Towards an emission-free waste flow strategy within an urban community supported agriculture scheme in Bonn, Germany

Roberto Tinoco[1] in representation of SOLAWI-BONN Field and Research Team

Partner Institutions: SoLaWi-Bonn Rhein Sieg e.V., Bonn im Wandel e.V, Projekt Bolle-Bonn
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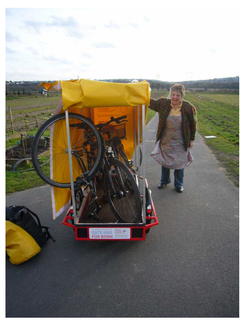
INTRODUCTION

An average of 100 kg organic waste of ecological-farming sources were collected weekly during approximately one year and transported from source to storage place in an organic farm. The source (Freikost Deinet) and the farm (Hof Groote) have both a rather periferic location within the urban matrix of Bonn city, Germany.

The farm is run under community supported agriculture principles (CSA) and it is on its third year of transformation process from conventional to organic-biodynamic agriculture. The source is a store of biological products which is run under a „plastic-free“ concept (https://freikost.de) .



DISCUSSION AND CONCLUSION

Once at storage place at Hof Groote, the biomass was composted following mainly biodynamic (Demeter) criteria. Thanks to the support of our consumers, compost piles were also enriched with additional fermented kitchen-waste treated under Terra-preta, Bokashi and worm-composting approaches. Both, composting and green manure fallowing are an important part of SoLawi-Bonn´s soil amendment strategy, as shown in figure 1.

Two farms with a global average of 6 Ha are the producing units of Solawi-Bonn e.V.. This area delivers all year round biologically produced vegetable and grains to 300 families under a community supported agricultural principle. 7 distribution centers (depots) are found between both farms: Hof Groote in Dransdorf and Hanfer Hof (Hof Bernd Schmitz) in Hennef.

The results of this pilot phase are key elements for a long term CO_2 negative soil amendment strategy. They are also the first steps towards a zero emission and a double-way transport concept that allows us to design a circular flow between our two farms, our 300 consumer families and other important sources of non-polluted green waste.

Figure 1. Elements of Solawi-Bonn soil amendment strategy 2016

METHODS AND RESULTS

A 15 km two-way route was driven weekly in average. Two emission free vehicles were used for transport: a) a Peugeot 106 electric car, model 1998, and b) the bicycle trailer “Bolle” with 150 kg load capacity. Bolle is developed, maintained and run as a commons, which means that a community drives non-commercial bicycle-based cargo mobility forward towards more car-free cities (https://bolle-bonn.de).

In sum a 720 km zero-emission pathway was possible to travel from August 2015 to December 2016 ensuring thereby a flow of ~ 6000 kg of organic and plastic-free waste from source to storage place. As reference for the emission calculations, online data set available for a Sprinter 211 CDI WORKER Motor OM 651 DE22LA were used (see table 1).

Considering an CO_2 emission value of 190 g/km in avarage, given in the table below, a total amount of 136,8 kg CO2 was posible to avoid during this period.

Table 1. CO_2 emission values for a Sprinter 211 vehicle

	CO2-Emissionswerte (g/km)	Sprinter 211 CDI WORKER Kastenwagen 84 kW (114 PS) Radstand 3.250 mm, Motor OM 651 DE22LA Typ 316 CDI Getriebe M6/A7 Kraftstoffart Diesel
Fahrzeug mit Abgasnorm Euro 6 Gr.I /Gr.III und Antrieb 4x2 mit BlueEFFICIENCY Paket	199 - 197 / 187 - 184	
Fahrzeug mit Abgasnorm Euro 6 Gr.I/ Gr.III und Antrieb 4x2 ohne BlueEFFICIENCY Paket	207 - 204 / 196 - 193	

https://www.mercedes-benz.at/content/austria/mpc/mpc_austria_website/de/home_mpc/van/home/new_vans/models/sprinter_906/panel_van_.html

Figure 2. Location of several bio-waste sources within the Solawi-Bonn Network

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1. Kontakt: solawi@bonn-im-wandel.de