

**From:** "5.1.2.e" <5.1.2.e@wur.nl>  
**Sent:** Sun, 3 Aug 2025 15:20:28 +0200  
**To:** "5.1.2.e" <5.1.2.e@wur.nl>; "5.1.2.e" <5.1.2.e@wur.nl>; "5.1.2.e" <5.1.2.e@wur.nl>; "5.1.2.e" <5.1.2.e@wur.nl>; "5.1.2.e" <5.1.2.e@wur.nl>  
**Cc:** "5.1.2.e" <5.1.2.e@cbs.nl>; "5.1.2.e" <5.1.2.e@wur.nl>; "5.1.2.e" <5.1.2.e@wur.nl>  
**Subject:** RE: Excretion factors housing/grazing

[Externe email]

Hi all,

Thanks for this reflection, 5.1.2.e You are right WUM is delivering time-unscaled and (generic) time-scaled values. So, I believe that your procedure will work.

Let's discuss this on Monday.

5.1.2.e

I've already discussed my absence on Monday already with 5.1.2.e and 5.1.2.e and put some relevant points to discuss in: [20250804 Agenda points ReNEMA meeting 4](#) 5.1.2.e [2025.docx](#).

Wishing you a good meeting!

Regards,  
5.1.2.e

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**From:** 5.1.2.e <5.1.2.e@wur.nl>  
**Sent:** vrijdag 1 augustus 2025 16:16  
**To:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>  
**Cc:** 5.1.2.e <5.1.2.e@cbs.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>  
**Subject:** Re: Excretion factors housing/grazing

Hi all,

An update on the excretion factor calculation discussion.

I have had a quick look at the WUM calculation excel sheet, and it currently looks like my guess was correct - the time-unscaled excretion rates, and "time spent producing specific type of excretion" values are calculated/contained internally in the WUM sheet, so this data is available to us now.

So, in principle, WUM does the same calculation as we do in ReNEMA for A1, just with different (more generic) input values. I think we should really rethink what is considered as the final output of the WUM module, as part of the ongoing ReNEMA input data restructuring effort.

Currently, I am thinking about something along the lines of:

1. Time-unscaled excretion factor table (excretion rate, assuming an animal excretes one type of excretion 100% of the time):

| livestock_category | region_level | region | excretion_type | element | excretion_rate |
|--------------------|--------------|--------|----------------|---------|----------------|
| a1                 | 1            | nw     | housing        | N       | 103.5          |
| a1                 | 1            | nw     | grazing        | N       | 103.5          |

|     |   |          |         |     |       |
|-----|---|----------|---------|-----|-------|
| a1  | 1 | zo       | housing | ... | 105.2 |
| a1  | 1 | zo       | grazing | ... | 105.2 |
| b1  | 0 | national | housing | ... | ...   |
| ... |   |          |         |     |       |

## 2. Time fraction, spent performing each type of excretion:

| livestock_category | region_level | region   | excretion_type | time_fraction |
|--------------------|--------------|----------|----------------|---------------|
| a1                 | 1            | nw       | housing        | 0.7           |
| a1                 | 1            | nw       | grazing        | 0.3           |
| a1                 | 1            | zo       | housing        | ...           |
| a1                 | 1            | zo       | grazing        | ...           |
| b1                 | 0            | national | housing        | ...           |
| ...                |              |          |                |               |

## 3.

This is, of course, a generic example. If we have farm-specific time fractions, we could either plug those in as a separate "injection" step in the model, or plug them directly into the time fraction table with a new region level for "farm ID level", for example:

| livestock_category | region_level | region             | excretion_type | time_fraction |
|--------------------|--------------|--------------------|----------------|---------------|
| a1                 | 999          | 766a1211f591c12... | housing        | 0.85          |
| a1                 | 999          | 766a1211f591c12... | grazing        | 0.15          |
| a1                 | 1            | nw                 | housing        | ...           |
| a1                 | 1            | nw                 | grazing        | ...           |
| ...                |              |                    |                |               |

Generally, most livestock categories would likely get assigned the same excretion rate for housing and grazing (if we do not have data on the ration differences), and non-grazing animals would just get 0.0 for time fraction performing "grazing" type excretion. This is quite in-line with previous suggestions from @5.1.2.e if I'm not mistaken. It keeps the data structure very flexible, so if you get a new type of excretion (e.g., differentiating between winter and summer excretions), or specify new regions for new livestock categories (e.g., b1 data is all of a sudden different for each municipality), the model calculation would need no changes to handle this.

Let's take some time to discuss this on Monday.

Have a nice weekend!

Kind regards,

5.1.2.e

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**From:** 5.1.2.e <5.1.2.e@wur.nl>

**Sent:** 5.1.2.e 30, 2025 12:07

**To:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e  
5.1.2.e <5.1.2.e@cbs.nl>

**Cc:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e  
<5.1.2.e@wur.nl>

**Subject:** RE: Excretion factors housing/grazing

Hi 5.1.2.e Hi all,

Currently, WUM calculates the excretions at the national level (except for A1, where a NW/ZO distinction is made). It is true that WUM is using a grazing fraction for A1 that is based on census data, being the same as used in ReNEMA. However, for WUM (and NEMA) the farm specific A1 grazing data is aggregated towards a mean NW/ZO grazing fraction in a preprocessing step outside WUM (and NEMA).

Consequently, WUM does not include the farm specific A1 grazing fractions.

Good the discuss this further next Monday.

Groet,

5.1.2.e

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**From:** 5.1.2.e <5.1.2.e@wur.nl>

**Sent:** woensdag 30 juli 2025 11:29

**To:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@cbs.nl>

**Cc:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>  
5.1.2.e <5.1.2.e@wur.nl>

**Subject:** Re: Excretion factors housing/grazing

(I have added other people to the recipients list. I think it's an important point to discuss)

Thanks!

But if WUM makes the housing/grazing excretion factor calculations, I suppose grazing fractions and (grazing time-unscaled) housing/grazing excretion factors of non-A1 categories are used somewhere in the WUM pipeline? @5.1.2.e perhaps you know more about how housing/grazing excretion factors are computed in WUM?

This would mean that WUM is basically doing the same calculation (except nw/zo split perhaps) for other categories, as we are for A1.

Since we want to integrate the two, I think it would make most sense to then either move the A1 excretion factor calculation into the WUM module, or move the housing/grazing calculations out of WUM into ReNEMA. That way we wouldn't have this situation, where some animal categories are handled by WUM, while some need to be handled by ReNEMA later in the pipeline.

Perhaps this is something to discuss next Monday?

Kind regards,

5.1.2.e

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**From:** 5.1.2.e <5.1.2.e@wur.nl>  
**Sent:** 5.1.2.e 30, 2025 10:58  
**To:** 5.1.2.e <5.1.2.e@wur.nl>  
**Cc:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>  
**Subject:** RE: Excretion factors housing/grazing

The grazing time for animals besides A1 is according to WUM. WUM gives excretion for housing and grazing. For A1 these excretions are added together and divided in housing and grazing with fweide.

We have limited information about the grazing of other cattle (see Beweiding-LBT24-seizoen23-v2.xlsx).

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**From:** 5.1.2.e@wur.nl  
**Sent:** 5.1.2.e 30, 2025 10:42  
**To:** 5.1.2.e <5.1.2.e@wur.nl>  
**Cc:** 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>; 5.1.2.e <5.1.2.e@wur.nl>  
**Subject:** Excretion factors housing/grazing

Hi 5.1.2.e

I am looking into restructuring ReNEMA inputs in a better way. Currently, I am looking at the split between housing and grazing excretion factors, but I am unsure if I am understanding them completely.

So, for A1, we take a regional (NW/ZO) excretion factor, and scale it by grazing time to compute housing/grazing excretion factors. But we don't do the grazing time scaling for other categories.

Does that mean that grazing time is already taken into account in the housing/grazing excretion factors that we use for animal categories other than A1?

If so, do we have access to the raw data that is used to compute these factors? Namely, time spent in housing/grazing and excretion per animal during housing/grazing, for each animal category?

Kind regards,

5.1.2.e 5.1.2.e | Software Engineer | Wageningen Environmental Research  
Droevendaalsesteeg 3 (building 101), 6708 PB Wageningen, the Netherlands  
5.1.2.e @wur.nl | 5.1.2.e

Websites: [Earth Informatics](#) | [WUR](#) | [Unmanned Aerial Remote Sensing Facility](#)

