

The Carbon Footprint of Academic Conferences: Evidence from the 14th EAAE Congress in Slovenia

L’empreinte carbone des conférences universitaires : le cas du 14^{ème} congrès de l’AEEA en Slovénie

Der CO₂-Fußabdruck wissenschaftlicher Veranstaltungen: Die Belege vom 14. Kongress der EAAE in Slowenien

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Climate change is – with good reason – a prominent topic at academic conferences of agricultural economists. Carbon taxes, emissions by the livestock sector or the need to increase resilience in the face of climate change are indeed key issues for agricultural economists (Davis *et al.*, 2015).

“ Les chercheurs devraient être au premier plan des efforts de réduction des émissions de CO₂ et montrer l'exemple à la communauté mondiale. ”

Yet, agricultural economists pay little attention to the carbon footprint of academic conferences and take even fewer concrete actions to reduce the negative impact of conferences on the climate. This is surprising from a moral point of view: if agricultural economists are serious about reducing CO₂ emissions, they should lead by example and, thus, seek to limit their own emissions (Favaro, 2014). Against the background of the upcoming climate summit in Paris in December 2015, I will argue that agricultural economists, and researchers more generally, should undertake

actions to reduce the CO₂ emissions of their profession.

I use the 14th Congress of the European Association of Agricultural Economists (EAAE) in Ljubljana, Slovenia in the summer of 2014 as a case study to illustrate that academic conferences emit a substantial amount of CO₂. The analysis enabled me to reflect upon strategies to reduce the carbon footprint of academic conferences. I hope this article can contribute to starting a debate among agricultural economists about their role in reducing CO₂ emissions.

The carbon footprint of the 14th EAAE congress

The European Association of Agricultural Economists (EAAE) organises a triannual academic congress in Europe. The most recent one took place in Ljubljana, Slovenia from 26th–29th August 2014 and was attended by 646 participants from over 40 countries. Most participants (around 85 per cent) came from

within Europe, mostly from Germany (15 per cent), France (10 per cent), Italy (10 per cent), the Netherlands (7 per cent) and Belgium (5 per cent). The European countries that have joined the EU since 2004, mainly Eastern European countries, accounted for only 15 per cent of the participants. Participants from outside Europe were mainly from the US (4 per cent) and Japan (2 per cent).

Table 1 (first row) shows the CO₂ emission of the conference under two scenarios. The methodology used to obtain these figures is explained in Box 1. The total CO₂ emission of the conference is 322 tonnes if all participants travelled by plane (scenario 1) and decreases to 308 tonnes if participants living within 600 km of Ljubljana travelled by train (scenario 2). This corresponds to an average emission of 0.5 tonne per participant. This may not seem much, but it amounts to 5 per cent of annual per capita emissions in Europe (Eurostat, 2015a). The estimate is remarkably close to the one reported by Spinellis and Louridas (2013) who

Table 1: Carbon footprint of the 14th EAAE congress (tonne CO₂ eq.)

	Scenario 1 (all participants travel by plane)	Scenario 2 (participants within 600 km of conference travel by train)
Conference in Ljubljana	322	308
Same conference, but organised in Stuttgart	291	248

Box 1: The key assumptions required to estimate CO₂ emissions

Transport to conferences, particularly air travel, is the most important contributor to the total CO₂ emissions of academic conferences (Achten *et al.*, 2013; Bofinger and Strand, 2013). To estimate CO₂ emissions, several assumptions were required with regards to distance travelled, choice of means of transport and CO₂ emissions of the transport. First, the roundtrip distance travelled by a conference participant was estimated as twice the shortest distance between the capital of their country of origin and Ljubljana. Second, because there was no information on the choice of transport of European participants, total CO₂ emissions were estimated for two different scenarios. The first scenario assumed that all participants travelled by plane to Ljubljana. The second scenario assumed that all participants living within 600 km of Ljubljana arrived by train. Third, the guidelines provided by the Department for Environment, Food and Rural Affairs (DEFRA) of the UK were followed to estimate carbon emissions of air travel. Assuming that all conference participants travelled in economy class, Defra recommends using an average emissions of 158 g/(km person) of CO₂ eq. for short-haul flights and 151 g/(km person) for long-haul flights (Defra, 2014). There is less consensus on CO₂ emissions for trains since this depends on the country-specific source of electricity and the specifics of the connection. Eurostar, for instance, reports CO₂ emissions of 11.2 g/(km person). Some popular online tools estimate CO₂ emissions of rail transport in the range of 10 to 20 g/(km person) depending on the connection (see, for instance, <http://www.ecopassenger.org/>). In this article, CO₂ emissions of rail travel was set relatively high at 25 g/(km persons).

reduced by nearly 20 per cent (60 tonnes), assuming participants living within 600 km of Stuttgart travel by train. This reduction occurs because total distance travelled decreases, but also because many participants switch from air to train travel. Nearly 50 per cent of the participants live within 600 km of Stuttgart, while only 23 per cent of the participants live within 600 km of Ljubljana. The assumption that participants within 600 km of Stuttgart prefer travelling by train rather than plane is reasonable.^{1, 2} Several studies have shown that high-speed trains can replace air travel for distances between 300–800 km, which corresponds to a journey time of 3 to 6 hours (Jiménez and Betancor, 2012). Amsterdam, Berlin, Brussels and Paris can all be reached from Stuttgart by high-speed trains within 3 to 6 hours. Although one can always discuss under which conditions conference participants would switch to train travel, the important point is that the combination of a central location and good access to rail networks has the potential to significantly reduce CO₂ emissions. This complements the findings of Stroud and Feeley (2015) who studied optimal conference locations, but did not consider rail travel as an alternative to air travel.

estimated the average carbon footprint of a conference paper at 0.8 tonne. This difference is in line with expectations since their study included all conferences in the world, while this case study focuses on a European conference with most participants coming from within Europe and, therefore, travelling relatively modest distances.

The average emission hides, however, large differences between participants' emissions. The distribution of CO₂ emission among participants is shown in Figure 1. The distribution is highly skewed: 10 per cent of the participants accounted for nearly 50 per cent of total emissions. These participants have travelled between 2,400 km (Israel) and 16,000 km (Australia).

The choice of the location matters for the total carbon footprint of a conference. The capital of Slovenia, Ljubljana, is not the most central location for EAAE participants since most are from Western Europe. In addition, it is not well-connected to Europe's high-speed rail network, reducing the number of conference participants willing to travel by train (EU, 2012).

To quantify the importance of the conference location, total CO₂ emission was re-estimated choosing a more central location in Europe, Stuttgart in Germany. This city is centrally located for EAAE participants and has excellent train connections to the major European cities. Results are shown in Table 1 (second row). CO₂ emissions are

Figure 1: Distribution of CO₂ emissions among participants

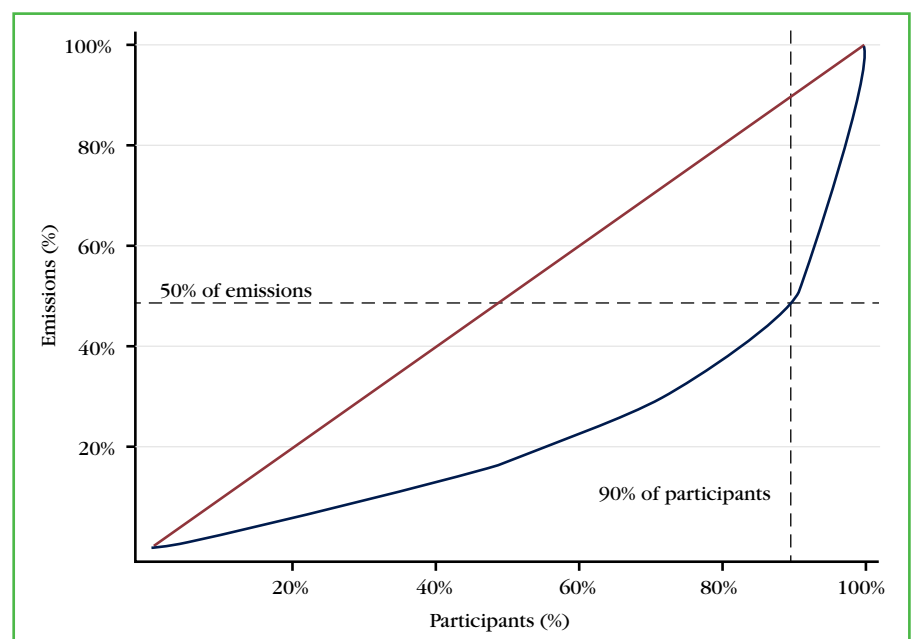


Table 2: Three strategies to reduce CO₂ emissions

	Carbon footprint (tonnes CO ₂ eq.)	Potential savings
Conference in Ljubljana	322	
Strategies to reduce the carbon footprint		
1. No participants from outside Europe	-160	-50%
2. A more central location (Stuttgart)	-22	-7%
3. Promoting public transport	-43	-13%
Total reduction in CO₂ emissions	-225	-70%

Can the estimate of total CO₂ emission of this particular conference be extrapolated to estimate the carbon footprint of academic conferences in Europe? This requires additional data and assumptions. Total emissions in Europe in 2012 equalled 4,679 million tonnes of CO₂ eq. (Eurostat, 2015a). According to Eurostat, there are 1.7 million full-time researchers in Europe (Eurostat, 2015b). Assuming that every researcher participates in one conference a year and given the finding of an emission of 0.5 tonne of CO₂ per conference participant, academic conferences in Europe account for 850,000 tonnes of CO₂. This amounts to 0.018 per cent of total annual emissions in Europe. Spinellis and Louridas (2013) estimated that total emissions of conference papers accounted for 0.003 per cent of global emissions. Both estimates thus differ by a factor of 6. The true carbon footprint of conferences is likely to be somewhere between the two estimates. Spinellis and Louridas (2013) underestimate the carbon footprint because they only included conferences that published indexed conference papers, which is not a tradition for all conferences. In addition, not all researchers attending a conference also present a paper. My estimate may be too large if European researchers attend less than one international conference a year. Both estimates illustrate, nevertheless, that academic conferences are far from innocent in terms of their carbon footprint.

Three strategies to reduce the carbon footprint of academic conferences

The previous analyses already hint at possible strategies to reduce the

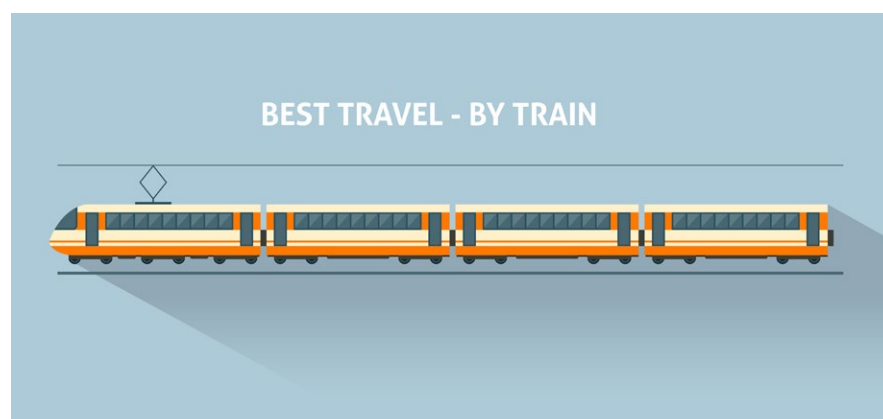
carbon footprint of academic conferences. I will discuss three strategies: reducing the number of non-European participants; organising conferences at central locations; and promoting travelling by train. While a full implementation of the first strategy is not desirable in terms of likely impact on conference quality, the two other strategies could be implemented with limited cost, although it will require effort from both conference organisers and participants. Table 2 shows the maximum reduction in CO₂ emissions if these strategies had been fully implemented during the 14th EAAE Congress.

As we have seen, 10 per cent of the participants accounted for 50 per cent of the emissions. As such, reducing the number of participants travelling long distance would drastically reduce CO₂ emissions. The carbon footprint of the EAAE conference would decrease by 50 per cent if participants working at non-European universities had been excluded from attending the conference. Such a strategy is too drastic since international conferences organised in Europe benefit from the input of non-European participants.

Yet, one could still ensure that participants with large carbon footprints play a key role in the conference. Since the dataset did not include keynote speakers, most participants that travelled such long distances only gave a 15 minute presentation or presented a poster. To fully justify the large carbon footprints of these individuals, the programme committee might only select them if their contribution to the conference is outstanding and ensure that they play a key role during the conference.

“Wissenschaftler sollten bei der Senkung der CO₂-Emissionen eine Vorreiterrolle einnehmen, um der Weltgemeinschaft mit gutem Beispiel voranzugehen.”

Organising conferences in central locations can further reduce emissions. If the EAAE conference was held in Stuttgart rather than Ljubljana, the carbon footprint could be reduced by another 22 tonnes because total distance travelled would decrease. Ideally, one should first select conference participants and, in a second stage, choose the conference location in such a way as to minimise CO₂ emissions. This is not feasible in practice. Yet, it is well known that most EAAE partici-



Travelling to academic conferences by train is one strategy to reduce total emissions of conferences. This requires organising conferences in a central location with good access to international high-speed rail networks.

pants are from Western Europe. Preference could therefore be given to conference locations in Western Europe with good access to international rail networks. Once again, this strategy can conflict with logistical constraints or other strategic objectives of international conferences such as giving different universities and countries the opportunity to organise a conference. However, organising conferences or summer schools in exotic locations (e.g. Crete) to lure more participants is definitely not a strategy that should be rewarded.

Promoting train travel and car-pooling is a third strategy to reduce

CO₂ emissions. Yet, this is only possible if the conference is organised at a central location within Europe with good access to railroad networks. Organising the EAAE conference at Stuttgart and convincing participants working within 600 km of the conference to travel by train would reduce CO₂ emissions by an additional 43 tonnes. This is the only strategy that does not directly conflict with other objectives of international, academic conferences and could, therefore, be implemented without any cost in terms of the quality of academic conferences. Yet, it seems important to increase awareness among researchers, including agricultural

economists, that taking the train instead of the plane benefits the environment and should be considered, even if it is slightly more expensive or time consuming. Perhaps, upcoming conferences could promote the train by increasing registration fees if participants travel by plane to offset CO₂ emissions. Setting the carbon price at €50/tonne would only increase the conference fee by €25 for the 'average' participant, although the additional cost would be much higher for participants from outside Europe. Such a small price increase may be insufficient to encourage European researchers to switch from air to rail travel, particularly because conference fees are generally covered by their university or institute. Other strategies to discourage air travel include facilitating booking train tickets, offering discount vouchers from train companies and informing conference participants about their carbon footprint.

“ Researchers should be at the forefront of reducing CO₂ emissions to set an example for the global community. ”

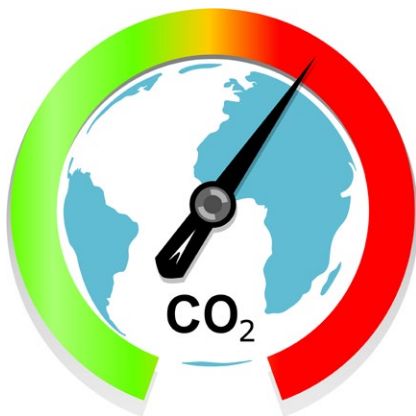
As Table 2 shows, CO₂ emissions of the EAAE Congress would have been 70 per cent lower if the three strategies had been fully implemented. Of course, a 70 per cent decrease is the maximum attainable reduction. It demonstrates, nevertheless, that substantial reductions are possible if there is a willingness of the conference organisers and participants to undertake actions to reduce the carbon footprint.

Raising awareness of researchers' impact on climate change

Although agricultural economists recognise climate change as one of the key challenges of our age, the



Air travel to academic conferences is one of the main culprits in the large carbon footprint of researchers.



Climate change has a profound impact on the world. Researchers, including agricultural economists, should contribute to mitigating carbon emissions.

discipline as a whole has not yet considered concrete actions to reduce the carbon footprint of its own activities. This article hopes to contribute to changing this attitude. Using the EAAE conference in Ljubljana in the summer of 2014 as a case study, this article has shown that substantial reductions in CO₂ emissions can be achieved. It requires, however, behavioural changes from both the conference organisers and conference participants.

Academic conferences are likely to remain an essential part of research

and this unavoidably entails air travel. Researchers should, however, be more aware of the impact of their professional activities on the climate and should act to reduce their carbon footprints. Several strategies to reduce CO₂ emissions of conferences have already been discussed in this article. These strategies are only a starting point for a debate, as many other strategies could be envisaged. These include organising conferences together with other events such as summer schools and workshops to limit air travel over a year, organising keynote lectures by tele-conference, organising a 'vegetarian day' during the conference and organising workshops to share best practices about carbon reductions at universities. In addition, conference organisers could calculate the carbon footprint of the conference, publish the findings on their website and provide feedback to individual delegates to raise awareness.

One can always argue that efforts of researchers will not change much as the CO₂ emissions of academic conferences are negligible compared to total global emissions. Although this is true, it can be said of every individual action to reduce CO₂

emissions. It is the combined action of many individuals that will make a difference. However, the most important reason to undertake actions to reduce CO₂ emissions of research is not necessarily the actual reduction, but the awareness and debate it can create among researchers and universities, resulting in new actions for carbon reductions. Researchers should be at the forefront of reducing CO₂ emissions to set an example for the global community, and also when this requires behavioural change that impacts their own lives.

Notes

1 The threshold of 600 km assumes that participants from Austria, Hungary, Italy and Switzerland travelled by train to the conference in Ljubljana, while participants from Austria, Belgium, France, Germany, the Netherlands, Slovakia, Slovenia and Switzerland would travel by train to a conference in Stuttgart.

2 Assuming that participants within 600 km of Ljubljana travel by train is probably too optimistic. Ljubljana is not as well-connected to a high speed rail network as Stuttgart.

Further Reading

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Summary

The Carbon Footprint of Academic Conferences: Evidence from the 14th EAAE Congress in Slovenia



Agricultural economists recognise that climate change is one of the key challenges of our time. Yet, the carbon footprint of research activities has received little attention to date. Air travel from and to academic conferences is a major contributor to the carbon footprint of researchers. This article calculates the carbon emissions due to air travel of the 14th Congress of the European Association of Agricultural Economists (EAAE) in Ljubljana, Slovenia in 2014 and proposes strategies to reduce them. Total CO₂ emissions are estimated at around 300 tonnes or 0.5 tonne per participant. There are, however, large differences between participants, with 10 per cent of the participants accounting for 50 per cent of the emissions. Strategies to reduce the carbon footprint of the Congress are considered. Reducing the number of participants from non-European countries that attend the conference could significantly reduce emissions. Organising the Congress at a more central location in Europe in combination with promoting travelling by train could reduce greenhouse gas emissions by another 20 per cent. It is argued that researchers, including agricultural economists, should lead by example and undertake actions to reduce the carbon footprint of their profession.

L'empreinte carbone des conférences universitaires : le cas du 14^{ème} congrès de l'AEEA en Slovénie



Les économistes agricoles reconnaissent que le changement climatique constitue l'un des principaux défis de notre temps. Pourtant, l'empreinte carbone des activités de recherche n'a reçu que peu d'attention. Les transports aériens liés à la participation à des conférences universitaires représentent une part majeure de l'empreinte carbone des chercheurs. Cet article calcule les émissions de carbone du transport aérien occasionné par le 14^{ème} congrès de l'Association européenne des économistes agricoles (AEEA) qui s'est tenu à Ljubljana en Slovénie en 2014 et propose une stratégie pour les réduire. Les émissions totales de CO₂ sont estimées à environ 300 tonnes, soit 0.5 tonne par participant. Les différences entre participants sont cependant importantes car 10 pour cent des participants sont responsables de 50 pour cent des émissions. Des stratégies de réduction de l'empreinte carbone du congrès sont considérées. Réduire le nombre de participants à la conférence en provenance de pays non européens pourrait abaisser nettement les émissions. Organiser le congrès dans un lieu plus central au niveau européen tout en faisant la promotion du transport ferroviaire pourrait réduire les émissions de 20 pour cent supplémentaires. Nous avançons que les chercheurs, y compris les économistes agricoles, devraient montrer l'exemple et agir pour réduire l'empreinte carbone de leur profession.

Der CO₂-Fußabdruck wissenschaftlicher Veranstaltungen: Die Belege vom 14. Kongress der EAAE in Slowenien



Agrarökonomen begreifen den Klimawandel als eine der zentralen Herausforderungen unserer Zeit. Dennoch fand der CO₂-Fußabdruck von Forschungsaktivitäten bislang nicht allzu viel Beachtung. Flugreisen im Rahmen wissenschaftlicher Veranstaltungen tragen in hohem Maße zum CO₂-Fußabdruck der Wissenschaftler bei. Dieser Beitrag berechnet die CO₂-Emissionen für die Flugreisen im Rahmen des 14. Kongresses der European Association of Agricultural Economists (EAAE) in Ljubljana, Slowenien, im Jahr 2014 und schlägt eine Strategie zur Emissionssenkung vor. Die CO₂-Emissionen liegen insgesamt etwa bei geschätzten 300 Tonnen oder 0.5 Tonnen pro Teilnehmer. Innerhalb der Teilnehmergruppe liegen jedoch sehr unterschiedliche Werte vor: Zehn Prozent der Teilnehmer verursachen 50 Prozent der Emissionen. Die Strategien zur Verringerung des CO₂-Fußabdrucks des Kongresses werden betrachtet. Eine Verringerung der Anzahl der Kongressteilnehmer aus nichteuropäischen Ländern könnte die Emissionen erheblich senken. Die Organisation des Kongresses an einem zentraler gelegenen Veranstaltungsort in Europa bei gleichzeitiger Förderung von Zugreisen könnte die Treibhausgasemissionen noch einmal um 20 Prozent senken. Es wird argumentiert, dass Wissenschaftler, so auch Agrarökonomen, mit gutem Beispiel vorangehen und Maßnahmen zur Verringerung des CO₂-Fußabdrucks ihres Berufsstandes ergreifen sollten.