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# Fact sheet

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# Swiss consumption and planetary boundaries

**If everyone were to live like the Swiss it would not be compatible with our planet's boundaries. The impacts of our consumption on climate change, biodiversity and the acidification of the oceans and nitrogen cycle are particularly unsafe. Switzerland's consumption exceeds the safe operating space for humanity in the long term. This is demonstrated the finding of a new study carried out on behalf of the Federal Office for the Environment (FOEN).**

Various methods exist for measuring environmental impacts. The best known is the Ecological Footprint method developed by the Global Footprint Network.[1] This method takes $CO_2$ emissions and land use for consumption purposes into account. A broader set of indicators was used in the latest study, which also takes, for example, the impacts of our consumption on biodiversity and the nitrogen cycle into account. The study adopts the concept of 'planetary boundaries' to estimate the extent to which these footprints can be sustained by nature.

## Planetary boundaries

The 'planetary boundaries' framework is a novel and broad-based scientific concept.[2] Planetary boundaries indicate the level of human impacts that can be sustained in different environmental domains while remaining within a "safe operating space", that is within a range of environmental conditions that are favourable to human development. The best known planetary boundary relates to climate change, however other planetary boundaries have also been identified: i.e. ocean acidification, stratospheric ozone depletion, land-system change, biodiversity loss, nitrogen and phosphorous losses, atmospheric aerosol loading, freshwater use, and chemical pollution.

## Evaluating footprints

In the study "Environmental Limits and Swiss Footprints Based on Planetary Boundaries", which was carried out on behalf of the FOEN, the authors developed new approaches for

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[1] Rees, W. and Wackernagel, M. 1994, 'Ecological Footprints and appropriated carrying capacity: measuring the natural capacity requirements of the human economy' , in *Investing in Natural Capital*, eds. A. Jansson, M. Hammer, C. Folke, and R. Costanza, Island Press, Washington DC.

[2] Cf. Rockström et al. 2009 http://www.nature.com/nature/journal/v461/n7263/full/461472a.html and Steffen et al. 2015, http://www.sciencemag.org/content/347/6223/1259855.abstract

evaluating the extent to which Switzerland's footprints are compatible with the planetary boundaries. To do this they began by deducing the limit value for sustainable footprints at the global level. Based on the assumption that all people have the same rights to resource use, national limit values were then downscaled from these global values. To do this, global and national population scenarios, the temporal aspects of the boundaries,[3] and past and future impacts were taken into account. The method is based on a similar study carried out for Sweden[4] and can be applied to other countries. With its 7th Environmental Action Programme, the EU is also pursuing the aim of "Living well, within the limits of our planet".[5]

By definition, footprints measure the environmental impact of consumption throughout the entire product lifecycle, and hence consider the impacts generated abroad. Due to the international division of labour, which results in many environmentally-intensive production processes being carried out abroad today and in the importation of numerous goods, the level of such impacts is particularly high for Switzerland. For example, the demand for palm oil can contribute to the deforestation of rain forests if the oil palms are cultivated in new plantations. Another example includes heavy industry products, whose manufacture generates greenhouse gas emissions and air pollution.

**Results for Switzerland**

The footprints for climate change ($CO_2$ and other greenhouse gases), ocean acidification (also caused by $CO_2$ emissions), nitrogen loss (overfertilisation) and biodiversity loss are classified as "clearly unsafe".

| Performance | Planetary Boundary concerns | Units | Limit for sustainable footprint | Current footprint | Footprint trend | Reliability |
|---|---|---|---|---|---|---|
| Clearly unsafe | | | | | | |
| | Climate Change | $MtCO_2$ eq | 4.8 | 109 | rapidly deteriorating | high |
| | Ocean Acidification | $MtCO_2$ | 5.7 | 82.8 | rapidly deteriorating | high |
| | Biodiversity Loss | dimension-less* | 0.16 | 0.3 | rapidly deteriorating | low |
| | Nitrogen Losses | kt | 53.8 | 108.6 | slowly deteriorating | low |
| Unsafe | | | | | | |
| | Land Cover Anthropisation | $km^2$ | 21 900 | 17 600 | rapidly deteriorating | medium |
| Data unavailable | | | | | | |
| | Phosphorus Losses | kt | 43.6 | *no data* | slowly deteriorating | low |

Table: Switzerland's performance, limits and footprints (values: per annum).
*For the biodiversity footprint, the biodiversity damage potential was weighted by area.

Switzerland's performance in the area of climate change, for example, is classified as 'clearly unsafe': based on model assumptions, an annual footprint of 4.8 million tonnes of $CO_2$ equivalents ("Limit") would be compatible with the planetary boundary: Switzerland's current greenhouse gas footprint is 109 million tonnes and the trend is upward.

The ozone layer, which is now recovering, is an example of a planetary boundary that was exceeded and on which the international community has already taken effective action.

[3] *Inter alia* the question as to whether a certain limit must be complied with every year or whether the cumulative emissions over a certain period matter.
[4] http://www.stockholmresilience.org/21/research/research-news/6-28-2013-a-safe-operating-space-for-sweden.html
[5] http://ec.europa.eu/environment/pubs/pdf/factsheets/7eap/en.pdf

**Consequences for a green economy**
The limit values provide indicators of the scale of the overexploitation of resources and provide orientation when it comes to the discussion of possible target values. Such discussions must also include, for example, the question of the attainability of targets, cost-benefit considerations and international cooperation. These questions were not considered by the study.

It is not feasible for Switzerland to quickly reduce its footprints to below the limit values. However, the federal authorities have already undertaken a series of measures to reduce the environmental impacts of consumption, for example through the reduction of food waste; food production is associated with major environmental impacts both at home and abroad. Other examples include climate and energy strategy and the efforts made to boost the implementation of international standards, e.g. for palm oil and soya. With the Federal Council's Green Economy Action Plan further measures to reduce resource consumption are being taken in cooperation with the business sector.


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## Internet
- Link to study: www.bafu.admin.ch/ressourcenverbrauch