obtained
- prevents a measure applied to one stage from having an adverse effect on other stages in the chain

Figure 2 – The textiles chain: projects and potential environmental benefit



The figure shows the material chain for textiles, including projects and possible environmental benefit.

Collaboration between government and industry

With the chain approach, government and industry jointly ensure a cleaner future. The government plays a facilitating role here, bringing market parties together, carrying out studies and providing financial support. Industry then implements the necessary changes, making sure the burden on the environment is actually lessened. Section 2 contains more information on the collaboration between government and industry.

Much has been achieved and learnt in the recent past, with some projects having trouble getting started, while others turned out highly successful. VROM is now taking stock of the next phase: implementing improvements throughout the chain and at all companies.

On route to sustainable materials management

The chain approach is a key factor in making the way materials are managed in the Netherlands more sustainable. The associated policy commenced with the project “Naar een ketenaanpak in het afvalbeleid” [towards a chain approach for waste policy]. Six pilot projects kicked off at the end of 2007, with the aim of gaining experience in the chain approach.

Landelijk Afvalbeheerplan 2009-2021 [the national waste management plan for the period mentioned] later announced the program “ketengericht afvalbeleid” [chain oriented waste policy] in 2009, resulting in a variety of projects in seven material chains, as described in this document.

Cars: an example of the chain approach

Cars produce a strong impact on the environment, mainly from their exhaust gases (CO₂ and particulates). As such, cars put the greatest burden on the environment when they are in use. Effective measures to tackle this burden concern the design and use of these vehicles. Examples include cleaner engines, electric engines, lighter cars and a different, more economical style of driving.

From the perspective of the chain approach, it is immediately clear that measures applied to one stage in the chain have an effect on the environmental impact of other stages. Accordingly, the use of electric cars increases the demand for new types of battery, which in turn has environmental implications relating to the mining of metals that are difficult to obtain. At the end of their useful life, moreover, these batteries have to be processed using environmentally friendly methods. The trick is to limit this transference as much as possible. This is where the power of the chain approach lies.

Section 2 Government-industry collaboration

The initial results from the chain approach are encouraging. The projects show that a large reduction in environmental impact is definitely possible, provided the market adopts the improvements. Accordingly, success with the chain approach depends on the collaboration between government and industry.

Forward together

For carrying out the projects in the seven material chains, government and industry are advancing in step. As a result, the government is gaining excellent insight into the potential and limitations of industry to reduce environmental impact.

In addition, the chain approach provides interesting advantages for the companies taking part: government support, cost savings, product innovations and opportunities for improving their images and for marketing activities. Moreover, the parties involved become well acquainted, which often leads to new collaborative ventures.

Government's role

The key role of the government in the chain approach is twofold: director of the process, and contact agent for bringing companies and organisations together. In addition, the government is able to guide and stimulate the chain approach using a variety of instruments:

- **sustainable purchasing** – encouraging sustainable production through government procurement of sustainable products
- **grants** – for research, development and pilot projects
- **taxes** – on products or production processes that pollute the environment
- **freedom to experiment** – temporary exemptions and permits for environmental initiatives of companies
- **credit facilities** – for high-risk environmentally friendly investments
- **promoting responsibility among producers** – making it compulsory for companies to dispose of their products at the waste stage or to help pay for this

Industry's role

Ultimately, it is up to industry – with the best possible government support – to actually reduce environmental impact. To achieve this, companies have to adapt their products and production processes at the right stages in the material chain.

For the projects cited, the frontrunners from a chain have the freedom to experiment, implement innovations and collaborate with companies from any part of the chain. These frontrunners set a good example in this way. In the end, the entire group must march in step if it is to realise genuine environmental benefits on a large scale.



A new life for discarded KLM uniforms

The chain approach has spawned an interesting example project: making products from the recycled fibres of discarded KLM uniforms, such as blue slippers, luggage straps and bags.

In general, industrial clothing no longer needed finishes up in the incinerator. For safety and image reasons, companies and organisations do not want such clothing to be identifiable if reused. A pity, as reuse saves expenditure on materials and delivers a sizable environmental benefit. This is because fewer primary raw materials need to be produced – textile fibres in this case – which means less consumption of energy, water and land, as well as less toxicity.

Parties from the entire chain are involved in this project, including KLM, textile processor Frankenhuis, designer firm D'Andrea & Evers, and one of Reshare's sheltered workshops as production facility. The project manager is the recently established innovation centre Texperium, which specialises in manufacturing new products from textile waste.

This project represents an inspiring business case for the entire industrial clothing sector: the government is creating the right conditions, a new market for recycled industrial clothing is emerging, and industry is engaging in financially attractive collaboration that also benefits the environment.

Section 3 Initial experience with the chain approach

The projects within the seven selected material chains encompass varying solutions for increasing the environmentally friendliness of production and consumption. Most of the projects are successful. That not all are is only to be expected from a new approach. The main thing is to learn from this. What went right and what did not? And why?

Solutions from the chain approach

Several promising projects are now underway for gaining experience in use of the chain approach. If the projects are adopted throughout the market – scaled up in other words – the next few years are likely to see a substantial benefit for the environment. The following are the selected solutions, including a few examples:

- **greater production efficiency** – printing firms consume less energy and material for their output on paper
- **closed recycling** – less incineration and discarding of clothing, more reuse of textile fibres
- **redesigning** – designing products to make recycling easier, for example, by mixing fewer materials together
- **combating waste** – reducing the waste associated with production and consumption, such as the millions of kilos of food that are thrown away each year in the dustbin
- **material substitution** – replace materials that impact the environment, for example, by swapping conventional cotton for recycled or biological cotton
- **influencing consumer behaviour** – convince consumers to put out their discarded clothing for collection separately from their residual waste

Conditions for a successful project

Three conditions are essential for the chain approach to be successful: clear limits, commitment and sufficient possibilities for exerting influence.

Limits

For most of the material flows, projects were initiated that could deliver significant environmental benefits. However, the selected material chain turned out to be too wide in some cases, so it was not easy to specify promising projects. As an example, the bulk domestic waste flow was far too varied. After further study, VROM trimmed this chain down to the two subchains furniture and mattresses.

Commitment

The chain approach implies collaboration. A potential environmental benefit is no guarantee of a successful project. The market must also be prepared to cooperate and trust the government as a partner. Commitment, trust and motivation mainly arise from showing companies the benefits to them of the chain approach: lower costs, product innovation, image enhancement and publicity.

The Netherlands' paper industry is a good example in this context. Less consumption of raw materials reduces both the burden on the environment and the cost of operating. It also presents a good image, something extremely important in this competitive industry. Economics and ecology are close allies here.

Influence

Material chains often have a strong international orientation, making it problematic to convince companies to use production methods that are more environmentally friendly. Collaboration with other countries or joint projects on a European level, say, can offer a solution.

An example of an international chain is the textile industry. Textile consumed in the Netherlands is largely produced abroad. Nevertheless, Netherlands' industry can exert influence in this situation. The buying power of Dutch fashion companies is extremely strong, enabling them to set criteria for production.

A list of major lessons

- the success of a project is thanks to the motivation and enthusiasm of the leading companies and organisations in the chain concerned
- the inclusion of different stages in a material chain produces results that would be impossible with the traditional approach
- as contact agent and director, the government plays a key role in getting projects going
- for carrying out a project, the parties involved often look to the government for financial support
- companies often find it awkward to have the government as a partner, and developing mutual trust takes time
- participation on projects creates favourable publicity for companies and organisations

Section 4 The government gets going with the chain approach

VROM has learnt much about the chain approach in recent years. How should the government go about it? How should the government select the right chain partners and promising projects? Below is an action plan for the chain approach, together with practical tips.

Environmental analysis of material chains

VROM selected seven major material chains for gaining experience of the chain approach. For each material chain, the Ministry examined the environmental impact of the chain as a whole and ascertained which of its subchains caused a high environmental impact. Taking the textiles chain as an example, the cotton and wool subchains are the main sources of substantial environmental impact.

It is also important to know which stages in the chain cause the largest environmental impact and where there are promising opportunities to reduce the burden on the environment of the chain as a whole, without transference from one stage to another. To study this, VROM used the LCA method to calculate the effects on the environment.

The LCA study

For examining a material or product chain as a whole, it is necessary to know what the effects on the environment are throughout the chain. To this end, the ministry employed the Life Cycle Assessment (LCA) method. An LCA study involves examining the environmental effects of all emissions and the use of all raw materials in a complete life cycle of materials and products.

With the LCA method, it is possible to quantify environmental effects, including climate change, acidification, manuring, toxification and land use. The output from an LCA study is an environmental profile, a score list of the effects on the environment from the materials or products in question. The profile shows the magnitude of the environmental effects of the entire chain and which effects are the most important in the life cycle.

Tips: begin with the chain approach

How should the government begin with the chain approach and how can it make the approach attractive to industry?

Consider interests

Take into account the structure of a chain and the interests that count in it.

Capitalise on developments

Capitalise on developments – at individual companies as well as for an entire sector – that make it possible to implement chain solutions. Two examples are the preference for certain raw materials and the desire to penetrate new markets.

Have additional pressure in reserve

Be in a position to apply pressure to make acceptance of the chain approach easier, such as by having regulations and taxes in reserve.

Look into upscaling

At an early stage, weigh up the opportunities and risks of upscaling: implementation of chain solutions for the entire market.

Use common sense

Although the LCA method is an excellent tool for the chain approach, it must not be used blindly. The results partly depend on the assumptions, weightings and available data used.

Give function top priority

Use a functional approach, meaning that the need a product satisfies – its purpose – is the focal point. This approach simplifies substitution and prevention, such as the paperless office for the paper and cardboard chain.

Choice of chain partners and projects

In each case, VROM has invited influential parties and leaders to jointly seek solutions for reducing the environmental impact of the entire chain. Most of these companies and organisations are from the chain in question, but some from a completely different sector.

Discussions with chain partners from the market usually generate a long list of ideas for projects. Each idea is then studied in terms of its expected environmental benefit and probability of environmental and commercial success. The final step is to select joint projects that have the potential to get the rest of the market on board.

Tips: collaboration with companies and organisations

Collaboration between government and industry is a prerequisite for the success of the chain approach. What actions does the government need to consider?

Approach industry leaders

Approach individual leading companies in a sector if the aim comprises fundamental changes that lead to a substantial environmental benefit in the long run.

Approach industry associations

Approach industry associations if the aim is to take a relatively small environmental step in the short-term, together with many parties.

Make clear agreements

Make timely agreements on knowledge protection and the allocation of the costs and revenues of a project.

Approach other parties positively

Rather than talking to other parties about problems, look together for projects that benefit all parties.

Welcome new blood

Be sure to also invite parties that are not directly involved in the relevant link of the product chain. This keeps options open, material substitution for example, and often results in surprising ideas.

Communication above all else

Companies have a need for clarity. Do not assume, therefore, that everything is automatically clear. Collaborating with the government is still awkward for many companies. It demands give and take and, above all, open and honest communication for companies to stop regarding the government as a troublesome setter of rules.

Tips: communicate clearly with chain partners

What is the best way for the government to communicate with industry?

Ensure there is a permanent contact

Arrange a permanent government contact for the participating companies. This creates confidence and generates enthusiasm.

Be clear about objectives

Be clear about the objectives that the government is aiming to achieve with the chain approach. Also state how these objectives relate to other government policies, for example, Doelgroepbeleid Milieu en Industrie (target group policy for the environment and industry) and Meerjarenaafspraken Energie-efficiency (long-term agreements on energy efficiency) in the Netherlands.

Do not create false expectations

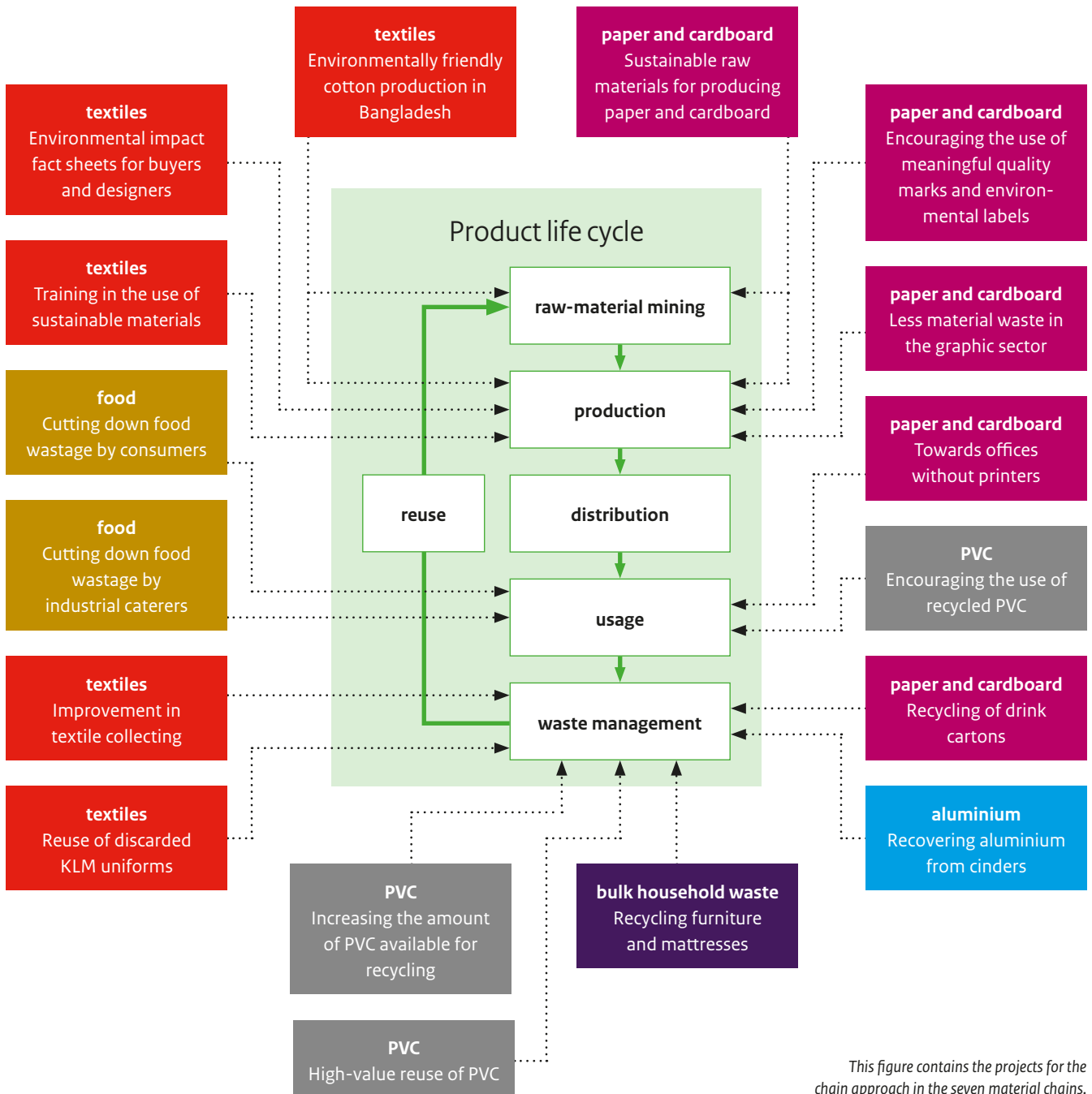
Make clear what the government can and cannot offer. Do not create any false expectations, as regards funding for example.

On to the next step

As the projects in the seven material chains are becoming increasingly well defined, it is time for the next step: implementation of the new products and processes throughout the market. VROM expects to gain experience with this in the near future.

Section 5 The seven material chains

Figure 3 – The projects in the seven material chains



This figure contains the projects for the chain approach in the seven material chains.

1 Textiles: environmentally friendly materials, washing more economically, and reuse

With the textile chain, the larger part of the environmental impact is attributable to:

- the manufacture of wool fibres (land use and methane emissions)
- cultivation and manufacture of cotton fibres (mainly land use)
- washing and drying (energy consumption)

The sector is increasingly aware of the need for environmentally friendly business conduct and already devotes considerable attention to this subject.

The chain approach for textiles

The major generic solutions for the chain approach as applied to textiles are:

- environmentally friendly production of materials with an environmental impact, such as wool and cotton
- replacement of cotton and wool with materials that have less environmental impact
- environmentally friendly washing and drying
- extending the useful life of textile products
- more reuse of textile waste in fibre recycling for example

34% less environmental impact

The objective of the chain approach for textiles is 20% less environmental impact by 2015. Environmental analyses show however that a reduction of 34% is possible. This requires substantial changes on the part of producers as well as consumers. The potential fall in the environmental impact breaks down as follows:

- **14%** – consumers washing and drying clothing more economically
- **9%** – replacement of 20% of all conventional cotton and wool by a material that is more sustainable
- **6%** – 50% more recycling of clothing from the use of residual waste instead of incinerating this waste
- **5%** – modifications to the textile production process in other countries, mainly by reducing energy consumption and using cleaner types of energy



Participating companies and organisations

The following companies and organisations are members of the chain projects relating to textiles:

- Modint, an industry association for fashion, interior furnishings, carpets and textiles
- Solidaridad, an international network for combating poverty by means of sustainable-product chains
- Made By, a consumer label for fashion brands and fashion retailing
- Vereniging Herwinning Textiel (VHT, Textile Recycling Association)
- CBW-MITEX, the association for companies in the fashion, home furnishing, shoe and sports sectors
- Vereniging Grootwinkelbedrijven in Textiel (VGT, Association of Textile Stores)
- Vereniging Voor Afval- en Reinigingsmanagement (NVRD, Association for Waste and Cleaning Management)
- Vereniging Nederlandse Gemeenten (VNG, Association of Netherlands Municipalities)
- Salvation Army Reshare
- Het Goed
- Henri Vernooy & Zoon
- WE Fashion
- Texperium, an innovation centre for the industrial processing of textile waste
- Frankenhuis & Zoon

Projects

Five projects are underway in the textile chain. They are focused on manufacturing cotton biologically, purchasing and using materials produced with less environmental impact, and ways to keep more waste textile from being incinerated.

Project 1. Making production in Bangladesh more environmentally friendly

The development organisation Solidaridad is going to assist 15 suppliers of fashion houses and brands in the Netherlands to manufacture cotton in Bangladesh using methods that are more environmentally friendly. The project's main aim is a decrease in the use of chemicals, energy and water for processing the cotton.

Project 2. Fact sheets for buyers and designers

In the first quarter of 2010, Modint, an association for the fashion, textile and interior furnishing industries, created fact sheets on the environmental impact of the clothing production chain and on the possibilities for designing and purchasing in a more environmentally friendly way. The fact sheets are aimed at buyers and designers for fashion houses and fashion brands. Modint produces these fact sheets in collaboration with VGT, CBW-MITEX and Made By.

Project 3. Training in the use of sustainable materials

In 2010, ten fashion companies, among them WE and G-Star, are defining a strategy for using more sustainable materials in their 2011 collections. As part of the project, Made By is training and assisting these companies. The intention is that in 2011 a further 25 fashion companies will follow the lead. The ultimate goal is for the use of sustainable materials to have risen 20% by the end of 2015.

Project 4. Improved textile collection

A random sorting test reveals that residual waste contains a large amount of useable textile. The amount in question is between 70 million and 80 million kilos of textile suitable for reuse or recycling. To increase the reuse of textiles, Reshare and VNG are studying the collecting of textiles in a number of municipalities. A study is also being conducted into the reasons why some households put out textiles separately for collection, while others do not, and how this behaviour can be influenced. A subsequent step is to implement measures, with consumers and municipalities in mind, for improving the way textiles are collected.

Project 5. Reuse of discarded uniforms

For security reasons, discarded industrial clothing is often destroyed, although reuse delivers a substantial environmental benefit and lowers the cost of materials. KLM, textile processor Frankenhuis, Salvation Army Reshare and designer firm D'Andrea & Evers are currently collaborating with innovation centre Texperium on developing products made from discarded KLM uniforms. A project that serves as an inspiring business case for sectors that use industrial clothing, as well as for producers that use textiles as raw material.

2 Paper and cardboard: the finishing touches

The Netherlands' paper and cardboard sector has been well organised from way back and is already doing a lot as regards the environment. To give an example, around 80% of old paper is reused in the Netherlands as raw material for paper and cardboard products. The sector is also highly motivated to consume more green energy, as evidenced by the project Supply Chain of the Future. All things considered, the chain approach meets the need of the sector to operate more sustainably.

Paper issues

In collaboration with the sector, VROM has selected several promising projects that neatly match the chain approach and the idea behind Supply Chain of the Future. The main areas initially under consideration are:

- recycling of drink cartons
- prevention of material waste
- use of alternative raw materials
- reduction in the use of paper in offices
- encouraging the use of quality marks and environmental labels

8% less environmental impact

The five projects involving the paper chain could together produce an environmental benefit of around 8% for the entire paper chain. The environmental benefit varies by subchain and depends on the effectiveness of measures throughout the chain. Owing to the large number of uncertainties, it is difficult to estimate these effects, though.

To illustrate the point, the use of alternative raw materials reduces the environmental impact by up to 3%. In contrast to this, the recycling of drink cartons can lower the environmental impact of its subchain by a good 70%. However, this subchain is only a small part of the whole paper chain.

The project for combating the waste of material in the graphic sector can reduce the environmental impact of this subchain by 20%, of which 10% is energy-related and 10% material-related. To realise this decrease, the approach has to be followed throughout the graphic sector.



Participating companies and organisations

The following companies and organisations are involved in the paper and cardboard material chain:

- Koninklijke Vereniging van Nederlandse Papier- en kartonfabrieken (VNP, Royal Association of Dutch Paper and Cardboard Manufacturers)
- Stichting Papier Recycling Nederland (PRN, Organisation for Paper Recycling in The Netherlands), representing the entire paper and cardboard chain
- Koninklijk Verbond van Grafische Ondernemingen (KVGGO, Royal Dutch Association of Printing Industries)
- Kenniscentrum Papier en Karton (KCPK, Paper and Cardboard Competence Centre)
- Informatiecentrum Papier en Karton (IPK, Paper and Cardboard Information Centre)
- Individual manufacturers of paper and cardboard

Projects

The following five projects are currently underway in the paper and cardboard sector:

Project 1. Sustainable raw materials

In collaboration with VNP and KCPK, paper manufacturers are developing a method to assist making decisions on the use of alternative raw materials in the production of paper and cardboard. The aim of the method is to increase the use of alternative raw materials.

Project 2. Quality marks and environmental labels

There are a great many environmental labels and quality marks on the market. Unfortunately, they are not all equally useful. For this project, IPK is providing information and support to all parties involved in the paper chain. The aim is to reduce the environmental impact of the paper and cardboard sector by using meaningful quality marks and environmental labels.

Project 3. Less waste of materials

Graphic businesses will be locally collaborating more and exchanging information, with the support of Stichting Stimular and KVGGO. In this way, the businesses aim to improve their individual environmental performances and reduce the amount of material wasted. Eventually, such collaboration throughout the graphic sector could produce a substantial environmental benefit.

Project 4. No more printing

In an office without printers, printing is impossible and no paper is used. VROM is studying the environmental effect of offices without printers, with paper replaced by electronic resources. Depending on the feasibility and likely environmental benefit, a pilot project based on an office without printers will be carried out.

Project 5. Recycling of drink cartons

CE is conducting a study into the environmental gains and costs of collecting drink cartons separately. The participants in this study are VNP, PRN, Stichting HEDRA, Federatie Nederlandse Levensmiddelen Industrie (Dutch Food Industry Federation), Centraal Bureau Levensmiddelenhandel (CBL, Food Retail Association) and Vereniging Nederlandse Gemeenten (VNG, Association of Netherlands Municipalities).

3 Construction and demolition waste: from rubble to new material

Almost all construction and demolition waste in the Netherlands is currently recycled. Over the next few years, however, the amount of this waste is set to grow substantially, whereas it is unclear whether there will still be an adequate market for the recycled materials. VROM is studying the potential of the chain approach to help reduce the environmental impact of the chain as a whole.

The chain approach regarding construction and demolition waste is still in the exploratory stage. The ministry is focusing mainly on concrete and brick rubble, and on wood waste, as these subchains are the source of the largest environmental impact. Synthetic materials and metals also make a considerable contribution to the burden on the environment. However, these subchains are already included in other chain projects.

Construction and demolition waste issues

The chain approach as applied to construction and demolition waste is focused mainly on the recycling of wood waste and concrete and brick rubble. VROM has studied the following possibilities:

- grinding concrete and brick rubble into raw material for a variety of products
- processing concrete granules to produce a gravel substitute
- grinding masonry into raw material for making bricks
- creating a market for surplus building material
- developing new methods to delay the incineration of wood for as long as possible
- utilising the energy of wood scrap better by burning it in high-efficiency incinerators
- collaborating with other material chains, such as PVC and aluminium

6% less environmental impact

The production and processing of concrete and brick rubble accounts for roughly 55% of the environmental impact attributable to construction and demolition waste. By grinding concrete and brick rubble into raw material for a variety of products, the environmental impact of the entire chain can be reduced by up to 6%. This process seems feasible.



Processing concrete granules to produce a gravel substitute during the manufacture of new concrete results in virtually no environmental benefit compared with current applications. It is an interesting option, though, given the shrinking market for the use of concrete granules in road bases, in conjunction with the expected increase in the volume of these granules becoming available. Processing the granules into a gravel substitute offers a way to maintain the recycling percentage level in this problematic situation. VROM and market parties are jointly examining how to realise this without the government taking charge.

Creating a market for building material purchased in excess of needs seems entirely feasible. The construction sector is going to take action on this. VROM will also be looking soon into the possible uses of wood waste.

4 Aluminium: production and recycling

The production of aluminium places a heavy burden on the environment, mainly because of the large amount of energy required. Although the construction and automobile industries recover a great deal of aluminium, some continues to find its way to waste incineration plants in residual waste. For this reason, VROM and various companies representing the industry are applying the chain approach to aluminium.

Aluminium issues

As mainly primary aluminium production has an impact on the environment, the Ministry is examining the following possibilities for modifying the production process and encouraging recycling:

- recovering aluminium from the cinders of incinerated residual waste
- modifying the primary smelting process through the use of new technologies and green electricity for example
- collecting aluminium packaging material separately
- finding alternatives for aluminium packaging material
- indentifying the criteria that buyers in the Netherlands can set for their suppliers to force the use of bauxite recovery methods that have less environmental impact

Realisable environmental benefit limited as yet

Owing to the large environmental impact of primary aluminium production, the potential environmental benefit is large as well. In the short term, however, aluminium production offers limited possibilities. One reason is that an improvement in the primary smelting process requires a significant innovation and a substantial investment. In the current economic climate, this is not practical. Moreover, the influence of buyers in the Netherlands on the sourcing of aluminium oxide is virtually nil, owing to the international structure of the market.

The environmental benefit from the use of more green energy in the production of aluminium can be as much as 20%, 30% or more. Gains can also be realised by updating or adapting packaging. However, both options encounter financial objections and are highly dependent on market trends. In the short term, very little can be expected from these options in the form of results.

The market currently sees little benefit in the separate collection of aluminium found in domestic waste. Improving the methods for recovering aluminium from cinders produced by waste incineration plants is an option, however. It can reduce the overall environmental impact of the aluminium chain by 7%.



Projects

The following project is currently underway in the aluminium chain:

Project 1. Aluminium from cinders

Vereniging Afvalbedrijven (Association of Waste Companies) will shortly start a project to recover more aluminium from cinders produced by waste incineration plants in the Netherlands. The project is focused on an analysis of the aluminium mass balance of the incineration process, the technology used for recovery, and the potential for implementing an improved approach throughout the Netherlands.

5 PVC: more recycling

Polyvinyl chloride – more commonly known as PVC – is an inexpensive synthetic material that is easy to process. The volume of recycled PVC is small, however, a reason for VROM to determine whether the chain approach can solve this anomaly.

PVC is used in a large number of products, which results in its constantly varying composition because of softeners, stabilisers and dyes. Owing to these different compositions, no standard recycling method exists for PVC. Accordingly, the Ministry is initially limiting its attention to PVC in ducts, pipes, cables, leads and mouldings, including frames. These applications represent a large part of the total PVC usage in the Netherlands.

PVC issues

Not much is known about the volume of PVC released as waste or the way in which this waste is processed. In addition, more knowledge is needed about the market for recycled PVC. The major issues relating to the PVC chain are therefore:

- to gain insight into the waste stage of PVC: amount reused, amount of residual waste, and the way this residual waste is processed
- increasing the amount collected and the amount made suitable for recycling

- active role of the government, such as through the practice of sustainable purchasing of recycled PVC materials
- enlarging the market for recycled PVC

Towards less environmental impact

Environmental analyses show that an increase in the recycling of PVC helps substantially reduce the environmental impact of the PVC chain. The size of the environmental benefit that can actually be realised remains unclear, however, mainly because too little is known still about the amount of PVC released during the waste stage and about how it is processed. Initially, therefore, the Ministry wants to obtain a better picture of the PVC chain.

Participating organisations and companies

VROM wants to obtain a picture of the PVC chain, together with other parties. These include the following organisations and companies:

- BureauLeiding, an association of pipe manufacturers that focuses on the collecting of pipes
- VKG, an industry association of producers and importers of PVC frames
- NRK, an industry association of manufacturers of synthetic materials
- Stuurgroep PVC, an industry association of mainly PVC producers
- various other players, such as industry association BRBS, waste sorting stations and scrap yards



Projects

The following three projects are underway in the PVC chain.

Project 1. Increasing the amount of PVC available for recycling

Together with the sector, VROM is studying how more PVC can be made available for recycling. For example, by improving existing systems for separated collection – with the installation of additional containers – and through more publicity. Both BureauLeiding and VKG will be taking action on this, as well as some waste sorting organisations and BRBS. The Ministry is also looking into the possibility of legally required waste separation at construction and demolition sites. A further option is the removal of PVC from mixed waste more efficiently, before it goes into the incinerator.

Project 2. Encouraging the use of recycled PVC

If more PVC for recycling becomes available, there also has to be a market for it. There are several possibilities for energising this market:

- sustainable purchasing by the government: in the autumn of 2010, the Ministry and a number of market parties will set the percentage of PVC in certain products that has to be recycled PVC
- tube producers are collaborating as a group, as well as with companies that recycle synthetic materials, to define quality criteria for recycled PVC
- manufacturers and universities are jointly developing frames that are easier to recycle
- another possibility under consideration is carrying out a pilot project for the use of recycled materials in frames

Project 3. High-value reuse of PVC

Market parties in the chain have agreed among themselves to process discarded PVC in such a way that, after being recycled, it is just as suitable for a high-value application as it was before being discarded. Particularly when it comes to the separation of PVC containing different additives, there is still a lack of suitable methods.

6 Bulk domestic waste: furniture and mattresses

In 2008, 750 million kilos of bulk domestic waste were disposed of at waste incineration plants. With this method, not only is much useful material lost, but the incineration process itself also pollutes the environment. More waste separation and reuse can reduce the environmental impact of bulk domestic waste in the next few years by at least 30%.

The chain approach in this sector was slow in getting started at first. Bulk domestic waste was too varied for specifying clear-cut projects, and there was a lack of data on the composition of the waste. For this reason, VROM is limiting consideration to two products that jointly represent a large part of bulk domestic waste: furniture and mattresses. The Ministry is joining forces with the waste sector to achieve more reuse of products and materials.

Bulk domestic waste issues

The chain approach for bulk domestic waste is primarily focused on reducing the amount of such waste that finds its way to waste incineration plants. The leading possibilities are:

- improving the reuse of furniture
- recovering materials from furniture and mattresses for reuse
- indentifying sales channels for the recovered materials
- carrying out sorting trials with residual fractions from bulk domestic waste and improving the separation performance of recycling centres
- sharing of knowledge by municipalities and regions
- increasing the awareness that the incineration of bulk domestic waste in particular creates a substantial environmental burden and that this situation has plenty of room for improvement

30% less environmental impact

By 2015, applying the chain approach to bulk domestic waste can reduce the environmental impact by at least 30%. This decrease breaks down as follows:

- 7% – by reusing 10% more of the household goods that are currently disposed of as bulk domestic waste
- 19% – by reusing 50% of the leather from furniture
- 4% – by reusing parts of mattresses



Projects

The following project is currently underway:

Project 1. Recycling of furniture and mattresses

In the three-town conurbation Apeldoorn, Deventer and Zutphen, the waste collection companies Circulus and Berkel Milieu, together with three recycling businesses and the municipal authorities, have agreed to substantially diminish the amount of residual waste by 2030. Their goal is a waste-free community in 2030, with the added intention of reducing the environmental impact from the collecting and processing of bulk domestic waste by 20% before 2015. In collaboration with Circulus and Berkel Milieu, VROM is looking into the possibilities for product and material reuse in the case of furniture and mattresses. The idea is that during the project it should become clear what the best way to process furniture and mattresses is and what the available sales channels are for the recycled materials.

7 Food: a shame to throw it away

Food contributes between 30% and 35% to the total environmental impact from consumption. Over half the impact is attributable to the production of meat and dairy products. In addition, individuals and companies throw a lot of food away. Sufficient reasons for VROM to apply the chain approach to this sector as well.

Food issues

This use of the chain approach for food is not in isolation. Apart from VROM, the Ministry of Agriculture, Nature and Food Quality (LNV) is also in action regarding the food chain. Both Ministries are collaborating closely, with LNV focusing on:

- increasing the sustainability of production
- developing alternative sources of protein
- wastage in all parts of the chain

VROM is devoting attention mainly to:

- combating food wastage by consumers, retailers, and hotel, restaurant and catering establishments
- reduction in the consumption of meat and dairy products

Powerful opposing interests in the food chain form a problematic sticking point for actions against wastage. The fact is that less wastage means less business for producers and the retail trade. Consequently, VROM does not expect education to achieve much and is mainly seeking ways to influence the behaviour of consumers. To this end, VROM is concentrating primarily on:

- research into the extent and composition of food wastage
- research into methods for effecting a change in consumers' behaviour, for example, less consumption of animal proteins and less wastage
- instruments to combat food wastage at hotel, restaurant and catering establishments

Eating habits form the key to reducing environmental impact

Applying the chain approach to the food chain offers sufficient possibilities for achieving a substantial reduction in its environmental impact. If everyone were to follow the guidelines for a healthy diet, the environmental impact would decrease by 13%. In addition, a doubling of the number of vegetarians – from 4.5% to 9% of the population – would produce a modest fall of approximately 1%. The effects of the actions to combat food wastage are still unknown. VROM is currently having a study conducted into this.



Studies

In 2010, the Ministry is carrying out two studies into food wastage by consumers and companies.

Study 1. Measuring food wastage

To underpin methods for combating food wastage, VROM is studying the amount of food actually wasted by households, hotel, restaurant and catering establishments, and industrial caterers. This study will provide answers to questions such as: How much food is wasted each year? For which product groups is there a large amount of wastage? Which types of food are wasted? At what stage of preparation does the most wastage occur – too much cooked, stored too long?

Study 2. Combating food wastage by households

The Ministry wants to gain more insight into food wastage by households. What are the causes of food wastage? How can the wastage behaviour of consumers be changed? Which organisations can play a role in achieving this? Based on the results of this study, the government intends to develop instruments for reducing the food wastage by households.

Projects

With the aim of cutting down food wastage at the end of the chain, two projects have been initiated in 2010. Project 1 is focused on consumers and project 2 on industrial caterers.

Project 1. Cutting down food wastage by consumers

In the Apeldoorn-Zutphen-Deventer conurbation, waste collection companies Circulus and Berkel Milieu, together with Wageningen University & Research Centre, are setting up a project to reduce food wastage by the 500.000 residents in their service area. The goal is a decrease of 20% by 2015.

Project 2. Cutting down food wastage by industrial caterers

Wageningen University & Research Centre, industrial caterers Albron and Kruidenier Foodservice are starting a project to tackle food wastage in the industrial catering sector. The project is focused initially on gaining insight into the volumes of the residual flows originating from Albron's catering facilities. The purpose of the next step is to diminish these residual flows, for example, by using a better method of ordering.



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