

# Chapter 7

## Community and School Education on the Subject of Waste Management: Experiences of Romania, The United Kingdom and Germany



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**Abstract** Waste management practices can help to conserve energy and resources, reduce carbon dioxide emissions and safeguard human health. Community and school education should help to increase knowledge, awareness and understanding regarding these practices. In the current chapter, three different European countries will be examined regarding their community and school education regarding waste management: Germany, Romania and England. Germany has an advanced waste management system in which only a small fraction of inert waste is landfilled. However, the quantity of waste that is produced per person is very high. Romania joined the EU in 2007 and translated European environmental legislation into national law. The country has made immense progress regarding environmentally sound waste disposal and waste management options. However, the largest fraction of municipal waste is still landfilled. Whether and to what extent waste management is covered in schools depends primarily on the individual teacher's motivation and interest regarding this topic. Community education often focuses on 'basic' waste management approaches such as the negative effects of fly-tipping and the correct use of recycling facilities. In England, which is part of the United Kingdom, a range of community and school education initiatives exist to support sustainable waste management. As a result of the Brexit—the United Kingdom leaving the European Community—fears have arisen that recycling and landfill reduction targets might be changed into more lenient targets in the future. This could also reduce the emphasis being put on community and school education regarding waste recycling and waste reduction.

**Keywords** Waste management · Education for sustainable development · Waste reduction · Recycling · European Union

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W. W. M. So et al. (eds.), *Environmental Sustainability  
and Education for Waste Management*, Education for Sustainability,  
[https://doi.org/10.1007/978-981-13-9173-6\\_7](https://doi.org/10.1007/978-981-13-9173-6_7)

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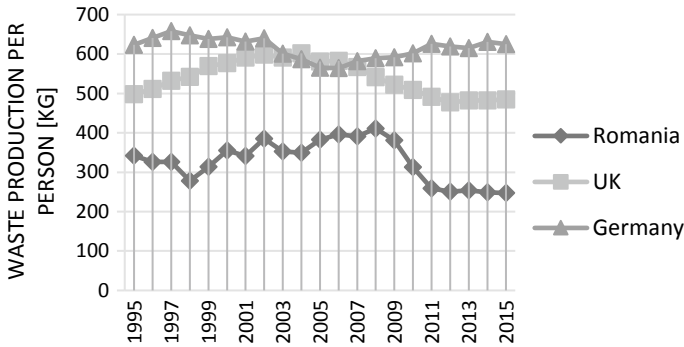
## 7.1 Introduction

The United Nations proclaimed that 2005–2014 will be the decade of education for sustainable development (UNESCO, 2005). Waste management is an essential part of sustainable development and education on this matter is vital to conserve resources for future generations, reduce carbon dioxide emissions, protect the environment and safeguard human health. Waste management itself differs largely in different countries, and community and school education initiatives should help the population to understand the problems associated with waste and how their behaviour can help to improve the management of waste, for instance, through the correct separation of waste materials or their choice of easily recyclable materials. Education regarding waste management is consequently interrelated with regional or national waste management systems.

Within the European Union (EU), targets are set for waste recycling and landfill reduction. How these aims are achieved is the responsibility of the member countries. However, it is now widely accepted that environmental education is a vital precondition for a well-working waste management system (Hasan, 2004; Palmer, 1995). Countries of the EU—as well as many other countries around the world—have, therefore, introduced different educational programmes that should help the population to live in a more sustainable manner (Aege, 2017; Foundation for Environmental Education, 2017; Knowlton Cockett, Dymont, Espinet, & Huang, 2017).

The concept of the waste hierarchy defines a priority of actions regarding waste management (European Parliament and European Council, 2008). The best option, according to this hierarchy, is to not produce waste at all. The second-best option is to reuse waste, followed by recycling, incineration and finally disposal in landfill sites. All EU member countries support the waste hierarchy since it is seen as the best option to save a maximum of resources and energy.

Education at the school level is particularly successful if carried out in a manner that addresses the young generation. Pupils act as ‘multipliers’ in their homes, which is why the effort and money that is invested at this level can lead to effects beyond the pupil generation itself (Armstrong, Sharpley, & Malcolm, 2004; Boerschig & De Young, 1993; Larsson, Andersson, & Osbeck, 2010). However, school education alone does not suffice. Every person within a community needs to be addressed through community education programmes. The three countries that are analysed in the current chapter illustrate in an exemplary manner the development of education on waste management, taking the improvement of the waste management situation into account. Romania is a country in which waste management that is in line with the EU vision is still at the beginning, the United Kingdom (UK) is in the phase where the largest improvements in waste management are currently being achieved and Germany is a country where waste management has already been optimised to a high level. While education on waste management has not yet been developed in Romania, most of such programmes have already disappeared in Germany since waste is no longer perceived as a problem. In the UK, where recycling, composting and landfill targets that were laid down by the EU still need to be reached, a vast



**Fig. 7.1** Waste production per person in Romania, the UK and Germany between 1995 and 2015. Source Eurostat (2017)

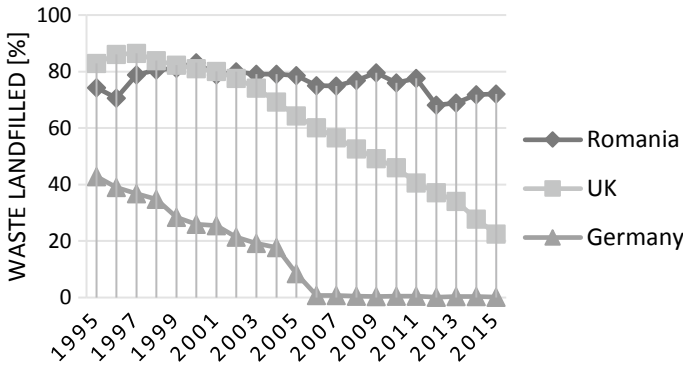
range of education programmes exists to encourage citizens to participate in, and to understand, waste management activities.

In the next section, an overview of the development and current situation of waste management in the three countries will be provided. Hereafter, in more detail what problems are associated with waste in the three countries and which specific education initiatives exist at the school and community level regarding waste management will be shown.

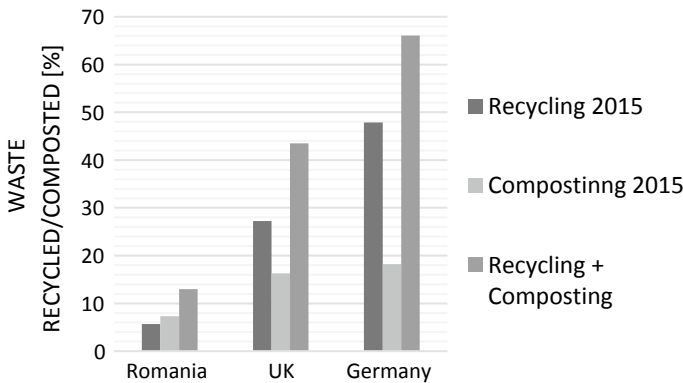
## 7.2 Background

In the current chapter, community and school education in three different EU countries which joined the Common Market at different times and with different pre-existing conditions in the environmental sector are compared. To understand what community and school education can achieve, it is necessary to know what the main challenges of waste management are in the three countries. Figure 7.1 shows the amount of waste that is produced in the three countries. It can be easily seen that Germany is producing the highest amount of waste per person. Within the European Union, only citizens from Cyprus and Switzerland, which is not part of the European Union but within the geographical area of the EU, produce more municipal waste per person. Romania, on the other hand, produced less than 250 kg of waste per person in 2015 and thereby only around 40% of what an average person in Germany produced. In the UK, waste production has decreased slowly since 2006. In 2015, the average citizen in the UK produced 485 kg, which is 9 kg above the EU average of 476 kg (Eurostat, 2017).

However, as can be seen in Fig. 7.2, the little waste that is produced in Romania is primarily landfilled. Over 70% ended up in landfill sites in 2015, compared to around 22% in the UK and almost no landfill in Germany.



**Fig. 7.2** Percentage of municipal waste that was landfilled in Romania, the UK and Germany between 1995 and 2015. *Source* Calculated from data provided by Eurostat (2017)



**Fig. 7.3** Recycling and composting rates in Romania, the UK and Germany in 2015. *Source* Eurostat (2017)

Equally, Romania has very low recycling and composting rates of less than 10%, as can be seen in Fig. 7.3. In Germany, over 65% of municipal waste is recycled or composted. Germany is consequently one of the countries with the highest recycling/composting rates within the European Union. It has already achieved the EU target of recycling 65% of municipal waste by 2030 (as was specified in the EU Waste Framework Directive).

## 7.3 Romania

### 7.3.1 *Current Situation Regarding Waste Management*

Romania joined the EU in 2007. During the negotiations preceding EU membership, the so-called *acquis communautaire* (entry requirements) played a key role. In this document, legislation regarding the EU is formally compiled. For Romania, the environmental chapter of the *acquis communautaire*, of which waste management is one part, was one of the most difficult chapters (Orban, 2006). Before 1989, environmental protection played no significant role in Romania's national legislation. Economic and social benefits were sometimes linked to environmental factors, but there was no public awareness of human behaviour threatening the environment itself (Turnock, 2002).

Waste management in Romania is still a 'work in progress'. While each citizen in Romania produces significantly less waste than do citizens in the UK and Germany (see Fig. 7.1), the little waste that is produced is managed in a manner which is questionable for the environment. Romania's water, air and land quality has been deleteriously affected because of environmental pollution, such as is caused by the smelting of non-ferrous metals, the extensive use of nitrogenous fertilisers, pollution of water resources by the petrochemical industry and improper disposal of waste by the building industry as well as the near universal use of landfill. Human health and environmental standards have declined significantly in some areas as a result (Zinnes, 2004). Moreover, it can be expected that waste production in Romania will increase in the future as a result of Western-style consumption patterns and a higher level of wealth. The European Commission concluded in a working document on the recovery of the Romanian economy after the recession in 2008/09, that higher consumption is first highly desirable to improve the local economy and second is a sign of the improved economic situation of households and the country as a whole (European Commission, 2010). Current research indicates that with the increase in waste production which is expected, the problems associated with waste will equally increase. Inglezakis, Ambārus, Ardeleanu, Moustakas, and Loizidou (2016) found that there is a severe lack of waste management infrastructure, separation facilities and (at least in some areas) a lack of capacity. Not only the very high percentage of waste that is landfilled is a problem, but in particular small, uncontrolled landfill sites (Orlescu & Costescu, 2013). The 'Operational Programme Environment' for the period between 2007 and 2013 was an EU-funded programme that aimed at reducing uncontrolled landfill sites and the conservation of resources through higher recycling rates (European Commission, 2017). Despite these investments, recycling rates are still low.

The participation of the public is vital in order to increase the overall level of environmentally sound management of waste. By now, it is widely accepted by the Romanian public that waste management is a huge problem impacting the environment and human health (Budica, Busu, Dumitru, & Purcaru, 2015). As many as 82% of Romanians believe that their country is producing too much waste (TNS Politi-

cal & Social, 2014). If environmental attitudes are considered, a study conducted by Crumpei, Boncu, and Crumpei (2014) showed that most Romanian students have pro-environmental attitudes that were ethically motivated. However, when confronted with a social dilemma, up to 50% of the questioned students chose the option which favoured economic over environmental aspects. Iojă, Onose, Grădinaru, and Serban (2012) analysed 457 educational institutions (among them pre-schools, primary schools, secondary schools, high schools and special schools) in Bucharest regarding their waste management approach and the available possibilities. The authors found that 49% of the schools did not have segregated waste collection facilities. Around 47% of the respondents reported a severe lack of information regarding waste management. Compared to the other European countries, citizens in Romania are least likely to recycle paper, plastic, glass, hazardous waste, electric and electronic waste and garden waste (TNS Political & Social, 2014).

### 7.3.2 Romania—Community and School Education

There is little education on waste management in Romania at any level, despite the fact that a range of scientists and legislators have highlighted the need for high-quality environmental education regarding this issue (Blaga, 2010; Petrescu, Ciudin, Isarie, & Nederita, 2010). Luca and Ioan (2014) concluded that ‘a big disadvantage that Romania has compared to other European countries is that there is no education [...] in the public educational system’ regarding separate waste collection. According to the authors, the ‘lack of formal environmental education [...] is a sore spot with long term effect’.

However, initial educational programmes have been introduced in some communities and in some schools. These normally concentrate on the correct sorting of waste materials and the negative effects of fly-tipping. For instance, the programme ‘Every Can Counts’ organises information campaigns in public places and schools regarding the recycling of cans to raise awareness of the benefits of can recycling. The organisation also organises a festival in which professional and non-professional artists can show what they have constructed out of used cans (Magsi, 2017). ‘Let’s do it Romania!’ is a non-profit organisation that organises different community events, of which some directly address waste management, for instance, the cleaning-up of areas outside cities on a specific annual ‘national clean-up day’ where everybody can participate in clean-ups of fly-tipping (Let’s do it Romania!, 2016).

Whether waste management is covered in the curriculum at the school level primarily depends on the teachers’ interest and the general management of the school. Many schools still lack the possibility to separate waste into different bins (Iojă et al., 2012). A study conducted by Kolbe (2014) showed that awareness levels are very high among the Romanian student generation. This is in accordance with findings from Budica et al. (2015), who see the generation born up to the year 2000 as being more concerned about waste management. However, Kolbe also found in a questionnaire-based survey that only around 30% of the students separated cans and

glass whenever possible at home. One major reason named for this low rate was the lack of specific facilities for recycling.

Currently, there are only a few programmes that address students directly. One very successful programme is the 'Recycling Patrol', which was initiated by the RoRec organisation to raise awareness in schools regarding the recycling of electric waste and batteries (RoRec, 2017). School classes can register for this programme and rewards are given to the groups that collect the highest amount of waste materials. In 2017, 95 school classes enrolled in the initiative (Nistor & Nedelea, 2017). RoRec also organises information days for university students, information days for pupils, and electronic media flashmobs regarding recycling electric and electronic waste.

Overall, there are a few education initiatives that focus on waste management at the community and school levels. Further programmes are urgently needed together with an improvement in the recycling infrastructure so that every citizen in Romania is not only aware of the problems associated with waste but also with the options for improving the waste management situation.

## 7.4 United Kingdom

### 7.4.1 *Current Situation Regarding Waste Management*

The United Kingdom joined the European Community in 1973. In the same year, the Community's First Environmental Action Programme was put into action. At that time, the country was relatively modern and proactive in the area of environmental protection (OECD 2002: 125). Scientists often conclude that this led to a 'first-mover disadvantage': because the UK's environmental legislation was very advanced, it paid little attention to the transformation of EU environmental policy. Possibly as a result of this, the UK had high landfill rates, low recycling rates and almost no composting facilities in the 1980s (Jordan, 2004; Sharp, 1998).

In addition to the Landfill Regulations, which represent a clear-cut translation of the EU regulations, landfill tax was introduced as the first 'green tax' in the UK (Morris & Read, 2001) in 1996 to decrease landfill rates. It must be paid in addition to other waste-related fees and thereby reduces landfill by making this method of disposal more expensive than alternative routes of management such as recycling or incineration. While in 1997 over 85% of waste was landfilled in the UK (see Fig. 7.2), this amount has fallen steadily during recent years. In 2015, only around 22% of waste was landfilled while over 43% was recycled or composted. This is not least an achievement of campaigns and initiatives which increased public awareness. In particular, the need to comply with EU recycling and landfill reduction targets increased the effort that was put into environmentally sound waste management (Price, 2001; SLR Consulting, 2015). Since the decision to leave the European Union, some stakeholders have proposed to reject EU waste-related targets (Priestley, 2016).

This would probably retard the further reduction of landfill and inhibit the increase in recycling and composting.

### ***7.4.2 Community and School Education***

Most communities had or have programmes which focus on correct waste sorting, waste recycling or waste reduction. Nationwide programmes encompass, for instance, the programmes of the Waste and Resources Action Programme (WRAP). WRAP conducts surveys and publishes reports on recycling behaviour, barriers to recycling, food waste collection and waste reduction. The results of these reports help communities to improve their collection services.

Many UK local authorities are proud of their achievements in the waste management sector. Recycling rates or achievements in landfill reduction are often covered in the local media and communities get some pride from announcing that they had the highest recycling rates in the region. Many councils had or currently have one or more of the following programmes or incentives to increase recycling rates: staff who talk face-to-face with households that do not sort their waste correctly, recycling crews that leave written information explaining why they did not collect waste that was not sorted correctly, newsletters for households, resident surveys and reward programmes for households that sorted their waste correctly. DEFRA carried out a household incentive pilot scheme in 2005/06. Different categories of incentives, namely charitable donations, community rewards, school rewards, personal (non-financial) rewards, prize draws and cash rewards were analysed regarding their effectiveness. The final report concludes that the best solution may in many cases be to offer additional services or infrastructure but that incentives—if communicated correctly—can help to reduce barriers for participating in new or existing schemes. They are therefore useful in ‘maximising the efficiency of waste management infrastructure and service provision that is already available to households’ (DEFRA Waste Strategy Division, 2006). Holmes, Fulford, and Pitts-Tucker (2014) found an average increase in the recycling rate of 8%, accompanied by a 4% reduction in the landfill in authorities that operated an incentive scheme compared to those that did not.

At the school level, waste management is also well covered. While there is no national curriculum requirement which forces all schools to cover this issue, a range of education programmes exists which are specifically designed for schools and/or teachers. The primary aim of these programmes is to educate pupils as to why recycling and waste reduction are beneficial and what they can do regarding these issues. A range of online resources is available and various educational approaches can be chosen. Roleplay, word search puzzles, the production of artistic objects from waste materials, testing magnetic characteristics and class discussions are proposed and promoted for school classes (The Guides Network, 2017).

Many councils offer free visiting speakers to schools to inform pupils about waste management and recycling—or offer home composting bins for schools at reduced prices. Waste management organisations and consortia equally offer their services



for organisations in the education sector (Crawleys, 2017; Veolia, 2017). In some cases, teachers or other educational personal can participate in training courses or the industries provide speakers who visit schools and explain specific aspects of waste management to the pupils. WRAP equally covers education on waste management and provides a step-by-step approach to setting up action programmes at schools to improve recycling rates (WRAP, 2016).

Overall, there is a wide range of community and school education programmes available in the UK emanating from governmental agencies, non-governmental organisations and private companies. While it is difficult to estimate the specific performance of each of these programmes, questionnaire-based research indicates that students in the county of Essex, England are very knowledgeable about waste and recycling. They participate in recycling behaviour and are eager to reduce waste (Kolbe, 2015b).

## 7.5 Germany

### 7.5.1 *Current Situation Regarding Waste Management*

Germany is a founding member of the EU. It has an advanced waste management system in which high rates of recycling and composting and low landfill rates have been achieved. Since December 1991, packaging waste has to be taken back by manufacturers, distributors, or retailers (Bundesministerium der Justiz, 1998). The Duales System Deutschland (DSD) has helped industries to free themselves from their obligation to take back packaging materials. The DSD finances itself through fees for the utilisation of its trademark, the Green Dot. However, it is important to recognise that the Green Dot is not an eco label; it does not identify the packaging materials as being environmentally friendly. Currently, there are approximately 19,000 companies that use the Duales System Deutschland.

Since June 2005, landfilling of untreated waste has been prohibited. Recycling rates are among the highest in Europe. However, waste quantities are equally among the highest in Europe. Each citizen in Germany on average produces around 625 kg of municipal waste. While the German population is still perceived as extremely environmentally conscious and eager ‘to recycle a teabag’ using four different rubbish bins (Schulte-Peevers, 2013), the loss of resources and energy through waste production is immense and the best practice according to the European Waste Hierarchy—waste reduction—is currently not reflected in the waste production statistics. Ironically, 40% of households in Germany believe that their waste production is already at a minimum and that they cannot reduce it anymore (TNS Political & Social, 2014).

### 7.5.2 *Community and School Education*

In the 1980s, environmental problems associated with landfill became a widely known problem and many landfill sites had to be cleaned up to limit the negative impact of leachate on the environment and human health (Bilitewski, Härdtle, & Marek, 2013; Köster, 2017). These problems were also covered in schools and led to public awareness of the problems associated with landfill sites. As a result of public pressure, the landfill of degradable waste was completely prohibited from 2005 onwards. In the years that followed, the landfill has almost completely disappeared and recycling and composting rates have increased (Eurostat, 2017). Compared to the extensive treatment that landfill demanded, recycling became a cheap option. Today, waste is managed in a manner which does not pose a threat to human health or the environment. However, few if any community education programmes can be found nowadays concerning waste management.

The city of Duisburg has constructed a waste management trail. Interested citizens can find information on the waste hierarchy as well as practical help and advice concerning waste recycling and waste reduction. Different stops on the trail offer information on recycling and composting techniques and the problems associated with landfill and fly-tipping. The trail is built close to a recycling centre, which can be visited on a guided tour (Expo Fortschrittmotor Klimaschutz GmbH, 2017).

The federal state of Brandenburg initiated a day of action against the illegal dumping of garden waste in woods and forests to raise awareness of the importance of correct garden waste disposal. A range of flyers and initiatives were provided for the public as part of this promotion. For instance, advisory signs were erected in wooded areas where garden waste was regularly illegally disposed of (Krause, 2014).

The German Railway Network provider DB regularly displays posters at its stations to discourage littering on the railway platforms. It provides bins with segregated compartments for the separate collection of different waste material categories.

Probably as a result of the generally effective and efficient waste management system, the subjects of waste management and waste, in general, have disappeared from the educational curricula. For instance, the curriculum of the Federal State of Baden-Württemberg covers sustainable development in various ways, for instance, in physics, chemistry, biology and geography. However, waste management is only covered very superficially as one aspect of product life-cycle analysis in the school subject of engineering—which is not a mandatory subject in German schools (KM Baden-Württemberg, 2016).

This is a direct result of efficiently working waste management. Waste is no longer perceived as a nuisance or a problem. This was confirmed by a questionnaire that was circulated in schools in Germany. Only 75% of the students clearly stated that waste should be reduced—in similar questionnaires in England and Romania, almost all students perceived the reduction of waste as being an important goal (Kolbe, 2014, 2015b). Moreover, not even half of the German students recycled ‘whenever possible’, and around one-fourth recycled ‘almost never’ (Kolbe, 2015a). While this is problematic from an environmental point of view, this attitude also

leads to high costs arising for waste management since separate collection at source is not performed.

Currently, only a few cities offer programmes for pupils that focus on waste management. They are not mandatory and it normally depends on the available time and commitment of the tutors or teachers. In the city of Mönchengladbach, education programmes on waste management and recycling for kindergarten and primary school children are offered free of charge (Mags, 2017). In Berlin, an educational institution which is supported by the German Environmental Foundation offers programmes for young children from kindergartens and primary schools. Children can learn playfully which waste materials are disposed of in which bin, which materials can be easily recycled and what the function of the Green Dot is (Trebeß, 2013). In Frankfurt, the local waste management company offers hands-on educational courses for pupils of all ages on waste management and recycling. Students can, for instance, separate different waste materials and produce paper from recycled fibre (Umweltlernen in Frankfurt e.V., 2013).

Overall, there are a few education initiatives that focus on waste management. Other aspects of education regarding sustainable development have started to dominate the curricula in schools, such as renewable energies. While some education initiatives still exist, these normally only occur sporadically. They do not address large parts of the German population or school pupils.

## 7.6 Discussion

In this chapter, three very different countries were compared regarding their community and school education on the subject of waste management. The three countries demonstrate as examples of the direction that waste management and education on waste management can take. Within this development, Romania is still at the beginning of introducing a functioning waste management system and suitable education programmes. The country joined the EU in 2007 and at that time, environmental awareness played only a minor role. Kerbside collection services and recycling facilities were almost non-existent. Education programmes on waste management are rare and normally organised by non-governmental institutions that do not work for a profit. It remains to be seen how far community and school education programmes will be introduced in the future that can help to increase awareness and participation in recycling schemes. This will be vital to further decrease landfill rates, to safeguard resources and to achieve EU recycling and landfill reduction targets.

The UK is in a transitional state—which is characterised by impressive improvements in the waste management sector: In 2001, the UK still landfilled over 80% of its waste. In less than 15 years, the complete waste management system has been transformed. In 2015, only around 22% of waste was landfilled. Today, a range of educational programmes exist that shall help citizens to further reduce and recycle waste. It remains to be seen whether the importance that is put on education of waste management will continue beyond EU membership.

Germany is at the end of the developmental process: It landfills almost no waste at all and has high recycling and composting rates. Waste management works so efficiently that waste is no longer perceived as being an environmental problem. Hence, it has almost completely disappeared from the educational agenda. While this might seem logical and environmentally beneficial at first glance, a deeper analysis shows that Germany produces extremely high levels of waste. Municipal waste production per person is among the highest in Europe. Evidence from questionnaire-based research revealed that many German students do not see any reason why waste should be reduced—since it is managed so efficiently. This is highly deleterious to the environment. The most important aim, waste prevention, has little priority or backing. It seems unlikely that there will be more importance being put on this issue through community or school education in the near future. While the developments in the waste management sector that took place in Germany led to almost no waste at all being landfilled, these developments triggered a disappearance of relevant education programmes. The few programmes that exist nowadays, some of which were detailed in the current chapter, do not address large parts of the population. There are no national or large-scale programmes that every student or every citizen can participate in. Further improvements that could have been achieved—namely to reduce waste production—are, therefore, unlikely to happen. Moreover, due to the lack of education at an early age, it is questionable whether the current high standards can be kept in the future. There is also a danger of going backward since the problems associated with high consumption patterns and the waste that arises as a result is no longer communicated to the public.

## **7.7 Conclusion and Future Research**

Three different countries were compared in the current chapter. The three countries can be seen as being good examples of the developmental process in the area of waste management and are closely connected to education on waste management. While at the beginning of this development, countries with little waste management infrastructure need to develop educational programmes that interact with the existing or developing waste management infrastructure, this interplay can improve waste management significantly. However, once a certain point is reached and waste management functions well, interest in further improvement declines and education is neglected in favour of other (environmental) issues.

Future research needs to establish ways to further increase awareness of the importance of waste management beyond the point that has been achieved in Germany. Waste reduction is vital and all developed countries should search for options to increase the willingness of citizens and stakeholders to further reduce waste and thereby safeguard resources for future generations. Moreover, best practices for Romania need to be established to increase recycling rates and waste management practices in the whole country. Education in communities and schools is one very important tool—the specific programmes, however, still need to be developed and

tested. In the UK, it will be of major importance how far the achievements of the past years can be transferred to the future. Other countries can learn from the example of the UK and consequently promote incentives to improve waste management through educational initiatives.

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