Calculating medicines' carbon footprint: what's the diagnosis?

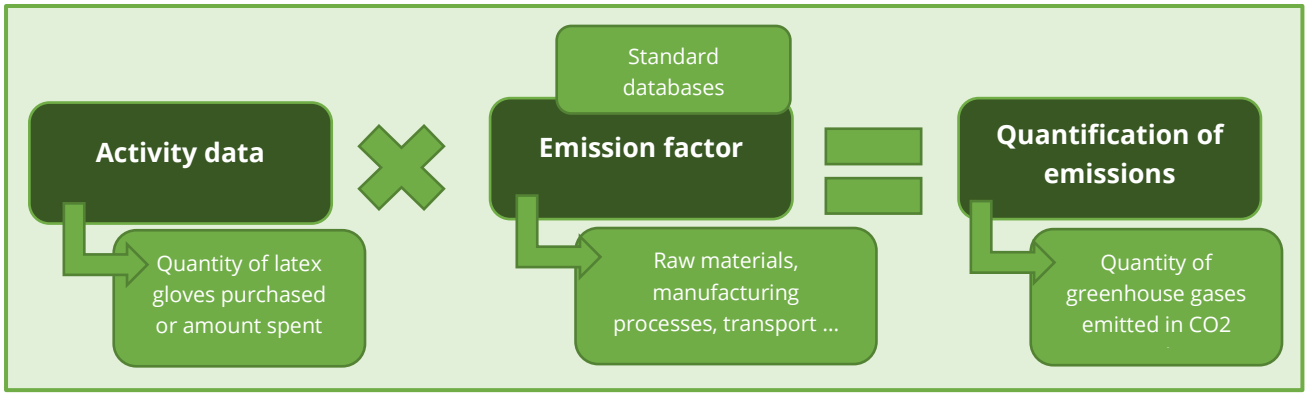
BACKGROUND

In the face of worsening climate and environmental crises and their disproportionate impact on the most vulnerable populations, the Humanitarian Environment Network (REH) has been supporting a collective initiative involving international solidarity organisations since 2020. Adopted in December 2020 by 10 organisations, the Statement of Commitment on Climate and the Environment by Organisations engaged in International Solidarity gradually brought together 14 signatory NGOs, committed to reducing their environmental impacts and evolving their operational practices. They have set a **target to reduce their functioning emissions by 50% by 2030**, compared to a base year to be defined. They have also **committed to measuring their environmental impacts, particularly their carbon footprint**.

As such, the signatory organisations (and the sector in general) have carried out carbon footprint calculations covering all their activities. **In doing so, certain limitations have been identified, particularly when considering the issue of medicines procurement…**

REMINDER: CALCULATING PROCUREMENT-RELATED CARBON FOOTPRINT

A carbon footprint is measured through an emissions inventory, also known as a Greenhouse Gas Emissions Inventory. This calculation should then **make it possible to identify which activities are most relevant to focus on in order to reduce greenhouse gas emissions, and subsequently to track the evolution of emissions over time.** This is a process with a well-defined methodology, regulated by several standards and protocols[1] , involving **data collection and analysis**. The calculation itself involves 'converting' activity data into CO_2 equivalents emitted:



So, on paper, all the ingredients seem to be in place for a straightforward exercise, but how is it really?

LIMITATIONS OF CALCULATING PURCHASING-RELATED CARBON FOOTPRINT AT EACH STEP

How is data collected?

In practice, data collection is one of the most complex parts of calculating a carbon footprint, particularly when it comes to procurement-related data. Indeed, a carbon footprint assessment takes stock of *all* emissions linked to an organisation's activities, and therefore all procurement, from production to end-of-liEF – it is very comprehensive! Questions will be asked about what type of medicines were ordered and in what quantities, and so on.

Although international aid organisations have access to a great deal of data on purchases due to budgetary monitoring requirements, the accessibility of data can in reality be influenced by many factors, such as the granularity of financial data, changes in information systems, loss of institutional memory, and so on. Data collection is, in fact, the most time-consuming part of calculating a carbon footprint. For example, Action Against Hunger took three years to complete its global carbon footprint calculation for 2021[2] ! The first step in calculating the carbon footprint of medicines is therefore already a highly complex and time-consuming task.

[1] In particular, we can mention ADEME's Bilan Carbone® method[1] or the GHG Protocol (for further details, see the knowledge sheet 'Carbon footprint measurement: what scope?')

[2] https://www.environnementhumanitaire.org/ressource/bilans-des-ges-2021-acf-juillet-2024/

Once we have the activity data, the other half of the equation is still missing: the emission factors

Once the activity data has been collected, it must now be 'converted' into CO_2 equivalents. The other part of the equation is therefore missing: the emission factors (EFs). There are physical and monetary EFs:

- **Physical emission factor (PEF)**: can be obtained in two distinct ways: either through existing life cycle analyses; or by direct calculation when energy expenditure, broken down by energy source used, is known[3] .
- **Monetary emission factor (MEF)**: corresponds to the carbon content of a purchased product or service per unit price. It is expressed in kgCO2e/k€ excl. VAT[4] .

It is preferable and recommended to use PEFs rather than EFMs, as they are more accurate. There are several databases that compile emission factors (the ADEME Footprint Database, UK DEFRA, EcoInvent, etc.), some of which are country-specific. Thus, using the available activity data and emission factors, it is *mathematically* possible for an NGO to calculate the carbon footprint of its purchases!

A limited choice of emission factors

To carry out their carbon footprint calculation, international aid organisations must identify the EF for each purchase, and therefore for each type of medicine purchased. However, **the number of available EFs remains limited and these do not necessarily correspond to the purchases made**, particularly as these organisations operate in countries for which there is often no database of specific EFs[5] . **Consequently, organisations are forced to select, by default, the EF that seems most 'plausible' for each purchase.**

Example of medicines: when the method determines the figure

Let's take the example of medicines. For a medical organisation, this will account for a large proportion of purchases and therefore of the carbon footprint. For medicines, a EFP will enable the carbon footprint of a specific molecule produced in a certain context to be determined. For example, paracetamol produced in France or paracetamol produced in China will not have the same EF because the production methods will differ. In other words, purchasing one type of paracetamol over another will have an impact on the organisation's carbon footprint.

However, there is currently rather limited data available on the LCA for medicines, as calculating an emission factor is a complex task, not to mention the wide variety of medicines and molecules available[6] . The APHP database, which specialises in the medical field, although very comprehensive, actually contains very few of the molecules purchased by humanitarian organisations.

ADEME also provides an EFM for 'Basic pharmaceutical products and pharmaceutical preparations' in general (i.e. not for a specific molecule). This allows the carbon footprint of purchased medicines to be calculated based on their quantity and price. However, as this is a general EF for medicines, regardless of the molecules used and the specific medicines, the level of uncertainty in the carbon footprint calculation result is necessarily higher than that achieved using PEF.

In this scenario, there are no accurate EF data available to precisely calculate the carbon footprint of the medicines purchased by the organisation. The organisation must therefore choose, from among several possible methodologies, the one that provides the closest approximation to the actual carbon footprint.

[3] https://prod-basecarbonesolo.ademe-dri.fr/documentation/UPLOAD_DOC_FR/index.htm?achat_de_biens_2.htm
[4] https://prod-basecarbonesolo.ademe-dri.fr/documentation/UPLOAD_DOC_FR/index.htm?ratio-monetaires_3.htm
[5] The largest databases mentioned above mainly cover European countries.
[6] The molecule corresponds to the active ingredient of the medicine. For the same molecule, there may be different brand names, for example, for paracetamol, there is Doliprane or Dafalgan. The FE values are calculated for the molecules.

Thus, for its carbon footprint calculation, Médecins du Monde considered several options and obtained the following results:

Methodological approach	Result (in tCO_2e)	Comments on the approach	Proportion of medicines in the total footprint	Total footprint (in tCO_2e)
Option 1: Use PEFs for the 6% of orders corresponding to APHP data. Then use an EFM for the remaining 94%.	3,912	Allows for maximum accuracy on orders corresponding to APHP data. Avoids making arbitrary assumptions about the remaining orders not covered (as PEFs vary greatly depending on the molecule). Complicates the calculation as two types of EF must be combined Have information systems/data collection in place to track, in detail and systematically at institutional level, the physical purchases of certain molecules.	41%	9,554
Option 2: Use PEFs for 6% of orders, and extrapolate the result using a simple proportionality rule.	23,918	Assumes that, from a carbon perspective, the 6% of molecules for which PEFs are available are representative of the remaining molecules. Have information systems/data collection in place to monitor the physical purchases of certain molecules in detail and systematically at institutional level.	81%	29,560
Option 3: Calculate an average of the PEFs by type of molecule ordered (injections, HIV medication, etc.) and apply these calculated PEFs to all orders.	12,632	Enables monitoring of cost-reduction efforts and avoids dependence on price fluctuations. Have information systems and data collection processes in place to monitor the physical procurement of certain medicines in detail and systematically at the institutional level.	69%	18,274
Option 4: Use a centralised procurement system for all orders.	272[7]	This is likely to underestimate the cost. Leads to a high dependence on price fluctuations.	5%	5,914

It can be seen that, for the same purchase data, depending on the method chosen, **the results obtained are very different.** Thus, ***Option 2*** gives a carbon footprint for medicines **approximately 88 times higher than *Option 4*!** Furthermore, using *Option 2,* **medicines account for 81% of the total carbon footprint, whereas they account for only 5% with *Option 4*,** not to mention that **the total carbon footprint varies by a factor of 5 between the two options!**

Furthermore, not all member organisations of the REH *Carbon* Working Group have chosen the same approach:

- Médecins du Monde (MDM) chose Option 1;
- Médecins sans Frontières (MSF) chose Option 4, as the APHP database was not available at the time of their carbon footprint calculation;
- Action Against Hunger (ACF) chose option 3, in order to be able to track their reduction efforts and not be dependent on price fluctuations;
- Première Urgence Internationale (PUI) chose option 4.

[7] Furthermore, it is quite unusual for an FEM to yield a lower result than an FE, as FEMs often tend to overestimate carbon footprints, being based on more conservative assumptions.

This example highlights the very high level of uncertainty surrounding the results, which can even **affect the orders of magnitude**! Whilst this analysis focuses on medicines, which are often produced using opaque methods and complex supply chains**,** and whose carbon intensity varies significantly depending on the molecules and processes involved**, the analysis can in fact be applied to many other goods purchased by NGOs.**

But does that mean we can make the figures say whatever we want?

As we have seen, depending on the choice of EF, the results will not be the same: for the same activity data (purchases of medicines), the results are very different – the orders of magnitude calculated for the impact of this emissions category vary enormously depending on the methodology adopted. Especially as we can see from the example that the different organisations studied (MDM, ACF, PUI and MSF) did not choose the same method. No single method can claim to be exact, and each choice is justified. Indeed, **whatever choices are made, the most important thing is to be transparent in one's approach, explaining the methodological choices adopted and analysing the results in the light of those choices.**

Is there still any point in trying to calculate this footprint?

The aim of a carbon footprint calculation is, on the one hand, to understand the orders of magnitude in order to identify the highest-emitting categories, and, on the other hand, to identify levers for action to reduce the carbon footprint associated with these emission categories. However, when we look at the carbon footprint calculation for medicines, we see that these two objectives are not fully met. On the one hand, as shown above, depending on the methodological approach chosen, the orders of magnitude vary completely. And on the other hand, there are in reality few levers available to reduce the carbon footprint of medicine procurement. Indeed, the issue of drug quality is absolutely paramount and ethically non-negotiable, as poor quality can endanger patients. Consequently, there is very little room for manoeuvre to change procurement criteria, in addition to the strict regulations that NGOs must comply with (national requirements, donors, etc.)[8] . It may, for example, be possible to replace one type of medicine with another whose production is less carbon-intensive (for instance, for HIV treatments, promoting dolutegravir as a replacement for efavirenz, or purchasing a medicine produced in France rather than in India). However, constraints related to procurement procedures, quality and budgetary considerations may limit the feasibility of this approach. **Calculating the carbon footprint based on PEFs, where available, allows us to identify the impact of reduction efforts on the overall carbon footprint**. However, where these are not available, and where there are fewer levers for reduction, it is important **to assess the relevance of carrying out this carbon footprint calculation for the procurement of medicines**. **This observation may also apply to other categories of procurement of goods and services essential to the populations supported by organisations.**

Beyond the calculation methodology, it is therefore important **to advocate with suppliers** for low-carbon manufacturing processes, in order to secure lower-carbon alternatives, as well as on the transparency of manufacturing processes.

Beyond carbon

Procurement still accounts for the largest share of a humanitarian organisation's carbon footprint, so failing to take the impact of procurement into account would be a dereliction of duty. Furthermore, **it is important not to consider only the carbon footprint when examining humanitarian organisations' procurement, but also environmental impacts as a whole (resource consumption, soil pollution, etc.)**. This ties in with the revision of the Statement of Commitment, as explained in the note on decarbonisation targets, which advocates retaining quantified decarbonisation targets for functioning emissions but not for goods and services intended for beneficiary populations; instead, **it calls for the implementation of best practices to reduce the carbon and environmental footprint as a whole.**

[8] Unlike other types of purchases, such as pens, blankets, etc.

CONCLUSION

After almost five years of sustained momentum, reflection and discussion amongst NGOs regarding decarbonisation targets and monitoring, limitations have begun to emerge regarding the calculation of the carbon footprint of procurement and the very capacity to reduce this footprint. This knowledge-sharing document thus highlights the **complexity and significant limitations of carbon footprint calculations for medicines, and more broadly for the procurement of goods and services directly for beneficiary populations**. The Carbon Working Group therefore recommends:

- When calculating the carbon footprint of medicine purchases, favour the use of PEFs where possible, aim to maintain the same methodology over time to track trends, and in all cases ensure the **transparency of the methodological approach** by clearly explaining the choices made;
- To assess the **need to carry out this calculation and the cost-benefit ratio** to identify levers for reduction (outside of regulatory carbon footprint calculations linked to legislation in the country where the organisation operates);
- To implement **best practices for reducing the environmental footprint** of pharmaceutical procurement, and to continue **collective work** on reducing the environmental footprint of procurement, particularly in conjunction with the work of the REH *Sustainable Procurement* Working Group;
- To continue **decarbonisation** efforts **across other emission categories**, particularly operational emissions.