TEXTE
84/2014

Compulsory implementation of separate collection of biowaste

Summary

For our Environment

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Compulsory implementation of separate collection of biowaste

Summary

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Summary

In response to the EU's waste framework directive, the Waste Management Act of 2012 (KrWG) in § 11 paragraph 1 obligates waste producers and mandated waste management authorities to collect biowaste separately at the latest as of January 1st 2015. The term "biowaste" in § 3 KrWG comprises yard, park, and landscape management waste as well as food and kitchen waste. In order to further shape the requirement in KrWG to collect biowaste separately, lawmakers intend to use the power to issue regulations as included in § 11 paragraph 2 KrWG and to pass a revised Biowaste Ordinance (BioAbfV).

This research project is examining the implementation of private household's obligation to collect biowaste separately. Furthermore, the research project investigates the validity of existing concerns against the expansion of separate collection of biowaste. Recommendations and targets for optimal system design are being derived from a detailed analysis of factors that influence the biowaste collection system.

Object of examination

The central object of examination in this study is biowaste from private households that is collected using biowaste bins. Waste collected through biowaste bins, especially food, kitchen, and yard waste, are monitored according to the waste index regulation (AVV) under the waste classification key 20030104 (waste from the biowaste bin).

Other separate collection systems for yard waste from private households are not in the focus of this study. They will, however, also be considered as far as overlaps in waste management procedures are concerned. The corresponding waste classification key, 200201 (biodegradable yard and park waste), comprises private yard waste as well as garden and park management waste from municipal sources and landscape management.

For further differentiation, this research project is using the following terms:

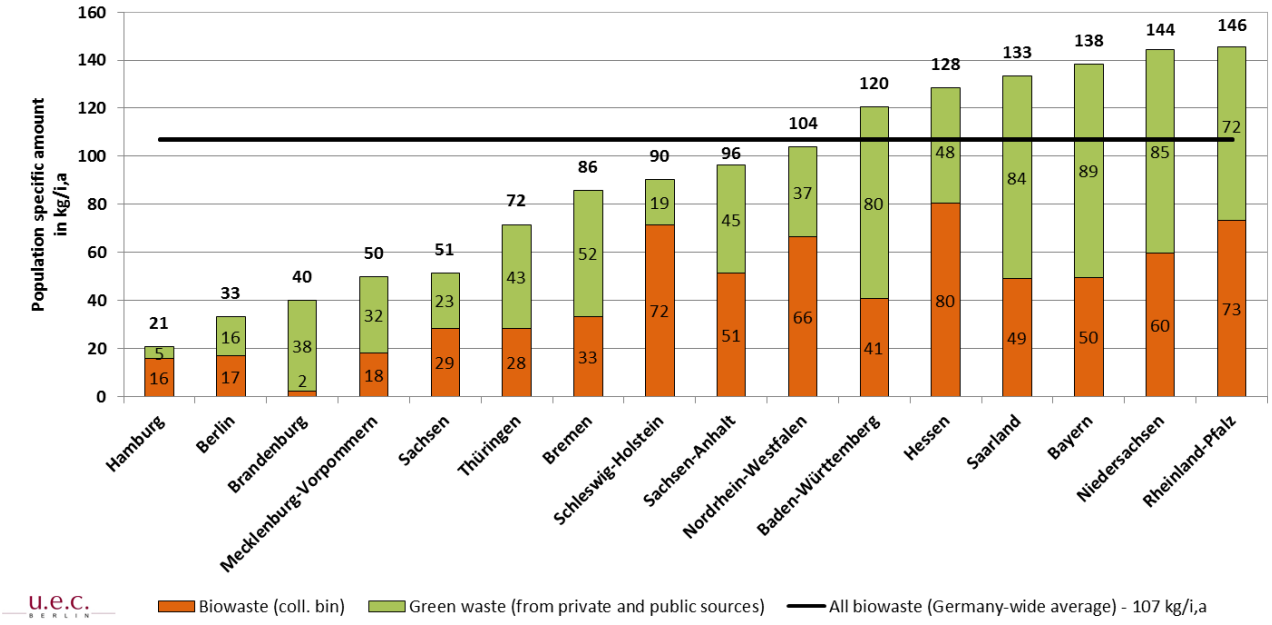
- Biowaste (coll. bin): separately collected (in biowaste bin or bag) food and kitchen waste, and yard waste from private households.
- Green waste: Separately collected yard waste from private households, and waste generated in municipal park and landscape management
- Biowaste: food, kitchen, and yard waste from private households, and waste generated in municipal park and landscape management. Combination of biowaste (coll. bin) and green waste.

Collection of biowaste (coll. bin) in 2010

In 2010, the amount of biowaste separately collected from private households and landscape management of public land in Germany amounted to 8.8 million Mg. 4.2 million Mg of this amount were collected using biowaste bins and 4.6 million Mg were green waste, collected by mandated waste management authorities (örE).

While the population specific Germany-wide average of biowaste (coll. bin) and green waste amounts to 51 kg/E,a and 56 kg/E,a respectively, amounts vary significantly across the German states (see Illustration 1).

Illustration 1: Separately collected amounts of biowaste in German states in 2010



Even more significant differences are observable when looking at the 402 German districts and independent towns. For instance, the district of "Friesland" is recording biowaste (coll. bin) of up to 224 kg/i,a.

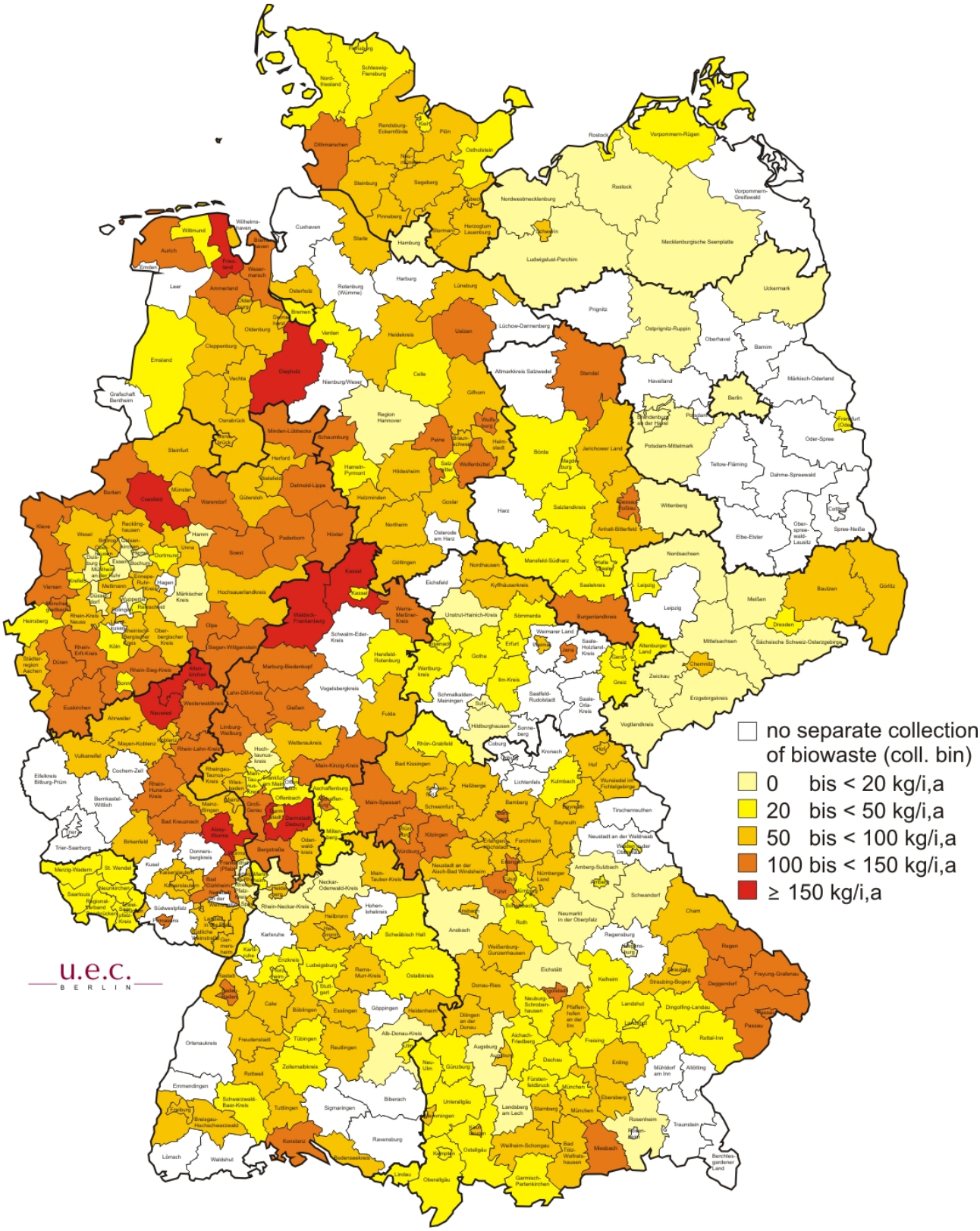
What is crucial concerning the extent of the collected amounts is the configuration of the separate collection system which is in the hands of the mandated waste management authority. They have the choice to collect biowaste (coll. bin) in a pick-up or drop-off fashion, and whether to use biowaste bins or bags as a collection container. In any case, the configuration of the system should be in accordance with the population's waste disposal preferences and be compatible with the existing collection system for green waste.

Not everybody in Germany was able to participate in separate biowaste collection done by public waste management using biowaste bins or bags. In 2010, private households in 286 districts had access to a comprehensive separate collection system that uses biowaste bins and is operated by mandated waste management authorities. While 39 districts offered separate collection in some parts of the waste management area, 77 districts offered no biowaste bin service at all.

Separate collection systems for private yard waste, however, are in place in most districts. Only seven districts do not have the possibility to dispose of green waste separately through mandated waste management authorities.

A survey among mandated waste management authorities using questionnaires in 2012 revealed that the actual rate of access of private households to separate biowaste collection using biowaste bins amounts to roughly 52% Germany-wide. This number increases to 65% in areas of comprehensive separate collection systems. Thus, close to 40 million people in Germany do not use the biowaste bin.

Illustration 2: Population specific amounts of biowaste (coll. bin) collected in German districts in 2010



Questionnaire-based survey among mandated waste management authorities

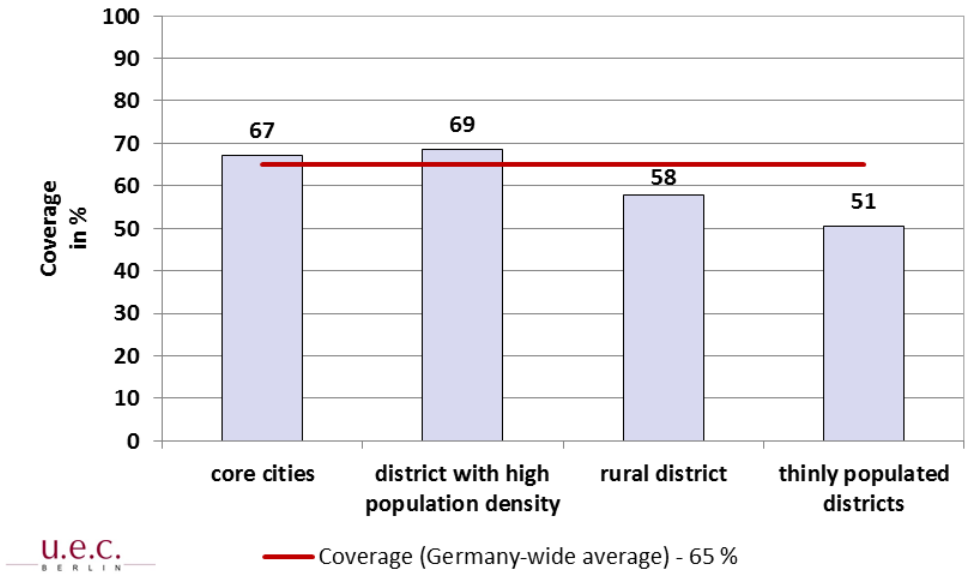
Corporate entities from 234 German districts participated in the above mentioned questionnaire-based survey on the future management structure of biowaste disposal. Because of a high return rate of questionnaires (58%) and the participation of several waste management authorities that serve in areas with varying populations and waste disposal structures, the results of this survey can be considered significant and meaningful.

With regard to the design of the regulation concerning biowaste bin usage, results show that a large majority (83%) of all areas where a comprehensive separate collection system is available also have an obligation for customers to use biowaste bins for biowaste disposal. The obligation to use biowaste bins does not, however, imply that all households are connected to the biowaste collection system. Most waste management authorities allow private households to opt out of the biowaste collection system under certain conditions, e.g. recycling biowaste using backyard compost. In many cases a written notice that is free of charge is sufficient to opt out.

As the recourse to the exemption backyard composting shows, the recycling of kitchen and yard waste in private yards is declining, but nevertheless still relevant in rural areas. One explanation for this observation is that in areas with a lower population density than in urban areas fewer households are connected to biowaste bin collection systems (see Illustration 3).

At the same time, differentiating coverage according to different types of housing structures indicated that outside larger cities more than 100 kg/a of biowaste (coll. bin) are collected per user of biowaste bins.

Illustration 3: Coverage of waste disposal areas with comprehensive availability of biowaste bins according to housing structure in 2011/2012



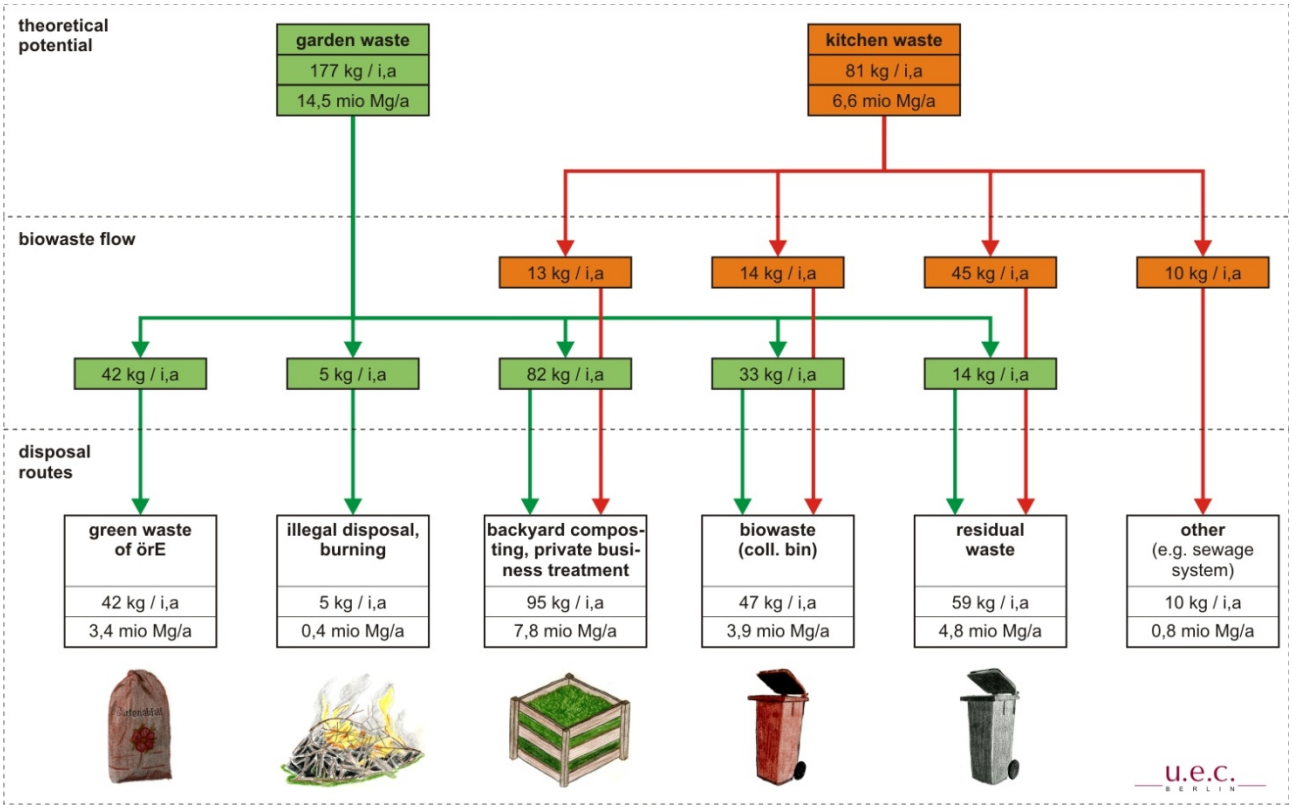
Biowaste flow modelling and forecast of biowaste (coll. bin) collection

The biowaste disposal situation in 2010 is described using a biowaste flow model solely developed for this purpose. The point of departure is calculating the theoretical potential of kitchen and yard

waste which is being assigned to individual biowaste disposal routes according to the biowaste disposal behaviour. The crucial measures are the amounts and the composition of biowaste (coll. bin), green waste and residual waste collected by mandated waste management authorities through the various waste collection routes.

It is observable that 35% of the theoretical biowaste potential (ca. 21.1 million Mg/a) has been collected by mandated waste management authorities in 2010, while roughly 23% (4.8 million Mg/a) went into residual waste. Another significant amount was disposed of in private yards and in non recorded private business treating biowaste (see Illustration 4).

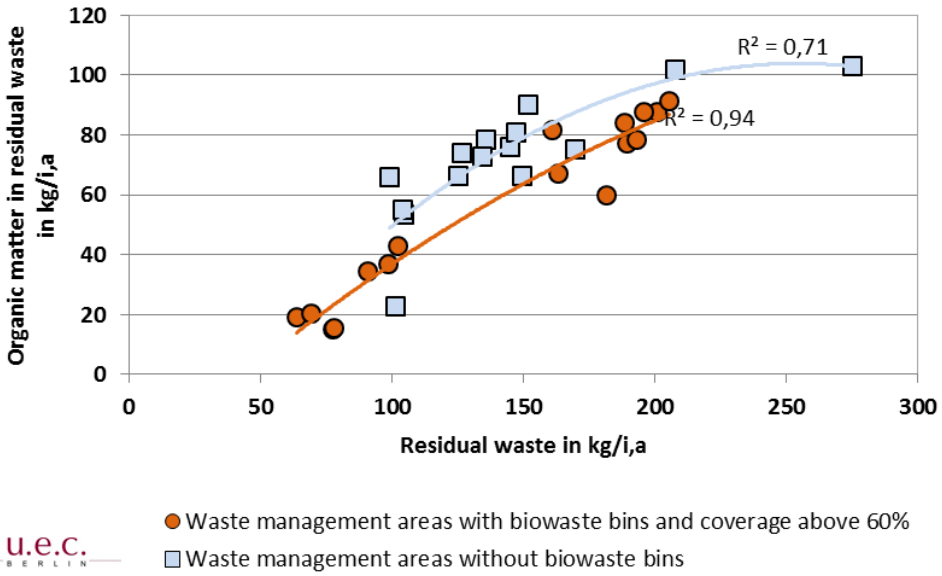
Illustration 4: Biowaste disposal routes of kitchen and yard waste in Germany in 2010



As residual waste analyses confirm, most organic material contained in residual waste consists of kitchen and food waste. Further separation efforts of residual waste should therefore focus on the separation of kitchen waste. The comparison of residual waste composition in areas with and without biowaste bins shows that already established biowaste bin collection reduces the amount of residual waste by 15 to 20 kg of organic matter per person and year (see Illustration 5). Additionally, yard waste is getting into biowaste bins that would otherwise be individually composted, be illegally disposed of, or get burned. Broadly speaking, 1 kg of organic matter that is getting separated from residual waste will lead waste management authorities to gain 2 kg in yard biowaste.

Nevertheless, even in optimal separate collection systems and in the case of efficient use of the biowaste bin, 15 to 20 kg/E,a of organic matter will usually go into residual waste.

Illustration 5: Population specific organic matter in residual waste



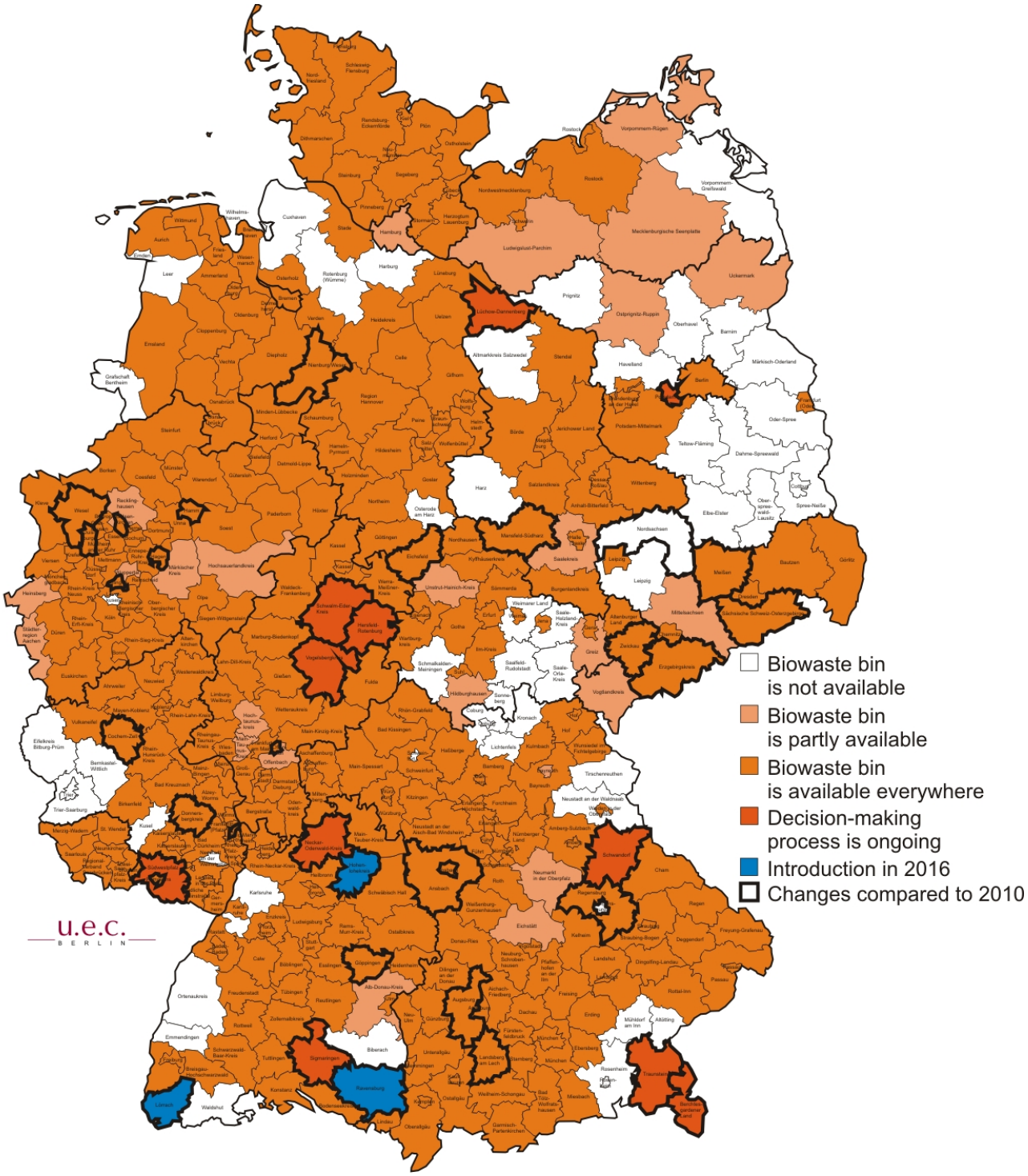
While up until 2010 the amount of collected biowaste (coll. bin) basically stagnated at around 4.2 million Mg, the amount has been steadily rising since 2010. This increase can already be accorded to the KrWG regulation regarding separate collection of biowaste (coll. bin). Changes in the collection status in 2015 or 2016 might or will likely take place in 39 districts:

- Introduction of separate collection using biowaste bins in 10 districts (another three will be introduced in 2016)
- Increase of availability achieving a state of comprehensive collection in 12 districts
- Abolition of separate collection using biowaste bins in two districts
- Ongoing decision-making processes in 12 districts

Depending on the outcome of these processes, the amount of biowaste collected through biowaste bins in Germany in 2015 should add up to 4.7 to 4.9 million Mg. At the same time, it is noteworthy that 57 to 69 districts will still not offer biowaste bin collection through mandated waste management authorities in 2015.

It is difficult to predict which potential can be achieved using the biowaste bin because it is dependent on political decision-making processes. The present study is using a min-max approach which uses coverage as the main input variable while also considering the analysis of various input variables and the results of biowaste flow modelling. Given a comprehensive access of households to biowaste bins, the amount of collectible biowaste (coll. bin) would total 6.4 and 9.1 million Mg/a, depending on the extent of biowaste (coll. bin) collection coverage of 70% or 100% respectively.

Illustration 6: Probably changes in availability of biowaste bins up to 2015 or 2016

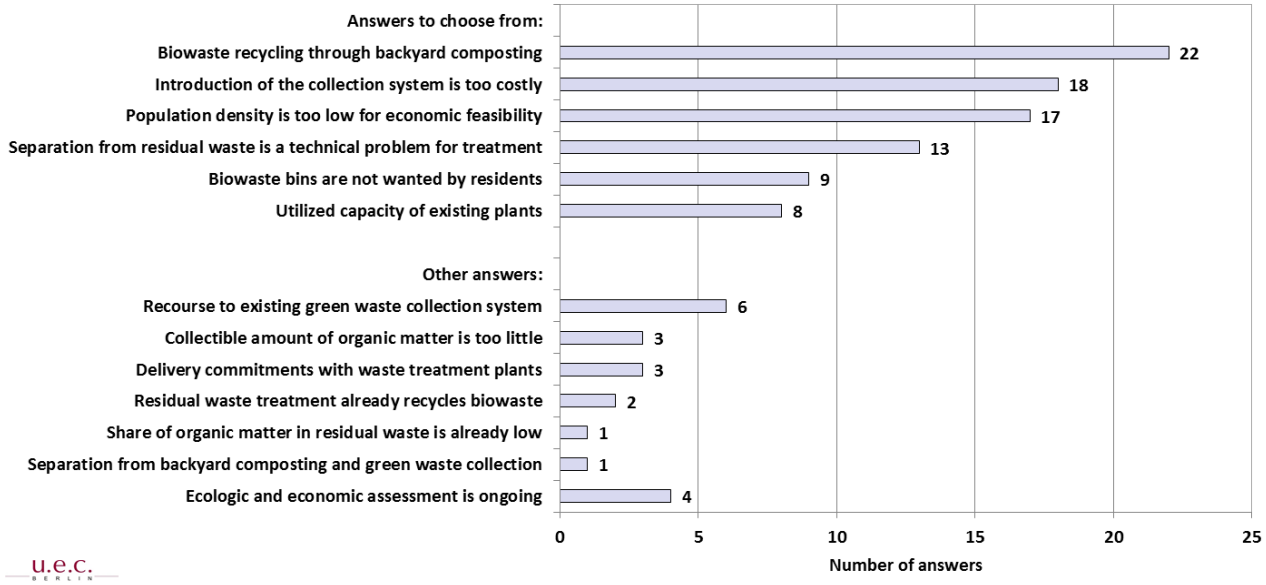


Reservations against separate collection of biowaste

Although the biowaste bin is widely used in Germany, fundamental reservations against the introduction and usage of biowaste bins persist. This observation is reflected in the answers to the above mentioned questionnaire-based survey (see Illustration 7). The main argument is that most biowaste

would already be recycled individually and that biowaste bins are economically not feasible in thinly populated areas.

Illustration 7: Arguments against the introduction of biowaste bins in 2013 (multiple selections are possible)



The notion that a comprehensive network of green waste collection points would suffice to answer the obligation to separately collect biowaste as of January 1st 2015 as determined in § 11 paragraph 1 KrWG can be clearly rejected because legislation dictates that kitchen waste must be collected as well.

Individual treatment on private properties is likewise insufficient because comprehensive biowaste treatment can not be assured and because not all waste producers are able to process their own biowaste in their own backyard. Residual waste analyses show that significant amounts of organic matter remain in the residual waste even in rural areas with good conditions for individual biowaste recycling.

Economic consequences of the introduction of separate collection using biowaste bins

Because of the strong dependency on conditions in each district, a general statement on the economic consequences due to the introduction of biowaste bin based collection is impossible. This study therefore includes an examination of several different scenarios linked in a calculation model that differentiates between rural and urban waste management districts.

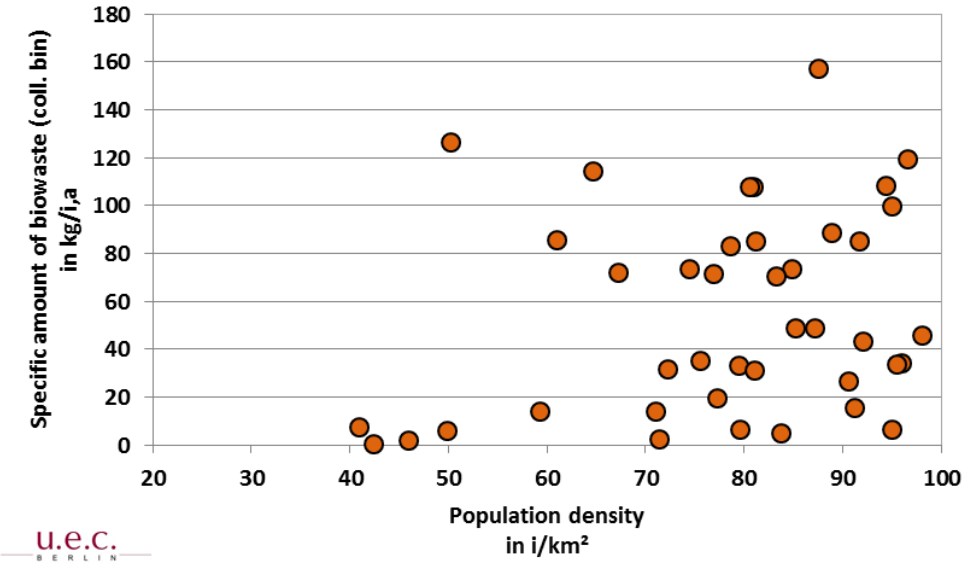
As a result, the economic consequences due to the introduction of a biowaste bin in urban areas fluctuate between cost savings of 4.12 €/E,a (best case) and a cost increase of 8.70 €/E,a (best case 2). Increased amounts of biowaste in rural areas lead to higher cost fluctuations, which results in a span of cost savings as low as 6.19 €/E,a (best case) to a cost increase of up to 18.38 €/E,a (best case 2). An expansion of biowaste (coll. bin) collection to a comprehensive system in waste management areas with already existing usage of biowaste bins can be done with low additional costs.

Generally speaking, possible additional costs as a result of the introduction of the biowaste bin have to be considered in conjunction with § 7 paragraph 4 KrWG. Thereby, introducing biowaste bins is

economically reasonable if costs of biowaste treatment are not out of proportion with the costs of residual waste disposal.

Experience with the collection of biowaste (coll. bin) in areas of low population density indicates that biowaste collection is in line with waste disposal needs of private households in thinly populated areas and is seen to be economically reasonable (see Illustration 8).

Illustration 8: Collected amounts of biowaste (coll. bin) in thinly populated districts in 2010



Steering instruments and targets

The agreements that are being currently debated in politics on specific guidelines to optimize separate biowaste (coll. bin) collection make sense with regard to the goals that are being pursued. In other aspects, however, they remain questionable.

While assumed amounts of biowaste can hardly be compared because of varying amounts of green waste in different districts, the target amounts in biowaste bins can, for instance, be achieved through reallocation of green waste. Determining the amount of organic matter in residual waste, below which the legal obligation to separately collect biowaste becomes obsolete, can only work if comprehensive rules are introduced Germany-wide on how residual waste is sorted and sampled for composition.

Results of this research project show that rather then setting explicit targets, successful separate collection of biowaste (coll. bin) needs better-shaped framework conditions. Once the separate collection system is tailored to the local waste management needs, goals will achieve themselves.

With regard to collectible biowaste (coll. bin) amounts, the volume of the biowaste bin is crucial. An extensive analysis of existing biowaste management areas shows that the amount of biowaste (coll. bin) disposed of increases with the size of the bin. A minimum emptying capacity of 10 to 20 l/i,week, depending on the structure of the area, is necessary to reach a collected amount of at least 50 kg/a of biowaste (coll. bin) per individual connected to the separate collection system.

Recommendations for high quality recycling of biowaste

According to the obligation regulated in § 11 paragraph 1 KrWG to separately collect biowaste from private household as of January 1st 2015, mandated waste management authorities can pursue two possible routes to design their system. Either waste management offers biowaste collection via biowaste bins that would be able to take both kitchen and yard waste, or waste management offers private households a combination of biowaste bins and separate green waste collection.

The findings of the research project lead to the following recommendations for a focused design of separate biowaste collection systems:

1. Mandated waste management authorities have to create a comprehensive system of kitchen and yard waste. No part of the waste management area should be excluded from the biowaste bin collection system.
2. Connection to and usage of the biowaste (coll. bin) collection system should be made mandatory and is to be enforced by mandated waste management authorities.
3. This gives the mandated waste management authority the opportunity to control biowaste (coll. bin) recycling efforts as the only possibility to be exempt of the system.
4. In order to prevent malpractice and guarantee appropriate private recycling of biowaste, mandated waste management authorities should set minimum standards that are conditional for opting out.
5. Biowaste recycling is to be done in a high quality way. Cascade use (combined recycling and energy generation) should be prioritized. Recycling should be a minimum requirement.
6. Environmentally damaging disposal of yard waste through illegal dumping or burning should be prevented by user-friendly green waste collection and an interdiction of burning.

In this case, the mandated waste management authorities have leeway whether or not a backyard is sufficient to opt out of the biowaste collection system. Another solution could be to make participation in the separate collection system compulsory for everybody (i.e. without the possibility to opt out) while offering small biowaste bins for non-compostable kitchen waste only.

High quality recycling of biowaste should be the standard for individual biowaste treatment as well. The possibility to opt out of the separate collection system should only be granted if existing backyard composting is appropriate and correspond to certain standard requirements that ought to be controlled by the mandated waste management authority. Aside from a written exemption application that includes the size of the property and the number of residents, the applying individual should prove a minimum yard space of 50 m² per resident. Because processing the application and periodic control lead to costs, the exemption should not lead to a complete riddance of fees for residents.