

Impact of biowaste collection on municipal solid waste management in Czechia

Michal Struk
Masaryk University

Biowaste in general

- Biowaste – biodegradable municipal waste
- Up to 50% of the municipal waste in EU
 - Even more in developing countries (Bidlingmaier 2004)
- Separate biowaste collection can reduce this below 30% (Dahlén et al. 2007)
- Widely discussed issue in recent years
 - Strong stress towards reduction and separation

What to do with biowaste

- Best not to produce...
- Typically anaerobic digestion or composting
 - Composting less expensive, suitable for green waste (individual at source + centralized industrial)
 - AD more expensive, but can be used for energy conversion, etc., suitable for food leftovers
- No single optimal solution, case-dependent

Biowaste in Czechia

- Historically biowaste was not a problem
- Strong agricultural tradition, biowaste was not perceived as a waste, but as a resource
- Industrial biodegradable waste is not a problem, today are producers clearly identified and strongly incentivized
- Municipal biodegradable waste is an issue – law sets municipality as the producer and it has to cover the costs
 - Shifting roles of gardens to ornamental purposes
 - People do not utilize biowaste, resulting in excessive biowaste

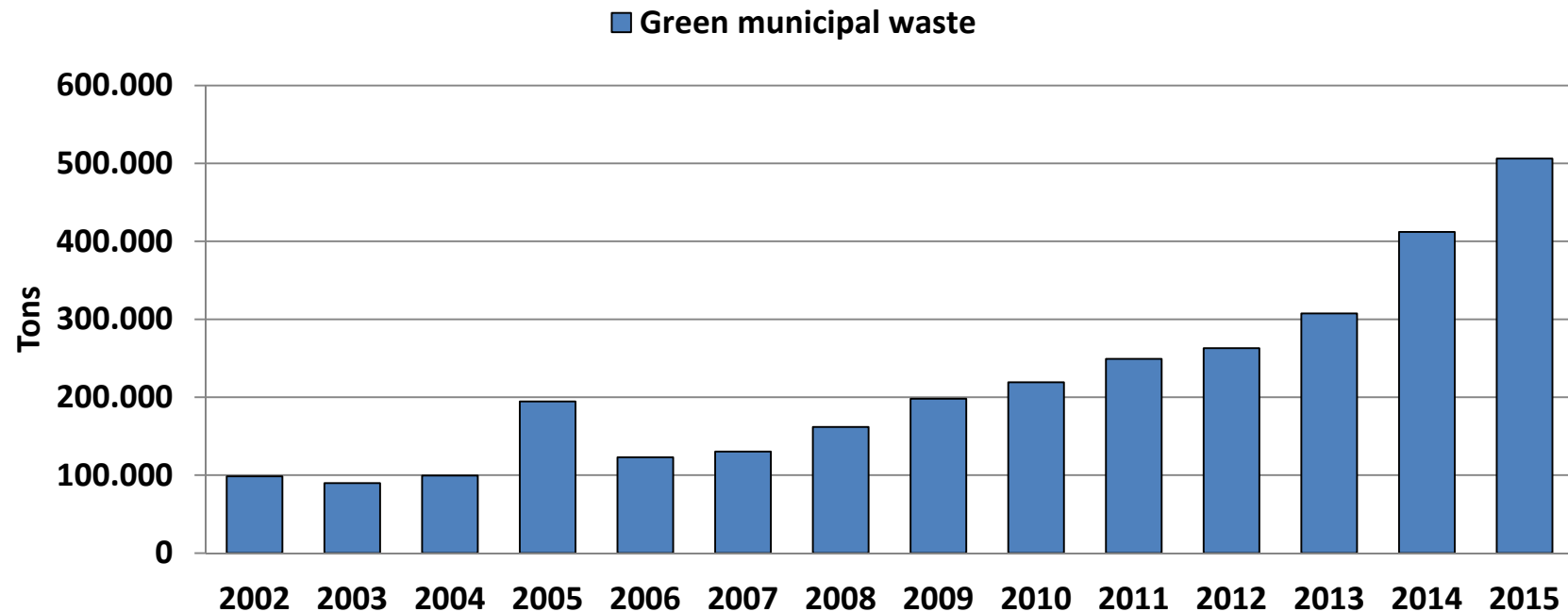
Biowaste changes in Czechia

- People started to demand biowaste collection in recent years
 - But municipalities often reluctant (changing current system, expensive)
- Questions of how to collect it + how to treat it?
 - So far, main focus on green waste
 - Food leftovers still to take care of
- In 2015 legislation requirements for each municipality to provide separate biowaste collection (many adopted earlier)
 - Central bins, kerbside collection, civic amenity sites, home composters...
 - Biowaste mostly treated in composting plants (more suitable than AD)

Research purpose and data

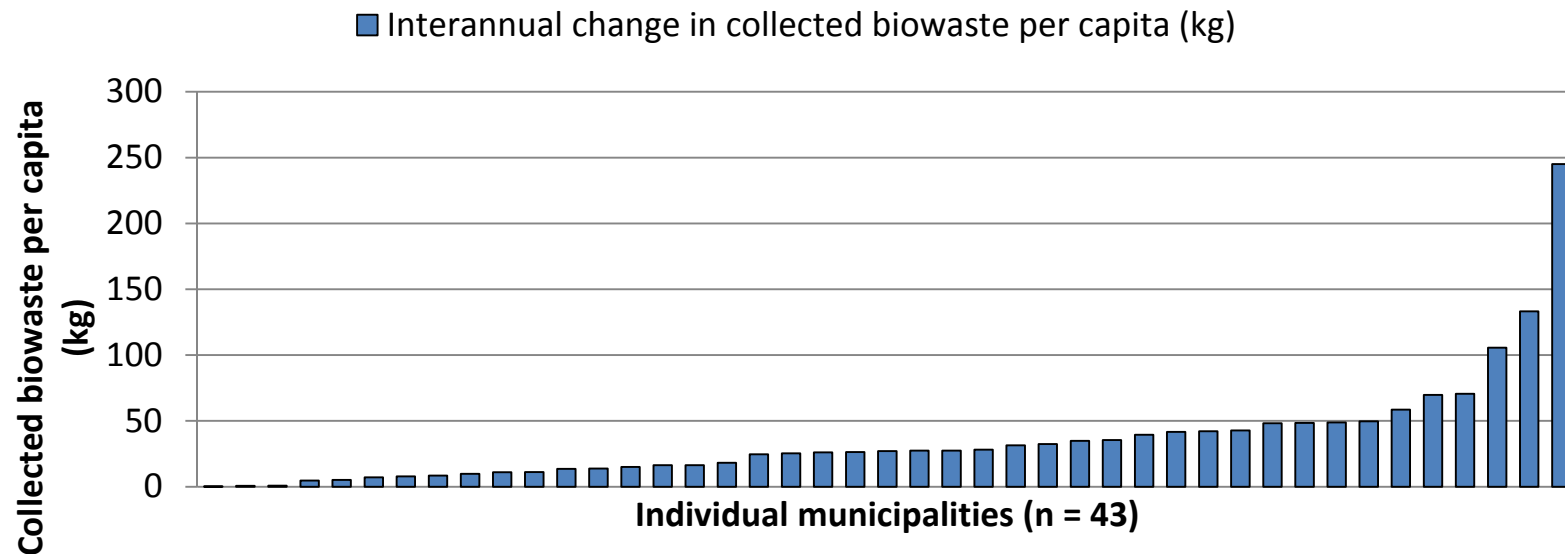
- Main question was the impact of the introduction of separate biowaste collection on the municipal waste management of the municipalities
 - What was the effect on biowaste amount?
 - What was the effect on residual waste amount?
 - What was the effect on waste expenditures?
- Data from 2009-2012 (some data not available)
- Only municipalities that begun with biowaste included

Development of green municipal waste in Czechia



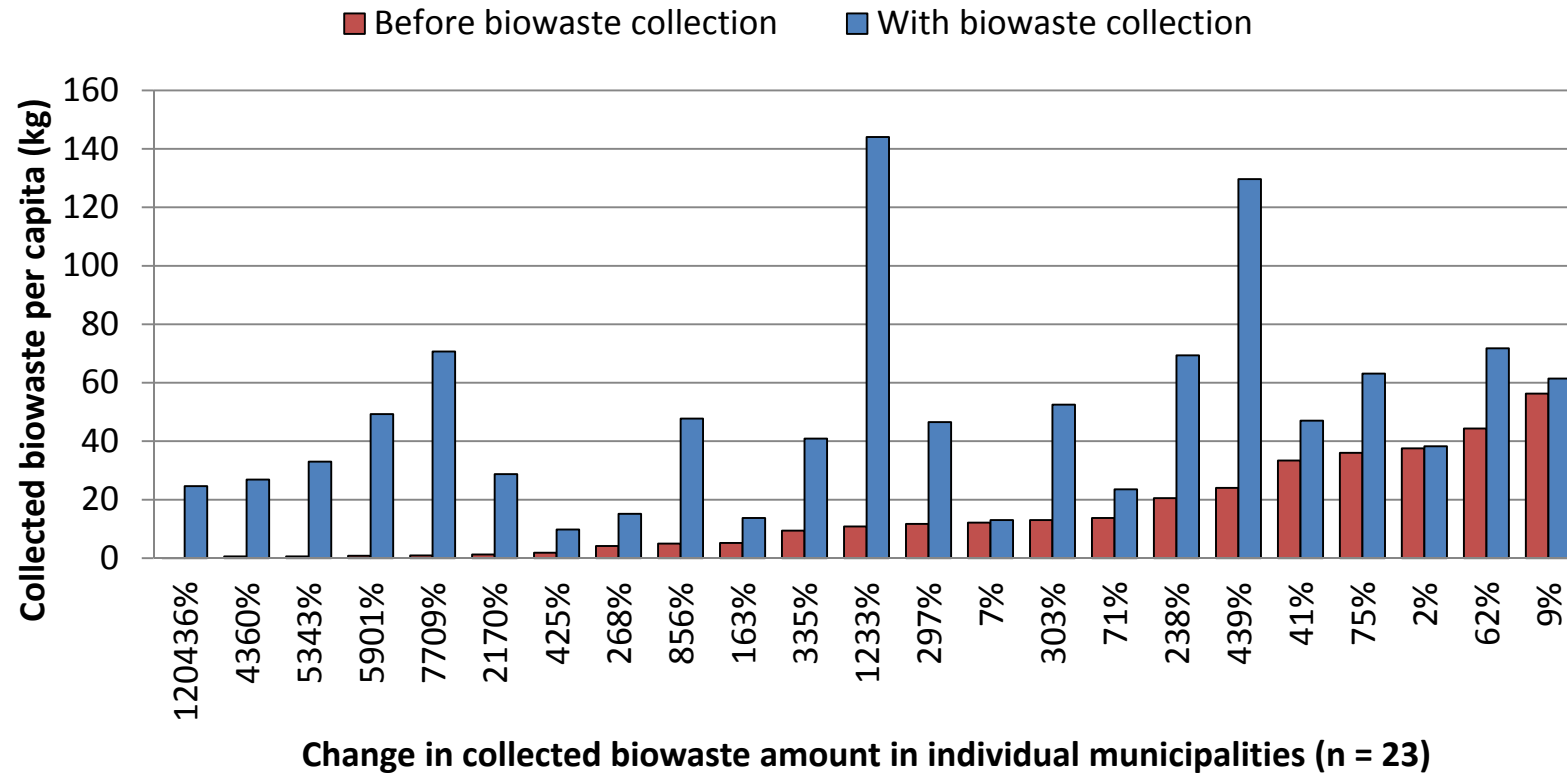
- Gradual increase since 2007, especially since 2014
- Per capita amount increased from 10 kg in 2002 to 50 kg in 2015

Interannual change in collected biowaste with the biowaste collection



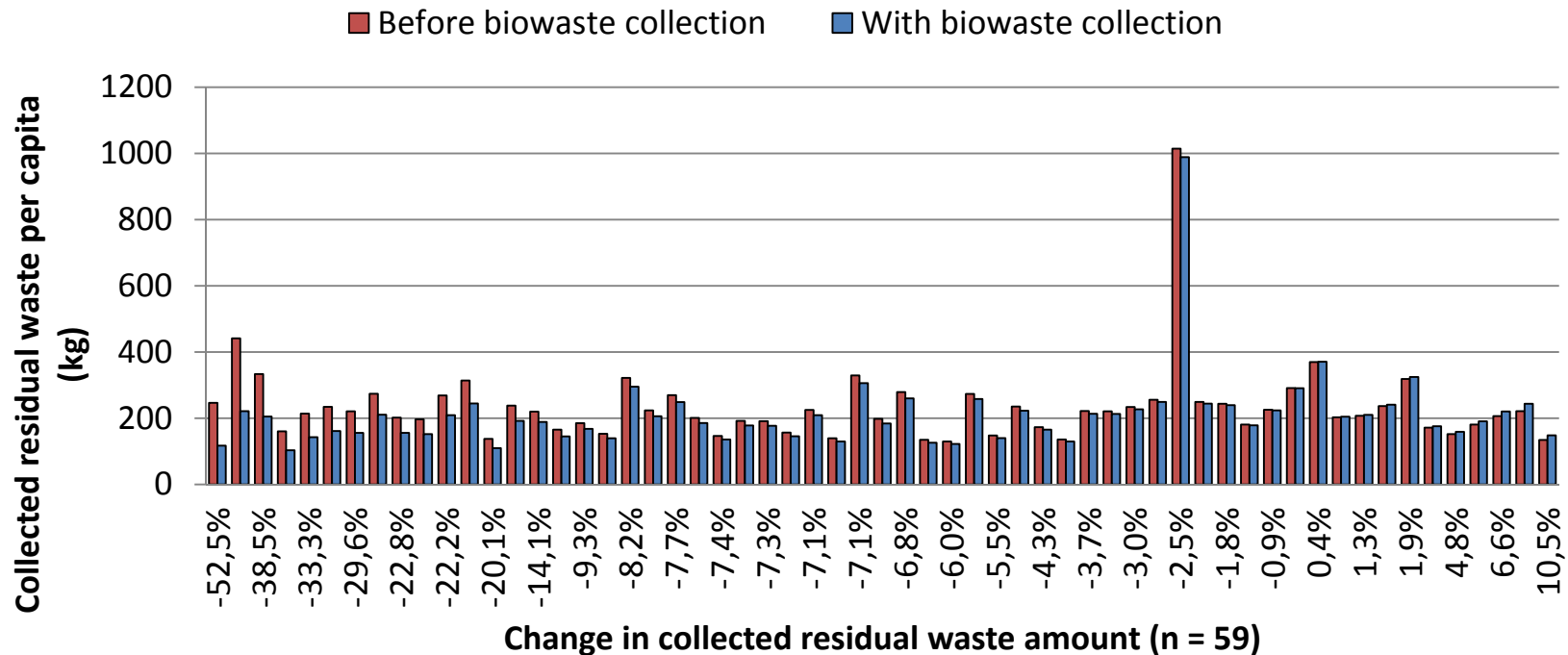
- Reported increase in collected biowaste (green municipal waste):
 - 1/3 of municipalities less than 20 kg per capita
 - 1/3 of municipalities 20-40 kg per capita
 - 1/4 of municipalities 50+ kg per capita

Difference between collected biowaste per capita before and after the biowaste collection



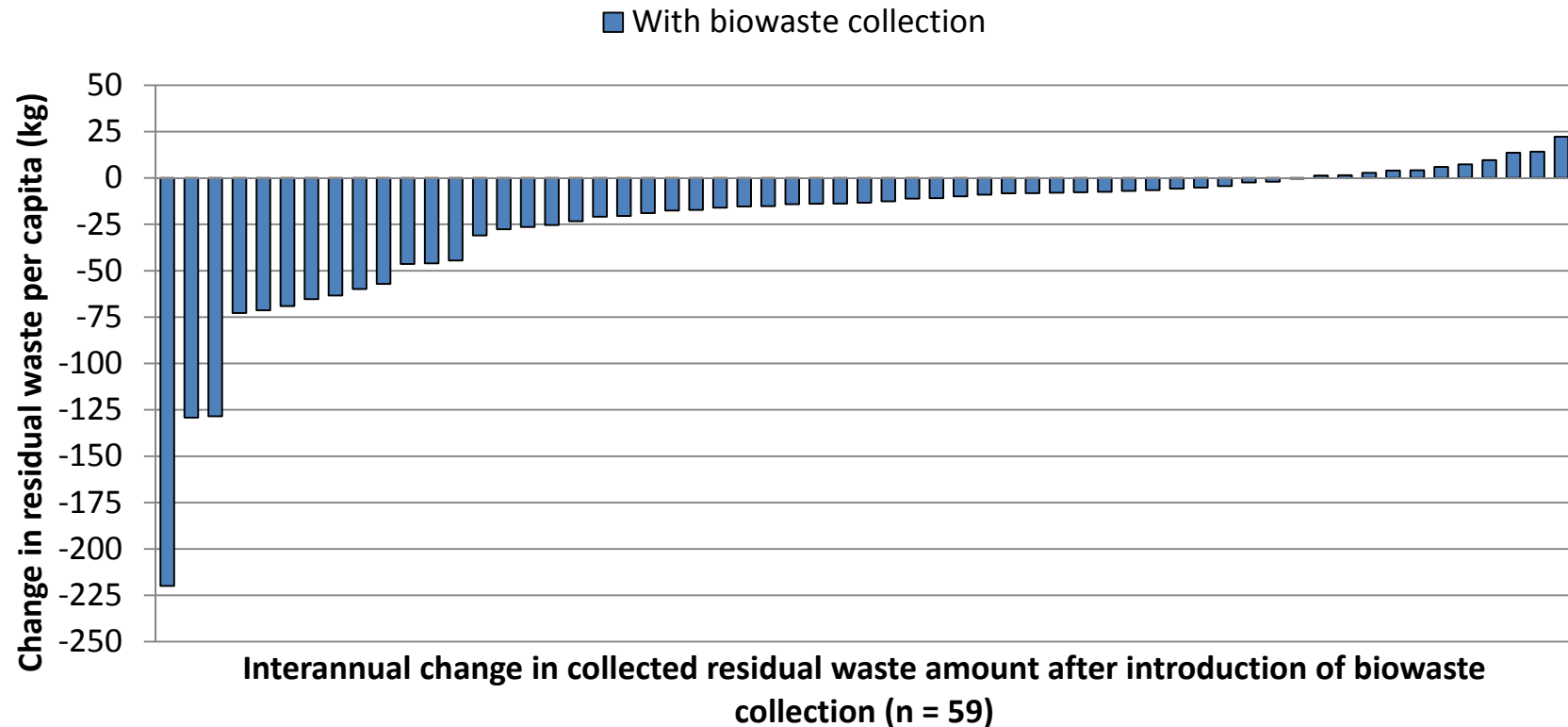
- Half of the municipalities reported 100-1000% increase

Interannual difference in residual waste generation



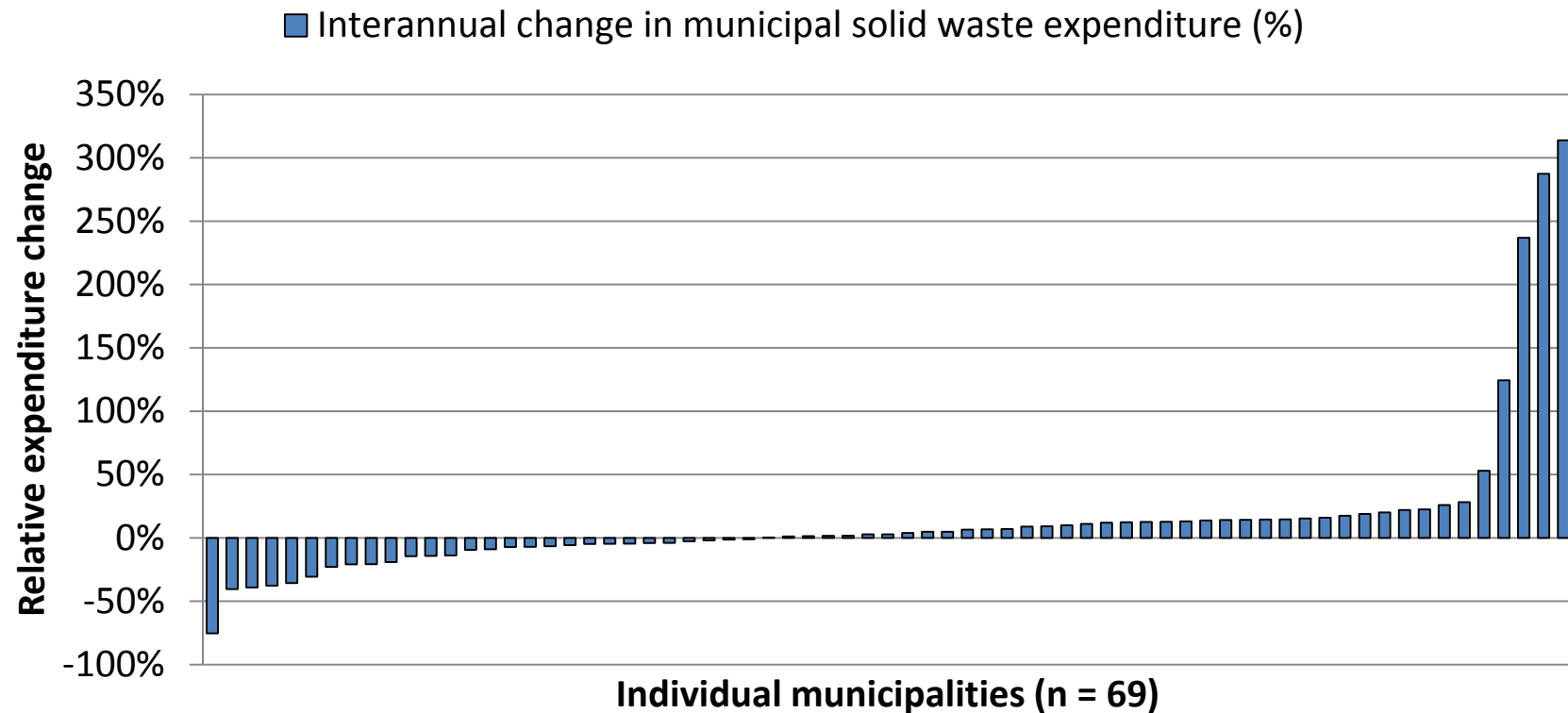
- Half of the municipalities report up to 10% decrease of the residual waste
 - Some even 30-50% decrease of the residual waste (but other factors can be present)
- Average share of biowaste in residual waste + biowaste was 3.5% before and 17.2% after the introduction of separate collection (with several over 30%)

Change in the reported residual municipal waste after the introduction of biowaste collection



- Half of the municipalities reported up to 25 kg per capita decrease
 - Several municipalities had more than 50 kg per capita decrease

Change in municipal solid waste expenditure after the introduction of biowaste collection



- Half of the municipalities reported only $\pm 10\%$ change in waste expenditures
 - Almost half reported a decrease in total waste expenditures

Comments

- Presented results cover only initial year of biowaste collection
 - Usually at least 2-3 years until full potential, people need to adjust
 - Several municipalities reported additional 100-400% increase in collected biowaste in the second year
 - Strong effects in municipalities with no previous biowaste collection
- Positive effect also on residual waste amount
 - Sometimes possible to reduce frequency of waste collection
- Usually little effect on expenditures in the first year
 - Fixed contracts, pilot projects, savings are expected in later years

Conclusions

- After initial reluctance municipalities find separate collection of biowaste positive
 - Generally decrease of residual waste with little effect on costs
 - But experiences of individual municipalities vary greatly
- No single solution fits all
 - Unique characteristics of municipalities need to be taken into account, waste collection needs to reflect the specifics
- Proper information campaigns are crucial
- Issues of utilizing produced compost remains

- Thank you for your attention
- struk@mail.muni.cz
- www.researchgate.net/profile/Michal_Struk