

support system' (or short: LSS), and to regard this as an AoP of its own. It is interesting to note that the endpoints for this LSS are located in the middle of the environmental mechanisms underlying the current impact categories. In principle it may be possible to model further along these mechanisms up to the well known endpoints such as human life and biodiversity. However, there are several reasons to regard the LSS as an AoP of its own. Impacts through the LSS on the other AoPs will in part happen in the far future, and will in general also be very uncertain. Moreover, the LSS as a basis for life on earth, is often given distinct attention in environmental policy. It is indeed seen by society as 'a thing to protect'!

Problem 3: As mentioned above, the man-made environment in only seen as AoP, in as far the mechanisms underlying the impacts pass along environmental processes. It is questioned whether this is sufficiently discriminative: will not too many impacts be included which we do not want to include? We will check this by giving suggested answers related to a number of examples.

Example 1: Are car accidents part of LCIA; and what about wild life casualties? Suggested answer: human car accidents do not imply environmental processes, so they are not part of LCIA. In contrast, as wild life is part of the environment, wild life casualties caused by motor traffic imply environmental processes (e.g., animal dispersion, population dynamics); so these indeed are part of LCIA.

Example 2: Are working environment impacts such as repetitive strain injury (RSI) and sick building syndrome part of the man-made environment and thus also part of LCIA? RSI is not based on environmental processes, so it is not part of LCIA. On the other hand, if we regard the work environment as part of 'the' environment, then at least components of the sick building syndrome (viruses, mites, etc.) are caused by environmental processes, and are therefore part of LCIA. However, because these types of impact deal with human health, they fall under the AoP 'human health' and not under the AoP 'man-made environment'.

Example 3: Is more competition between humans over resources part of economic values and therefore also part of LCIA? The answer could be: only if human competition expresses itself in interventions which influence environmental processes, the impacts will be taken into account in LCIA. For the rest they can be part of LCI modelling.

Example 4: Is less economic productivity due to erosion the impact we want to assess, or is it the direct loss of soil (-quality, -fertility)? This example clearly implies environmental processes. So a first answer is that it is important that these impacts are included in an impact category with a good category indicator. The next question then is whether we should select this category indicator at midpoint or at endpoint level. If we accept the LSS as an AoP of its own, the endpoints are at intermediate level, and there is no need in LCIA to model further up to the economic damage.

Example 5: Will also economic (or some environmental) impacts be included due to future (economic) restoration processes when foreseen? The answer should be yes; the restoration processes are economic activities, the impacts of which should in principle be taken into account. The only point is that the relationship with a given product function should be well established.

Suggested Conclusion Problem 3: From these examples it may become clear that the given guideline may well be able to give sufficient clarity. It is not so much the question whether the endpoints lie within the economy or within the environment; rather the question is whether environmental processes are involved in the causation of the damage.

4 Overview

The Areas of Protection together with the major related societal values, are presented in Table 1 below, in order to exemplify the above suggestions (see also Fig. 1).

Table 1: The Areas of Protection and the major related societal values

Areas of Protection	Societal values
Natural resources	
– abiotic (minerals, fossil fuels, sand, water)	economic value
– biotic (fish, wood, from natural populations)	economic value
Human health	
– life time	intrinsic value of human life
– life quality	intrinsic value of human life
Natural environment	
– natural landscapes	intrinsic value of nature
– biodiversity (ecosystems, species, genomes)	intrinsic value of nature
Man-made environment	
– crops, plantations, fish ponds, etc.	economic value
– cultural landscapes	cultural value
– buildings, materials	economic value/cultural value
Life support system	
– climate, ozone layer	life support
– bio-geochemical cycles	life support
– hydrological cycles	life support
– soil fertility	life support

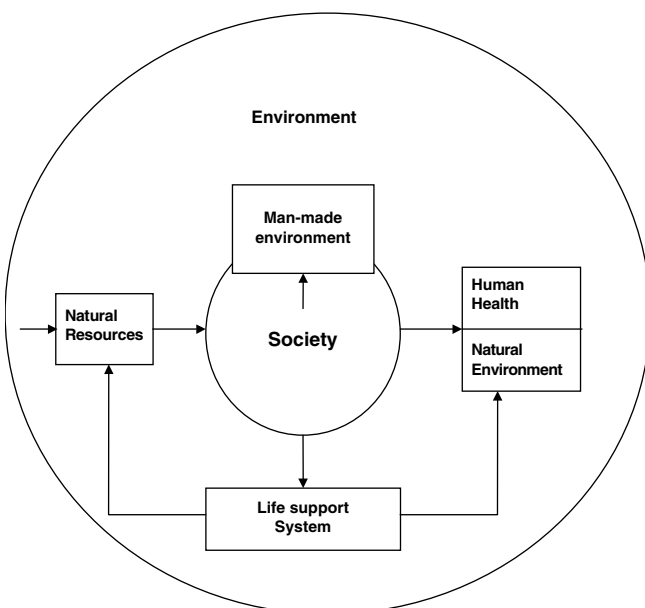


Fig. 1: Areas of Protection and the major related societal values