Summary

In 2010, the ecological footprint of Flanders was calculated for the first time (Bruers en Verbeeck, 2010), with a result of 6,3 global hectares (gha) for data year 2004. The calculation followed the standards set out by the Global Footprint Network for their National Footprint Accounts edition 2008. However, GFN published a new National Footprint Accounts edition in 2010, with many methodological improvements compared to the 2008 edition. The most important methodological changes are: 1) a new method to allocate bunker fuels from international maritime and air transport to individual countries, proportional to the total import of a country, 2) a more accurate inclusion of processed and secondary agricultural products, 3) the inclusion of international electricity trade, 4) taking into account the use of fish meal in the livestock sector, 5) new assessments of livestock feed requirements, 6) the inclusion of new products with CO_2-emissions related to their production, and 7) recalculations of footprint intensities (gha/ton product) of exported products, using averages weighted by import and domestic production quantities, in order to take into account production efficiency differences between domestic and foreign production. Using this new methodology, the footprint of Belgium increased with 50% relative to the 2008 edition: from 5,1 gha to 7,6 in the new 2010 edition.

In this study, we recalculated the ecological footprint of Flanders, using this new National Footprint Accounts methodology, together with more extensive data. To have a better understanding of the evolution of environmental impacts in Flanders, we did this not only for the data year 2004, but for the period 2004-2009.

The recalculated footprint of Flanders was 9,0 gha/person in 2004, which is 43% higher than the previous estimate of 6,3 gha (Bruers & Verbeeck, 2010). The available biocapacity (maximum sustainable footprint level) for the current world population of 7 billion people is 1,8 gha/person. If everyone on earth would consume like an average Flemish person, we would need more than 5 planet Earths.

The ecological footprint of consumption consists of the footprint of *domestic production* plus *net-import* (import minus export). Alternatively, the footprint can be subdivided into a part related to the *use of fossil fuels* (energy land needed to assimilate CO_2-emissions from fossil fuels), a part related to the *use of renewable materials* (cropland, grazing land, fishing grounds and forest land used in agriculture, fisheries and forestry) and a part related to the *use of built-up land* (buildings and infrastructure). Table 0-1 gives the average ecological footprint value for 2004-2009 subdivided in these two ways. Two values stand out and contribute the bulk of the total consumption footprint: nearly 50% (4,0 gha per person) is related to CO_2-emissions from domestic use of fossil fuels (all anthropogenic emissions on Flemish territory); another 40% (3,7 gha pp) comes from the net-import of renewable materials. Energy land footprint is the virtual forest area required for CO_2 absorption. Even without taking this virtual land use into account, the footprint of 4,7 gha per person is still higher than the available biocapacity of 1,8 gha per person (the Fair Earth Share).

[gha/person]	Footprint fossil fuel use (energy land)	Footprint renewable materials (crop, grazing, fishing and forest land)	Footprint buildings and infrastructure (built-up land)	Total
Domestic production	4,0	0,6	0,4	5,0
Net-import	0,3	3,7	-	4,0
Consumption	4,3	4,3	0,4	9,0

Table 0-1: average footprint values for period 2004-2009 (gha/person)

The Flemish production is more efficient than world-average production: the average Flemish footprint intensities (gha/ton or gha/kWh) are often lower than world-average values. For example the Flemish footprint intensity of livestock products (gha/ton) is relatively low, which can be explained by the use of faster growing animals and an intensive use of cropland with a lot of fast growing maize for forage and silage. That is one of the most important reasons why the Flemish production of renewable materials has a small ecological footprint. In addition, the Flemish footprint intensity for electricity production (gha/kWh) is very low, because few coal power plants (which have high CO_2-emissions) are used in Flanders and a large proportion of electricity is generated with nuclear energy, which has zero direct CO_2-emissions. However, we have to keep in mind that the ecological footprint does not capture all environmental impacts and risks: despite the lower CO_2-emissions due to nuclear energy, its use has important safety risks. Similarly, the intensive production methods used in the Flemish livestock sector lower the ecological footprint, but it also causes a high nitrogen footprint (from manure).

The import-export data are not accurate enough to make a reliable analysis of the evolution of the Flemish footprint for the period 2004 - 2009. As a general trend, the production footprints of fossil fuels and renewable materials (livestock animals, wood products) are decreasing, but this decrease seems to be compensated by an increasing footprint from net-import. The production footprint decreases due to a decrease in the direct CO_2-emissions, the number of livestock animals, the fish captures and the logging volume in Flanders. The increase from net-import is due to an increase in net-import of products with relatively high footprint intensities (gha/ton). Regarding renewable materials, this increase is mostly due to a bigger net-import of some animal products (dairy, chickens, beef meat) and secondary products such as paper, with a relatively high footprint intensity. Also, the net-import of energy land has increased, but due to data inaccuracies this trend shows large fluctuations. It is not clear which products can explain this increase in net-import of energy land, although some chemical products (hydrocarbons, inorganic acids, ammonia) and metals (aluminum) have a large contribution to the net-import footprint.

The shift from production to net-import does not imply that the external footprint of Flanders (the share of the consumption footprint with origin outside of Flanders) increases. Net-import is not the same as import appropriated by domestic consumption. The share of external footprint in the Flemish consumption footprint remains constant in the period 2004-2009. The fact that a decrease of the production footprint can be compensated by an increase in net-import, shows that we should not merely try to improve the production footprint. Attention should also be given to the ecological debt by import, as is also demonstrated by a footprint analysis of Belgium (e.g. WWF, 2010).

This has important implications: not only the Flemish producer should bear the responsibility to manage their environmental impact, but also the consumer has that responsibility. This conclusion is supported by the evidence from the two most important contributors to the Flemish footprint:

1) the footprint related to the domestic use of fossil fuels. This is the responsibility of Flemish producers (industry, freight) and households (heating, personal transport) in particular.

2) the footprint of net-import of renewable materials. Flemish consumers have a high responsibility to lower their use of agricultural products with a high footprint intensity (e.g. animal products and vegetable oils). Governments and businesses in the service sector have a responsibility to decrease their use of paper from wood pulp.

It is not realistic to expect a sufficiently drastic decrease of the Flemish footprint by technological innovations in production and consumption. Improvements in material and energy efficiency are positive, but sometimes it has harmful side effects (e.g. intensification in agriculture results in higher emissions of reactive nitrogen and a higher use of fresh water). Efficiency improvements could also lead to a rebound-effect: the money saved by using energy efficient cars can be spend to other energy consuming activities (e.g. more airplane travel). If we want to decrease our environmental impact, it is important to not only promote technological efficiency improvements, but also lower our consumption in general.