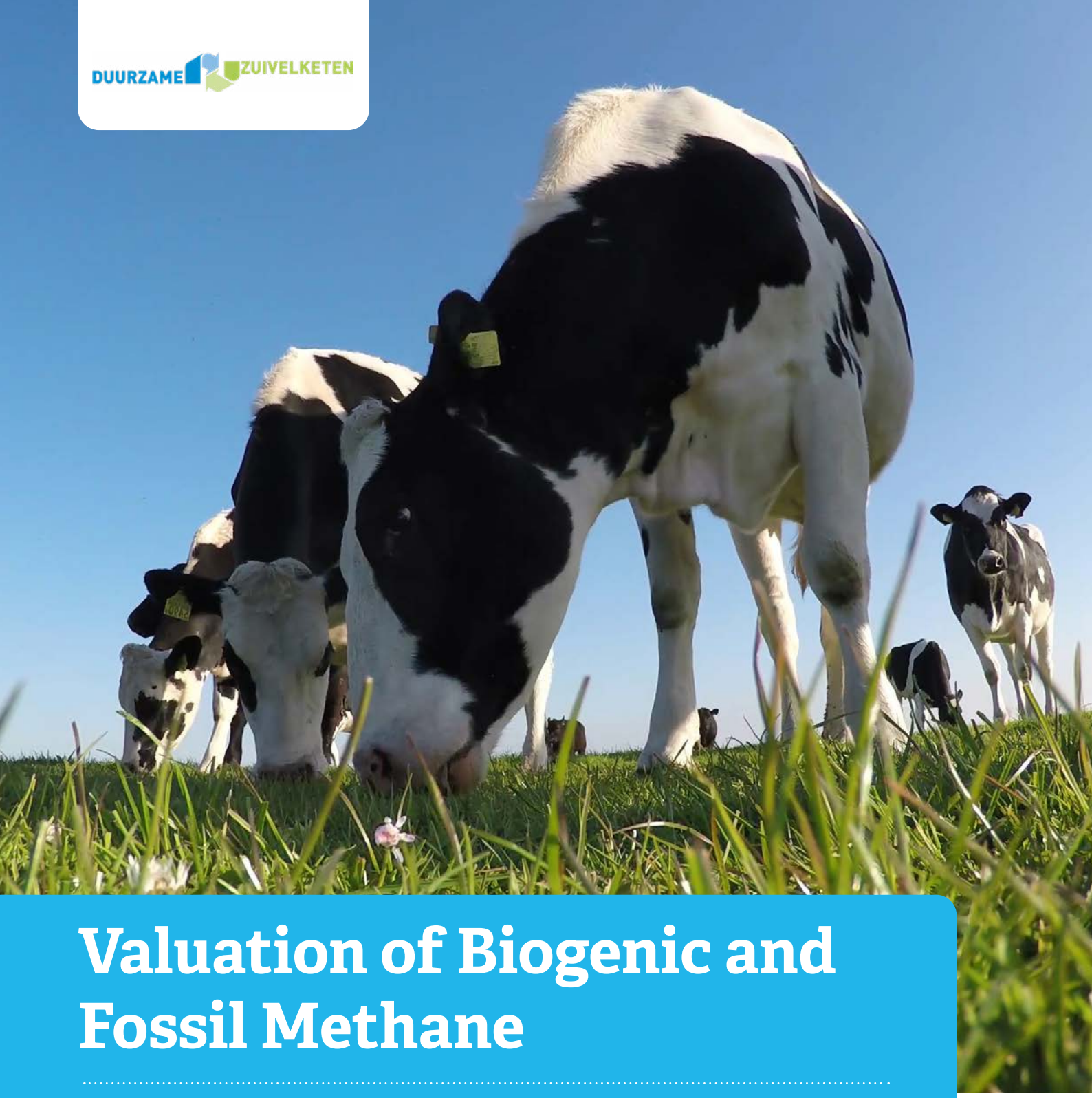
DUURZAME ZUIVELKETEN



Valuation of Biogenic and Fossil Methane

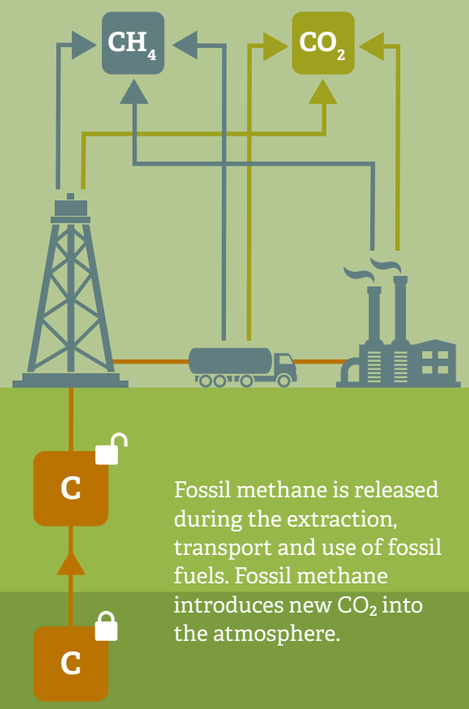
Methane is a greenhouse gas and can enter the atmosphere through 2 different processes: biological processes or the extraction and use of fossil fuels. This distinction has recently received increasing scientific attention. Compared with other greenhouse gases, methane has a relatively short atmospheric lifetime of approximately 12 years. To calculate the impact of a greenhouse gas, the globally accepted standard GWP100 is used. An alternative metric for measuring the impact of methane has since been developed, known as GWP*. This metric assumes that, if global emissions remain stable, emissions of biogenic methane do not make an additional contribution to global warming. Under GWP100, however, they are counted as doing so (Moerkerken, 2022).

Methane

CH_4

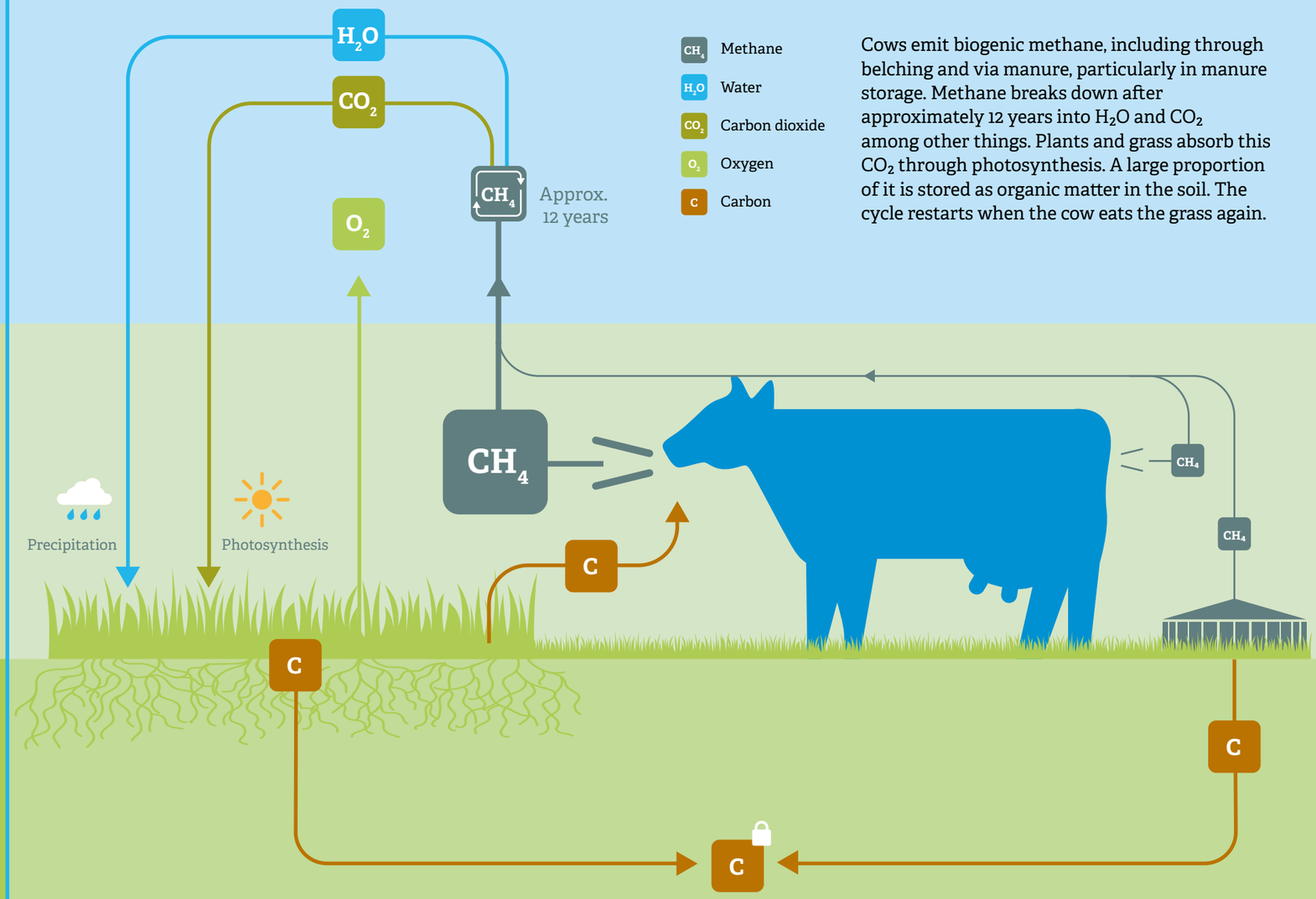
- Breaks down in approx. 12 years
- 2 variants:
  - Fossil methane
  - Biogenic methane

Fossil Methane



Fossil methane is released during the extraction, transport and use of fossil fuels. Fossil methane introduces new CO_2 into the atmosphere.

Biogenic Methane



- CH_4 Methane
- H_2O Water
- CO_2 Carbon dioxide
- O_2 Oxygen
- C Carbon

Cows emit biogenic methane, including through belching and via manure, particularly in manure storage. Methane breaks down after approximately 12 years into H_2O and CO_2 among other things. Plants and grass absorb this CO_2 through photosynthesis. A large proportion of it is stored as organic matter in the soil. The cycle restarts when the cow eats the grass again.

GWP100 or GWP*

GWP100 measures the effect of methane emissions over a 100-year period and converts this into the warming potential of CO_2.
GWP* takes into account the shorter atmospheric lifetime of methane.

What can we do?

- Grazing
- Improving feed efficiency
- Adjusting the ration
  Reducing concentrate feed
- Manure storage measures
- Manure processing

We too must act

Sources:

- Intergovernmental Panel on Climate Change (n.d.). About the IPCC. IPCC. Retrieved July 28, 2022, from www.ipcc.ch/about/.
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- Intergovernmental Panel on Climate Change (2021). Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
- Doornewaard, G.J., Hoogeveen, M.W., Jager, J.H., Reijs, J.W., & Beldman, A.C.G. (2022). Sectorrapportage Duurzame Zuivelketen; Prestaties 2020 in perspectief [In Dutch]. Wageningen Economic Research.

Global Warming Potential (GWP)

There are various types of greenhouse gases. Carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) are the most relevant to the agricultural sector. The Intergovernmental Panel on Climate Change (IPCC, 2022) reports a Global Warming Potential (GWP) for all greenhouse gases and updates these when necessary. A GWP can be calculated over different time horizons.

For the monitoring and reporting of emissions under the Paris Agreement, a time horizon of 100 years is predominantly used (GWP100). To aggregate the emissions of different greenhouse gases, the IPCC has developed conversion factors, with CO_2 used as the reference value of 1.

Intergovernmental Panel on Climate Change (IPCC)

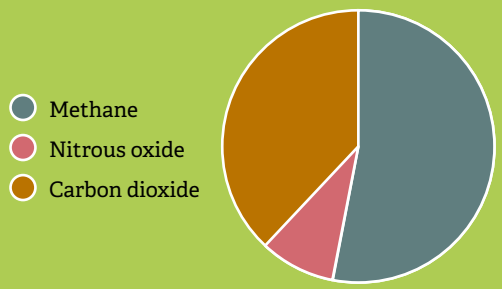
The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations. The IPCC ensures that policymakers have access to the most relevant and up-to-date information from scientific research on climate change. It determines, amongst other things, the calculation rules that governments must use when assessing their climate impact.

Carbon Footprint

On a dairy farm, several types of greenhouse gases are emitted. The most well-known are carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). The carbon footprint represents the total greenhouse gas emissions of a dairy farm. By using the unit CO_2 equivalents (CO_2eq), it is possible to compare the effect of the different greenhouse gases with one another.

The IPCC has established a Global Warming Potential (GWP) for all greenhouse gases, by which the warming potential of each greenhouse gas, expressed in CO_2eq, is determined.

Carbon footprint of a dairy farm broken down by greenhouse gas (Doornewaard, 2022).



GWP100 or GWP*

To calculate the impact of greenhouse gases, the globally accepted standard GWP100 is used. An alternative method for measuring the impact of methane has since emerged: GWP*. This approach assumes that stable global emissions of biogenic methane make no additional contribution to global warming - better reflecting the short lifespan of biogenic methane. When the same constant emissions are calculated using GWP100, the calculation method produces a result that suggests additional warming.

For the time being, GWP100 remains the global standard for national reporting. It is the metric used by the IPCC and applied by, for example, governments worldwide. The PEF CR Dairy - the calculation rules for determining the CO_2eq footprint of dairy chains - also prescribes the use of GWP100.

Reducing Methane Emissions

The impact of dairy farming on the climate has shown a slight downward trend for several years. Regardless of whether GWP* or GWP100 is used, reducing (methane) emissions remains necessary. Methane reduction can be achieved, including by:

- increasing the proportion of grazing.
- improving feed efficiency.
- using additives.
- reducing the amount of concentrate feed in the ration.
- taking measures for the storage and processing of manure.

ZuivelNL
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