



DGSK

**Biological und Cultural Diversity
in a
Globalised Information Society**

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Preface

The aim of this study was to examine the relation between the present decrease of biological and cultural diversity on our planet and the increased development of a modern globalised information society. Despite being rather different categories, cultural and biological diversity have some aspects in common. Spatial isolation contributes both to the creation of biological and cultural diversity and in both areas this isolation is lost through globalisation.

Looking at cultural diversity for example, one may observe a world wide spread of "Western Lifestyle" both by the traditional and by the new media, while in the area of biological diversity more and more damage is caused by invasive species which follow the flow of merchandise products.

It is very clear that the development and use of information technologies can have a tremendous indirect effect on diversity. In contrast to previous assumptions, the information technology has contributed to increased resource consumption which is a major threat to valuable biotopes. At the same time as contributing to the destruction of the real world, these virtual worlds may distract our attention from the real problems and cloud them in virtual ambiguity.

This study gives an insight into the complexity of these relationships and focuses attention to the urgency of measures for the preservation of biological and cultural diversity.

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Niedereschach, July 2002

Thomas Schauer

1. The Reduction of Biological Diversity

Biological diversity is decreasing world-wide drastically. Comprehensive studies show that presently 24% of mammal and 12% of bird species are threatened by extinction. With respect to plants less is known as not even all plant species have been described and many of them may be destroyed without even having been discovered. The main reason for the decrease of biological diversity is the destruction of precious biotopes both in developing and in developed countries.

We come to a very important point which is hardly discussed in the European media and which is closely related to economic globalisation: The displacement of native plants and animals by invasive species. For example, neophytes are plant species which invade biotopes and change their natural equilibrium. This in itself is neither unusual nor negative. Central Europe has traditionally been a region of frequent immigration processes since the reduction of the original biological diversity during the last ice age. As the ice moved more and more to the South, so did the plants - until finally they reached the Alps which formed an unsurmountable barrier. The organisms found themselves trapped. As the ice age came to an end, the continent was re-populated by new species - and this is still an ongoing process.

However, the immigration of foreign species has increased to such an extent today, that this natural rate is exceeded. Scientists have imported organisms from all regions of the planet and inevitably some species have travelled as stowaways. Most of the imported species were unable to adapt to the conditions in Europe and disappeared again, but some others survived and thrived in the new surroundings and were very successful. Having no natural enemies in Europe they could multiply almost without restrictions. *Solidago canadensis*, *Heracleum giganteum*, *Reynoutria japonica* and *Impatiens glandulifera* are impressive examples of such species. Some of them have actually displaced the native vegetation almost completely in some biotopes.

Because economic globalisation increases the transportation of goods, there is a risk that the number of invasive species which is spread world-wide will continue to increase, too. In a worst case scenario these invasive species would continue to populate and invade until different biotopes were homogenised world wide. Regions with similar climatic conditions and soils would finally be inhabited by the same organisms irrespective of their location in

Europe, Northern America or New Zealand. A lot points to the fact that world wide development is heading in this direction. For example, in Germany there have already been about 250 successful "invasions" of plants.

The German Society for Rare Agricultural Plants (Deutsche Gesellschaft für seltene Kulturpflanzen e.V.) helps to maintain and preserve rare organisms which themselves often have the capacity to invade natural biotopes (i.e. *Helianthus tuberosus*). Even *Oenothera* which is used in the logo of the organisation represents both the potential uses and risks related to the introduction of new plants. On one hand *Oenothera* provides useful compounds but on the other hand the plant escaped from controlled cultivation and can be found today in nature in Central Europe. In order to fight the risks related to potentially invasive plants, the German Society for Rare Agricultural Plants has proposed a Neophyte-Codex which was welcomed by the German Government (Bundesregierung 2000).

Neophyte-Codex of the German Society for Rare Agricultural Plants

1) Neophytes and genetically modified plants should be treated equally !

Whether plant species and varieties appear in European biotopes after travelling by ship from Southern America or whether they escape from fields where genetically modified plants are cultivated, does not matter. Both phenomena should be judged by equal criteria. Presently, the dangers that arise from the import of organisms are underestimated whereas the dangers which arise from genetically modified plants are often overestimated and both categories are treated differently.

2) The population should be informed !

The knowledge of the population about neophytes and genetically modified plants is not sufficient. In a survey 2/3 of the population were unable to ascertain that the statement "Genetically modified tomatoes contain genes whereas traditional tomatoes do not contain genes" was wrong. Also, invasive species cannot be identified by most people as the botanical knowledge is generally rather poor. People can distinguish only few species.

3) A "Black List" of those plants which must be stopped from spreading should be prepared !

In order to deal with the neophyte problem successfully, it is necessary to prepare a "Black List" of invasive species. Plants on this list should be eliminated from natural biotopes. Spreading or sale of species on the "Black List" should be prohibited.

4) The polluter-pays-principle should be applied !

If there are invasions of plants into natural biotopes or even into protected areas, the polluter-pays-principle should be applied both in the case of neophytes and genetically modified plants. The "polluter" has to accept responsibility which means that he is responsible for paying all the costs related to the elimination of the invasive organisms.

The Reduction of Agricultural Biodiversity

In the past the formation of international markets for agricultural products had a very negative effect on agricultural biodiversity. International competition forced farmers to cultivate just those species and varieties which returned the highest short-term income. Therefore, regionally cultivated varieties which would have been a very valuable resource for future plant breeding but which have lower yields, were no longer cultivated.

The number of higher plant species existing on Earth is estimated to be 300,000 - 500,000. About 250,000 species have been described scientifically so far and about 30,000 species have proven to be edible. However, humankind has cultivated only about 7,000 species so far. Today we are in a situation in which only 30 different species are used to produce the nutritional needs for the world population, and wheat, corn and rice alone provide 50% of the calories (FAO 1997). Not only is the low number of species used for agriculture a problem but also the varieties of these cultivated species have been reduced significantly in the last century. This lowering of diversity can have heightened risks associated with crop failure.

- 10,000 wheat varieties were documented in China in 1949, but by 1970 their number had been reduced to 1,000.
- Between 1804 and 1904 there were 7,000 varieties of apples cultivated in the United States. 86% of them do no longer exist. Apart from that, 95% of the cabbage varieties, 94% of the pea varieties and 81% of the tomato varieties have disappeared from the United States.
- In Mexico 80% of the corn varieties have disappeared since 1930.
- In Korea the number of plant varieties cultivated in small gardens was reduced by more than 75% in the period from 1985 to 1993.

This "genetic erosion" continues and agricultural diversity is replaced by a dangerous uniformity which could prove to be a major threat to food security in the future.

2. The Reduction of Cultural Diversity

In the cultural area, diversity is disappearing more and more. This can be shown by looking at the number of languages spoken world-wide. Today there are approximately 6,500 different languages spoken on Earth. On the average, one language disappears every 14 days and with this language a unique culture, unique tales, myths and unique ways of thinking disappear as well.

The spread of "Western Culture", which is facilitated by the new media and by industrial products is one of the main reasons for this decrease in diversity. Often the term "MacDonaldisation" is used to describe the phenomenon of the disappearance of regional differences.

This disappearance however existed already before the introduction of the internet. For example, many German dialects have lost the specific words which distinguished them from other dialects and are reduced today to accents which are used for the pronunciation of the same words. The internet may accelerate the further reduction of regional differences by introducing English as a standard for communication. It seems that the internet is not a place of high cultural diversity.

On the other hand the number of existing websites exploded within recent years. According to Murray (2000) the limit of 2 billion websites was already exceeded in the year 2000 (In June 2000 the number of existing websites was estimated to be 2.1 billion with a daily increase of 7.5 million). Bergman (2001) explored the difference between the Surface Web and the Deep Web. The Surface Web consists of those websites which are theoretically accessible by search engines and the Deep Web contains those sites which are not static but are generated by queries. These sites are not accessible by presently available search engines. According to the study, the Surface Web contained 19 terabytes of information whereas the Deep Web contained 7,500 terabytes in March 2000. To illustrate: A paper strip covered in a single-line text (12pt Times New Roman) and with a length corresponding to the equator would contain 0.13 terabytes. The registration of domains has been processed with a breathtaking speed. At the end of the year 2001, there were 31,595,287 domains and only the IT crisis caused stagnation and a slight reduction later.

But the number of websites and domains is a misleading indicator of diversity. Global statistics show that the majority of hosts are located in the United States and that most websites are written in English. 43% of internet users have English as their mother language even though this group forms only 6% of the world population.

The dominance of the English language on the internet can be explained on the one hand by the technological leadership of the United States and on the other hand by the fact that in addition to 350 million native English speakers there are another 1.35 billion people who have learnt this language. English has become the standard in international communication - and for example the number of people, who are currently learning English in China is larger than the number of inhabitants of the United States.

Language	Percentage	Language	Percentage
English	68.39 %	Polish	0.27 %
Japanese	5.85 %	Hungarian	0.16 %
German	5.77 %	Catalan	0.14 %
Chinese	3.87 %	Turkish	0.14 %
French	2.96 %	Greek	0.09 %
Spanish	2.42 %	Hebrew	0.06 %
Russian	1.88 %	Estonian	0.06 %
Italian	1.56 %	Romanian	0.05 %
Portuguese	1.37 %	Icelandic	0.04 %
Korean	1.29 %	Slowenian	0.04 %
Dutch	1.01 %	Arabic	0.04 %
Schwedish	0.93 %	Lithuanian	0.03 %
Danish	0.44 %	Latvian	0.02 %
Norwegian	0.40 %	Bulgarian	0.02 %
Finnish	0.38 %	Basque	0.01 %
Czech	0.32 %		

Relative frequencies of languages on websites (minimum share 0.01%, Cohen 2001)

Language	Share of native speakers in the internet community
English	43.0%
Japanese	9.2%
Chinese	9.2%
Spanish	6.7%
German	6.7%
Korean	4.4%
Italian	3.8%
French	3.3%
Portuguese	2.5%

*Population groups in the internet community,
listed according to the number of native speakers (Globalreach 2000)*

Presently, a decrease in the dominance of native English speakers on the internet can be detected. Up to a few years ago they still had a dominance of more than 50%, but as other nations begin to access the internet, their languages and cultures are represented on the web.

E-commerce could play a role in enhancing this process and could increase cultural diversity on the internet. Surveys showed that the readiness of people to engage in e-commerce increased as soon as they were offered goods and services in their native language. However, it would be misleading to conclude from these trends, that sooner or later all cultural minorities will be addressed in their native language on the internet. The translation of websites to rare languages and their updating is expensive. Therefore it can be expected that in the long run only those population groups with the sufficient financial resources to be active customers will be addressed in their native language. However, many cultural minorities are disadvantaged financially and cannot provide a market which would be large enough to make websites in their language profitable.

Moreover, it turns out that the global economic players are not even prepared for a multilingual internet. In a study (Worldlingo 2001a) the reaction of large companies to emails in foreign languages was examined. Mails in Japanese, French, Spanish, Italian, German and Portuguese were sent to 250 of the world-wide largest companies. Only 11% of them sent a

reply in the language they were addressed. 64% did not answer at all to the mails using foreign languages. In the study, Italian companies provided the best results while Japanese and American companies showed the worst performance. In an additional examination, the providers of the 50 world-wide most successful websites were addressed by mails in foreign languages. More than 95% of them did not send adequate replies. The performance of the top internet companies was thus worse than the performance of the construction industry (World Lingo 2001b).

Can endangered cultures be saved by the internet ?

On the internet it is possible to find websites of European activists who are engaged in the maintenance of threatened cultures, for example the website of the "Society for Threatened Peoples" (<http://www.gfbv.de>), or official websites of international organisations such as part of the website of the UNHCR ([www.unhcr.ch/html/menu2 /ind_main.htm](http://www.unhcr.ch/html/menu2/ind_main.htm)) and some websites made by members of threatened cultures themselves. But by storing them on the web it will not be possible to save these cultures and often the number of websites which represent these cultures on the web is overestimated. For example a Google search for the Tlingit tribe (native Americans) reveals 27,000 hits. Considering that only 14,000 Tlingit are living today, the high number of hits might provoke the conclusion that there is an internet euphoria in this tribe. But a closer look shows that this is obviously not true. Most of the websites found are neither made by Tlingit nor for Tlingit. Most are citations of dictionaries, lists of tribes of native Americans, descriptions of handworks and sites which profess to sell Tlingit souvenirs. There are only few websites actually representing the culture and the life of the Tlingit such as the website of the official representatives of the Tlingit and the Haida tribes (<http://www.tlingit-haida.org>), the description of a village (<http://yukonweb.com/community/teslin/museum/>) or the description of a school (<http://www.yesnet.yk.ca/schools/teslin/>).

Vertical versus horizontal cultures

While the internet supports cultural levelling of the regions on the one hand, it can on the other hand support the formation of so-called horizontal cultures. This phenomenon as such is not a new one. Already in the Middle Ages there were not only regionally different (vertical) cultures but also horizontal cultures such as the religious orders which established specific cultures on an international level. The members of these communities were often active long

distances from their hometowns and their native cultures. The prerequisite for the formation and the maintenance of these horizontal cultures was a system of fixed standards of behaviour and a (relatively) effective communication system. While in the past the emphasis was on the predefinition and interpretation of rules of behaviour, there are less explicit rules necessary on the internet age. Today any group can gather together on the internet to form specific horizontal cultures. Coherence of the group is facilitated by a permanent feedback and does therefore not need a definitive code of conduct.

But nonetheless the possibility of the creation of horizontal cultures via the web seems not to keep pace with the disappearance of cultures from the real world. Presently, much more knowledge of native vertical cultures is lost than new knowledge created by horizontal cultures on the internet.

Cultural and biological diversity - common aspects

There is a significant correlation between the richness of countries with respect to biological and cultural diversity. Among those 25 countries which have the highest cultural diversity there are 16 states which have the highest biodiversity of plants and 14 states with the highest diversity of vertebrates (Harmon 1996). With respect to the threat to biodiversity and cultural diversity there are interesting parallels as well. One example is the phenomenon of invasion - on the one hand invasions by species have caused significant damage in ecosystems for example in Australia, New Zealand or in the Mediterranean (Caulerpa). On the other side there is the invasion of the English language. For example computer specialists or managers world-wide do no longer speak their native language but a mixture of their language and a large portion of English terms. In the meantime not only are NGOs such as Terralingua (<http://www.terralingua.org>) focussing on the parallel aspects of cultural and biological diversity, British Telecom dealt with the problems, too, and published a report on the topic (BT 2000). Finally, spatial barriers were observed to play a crucial role in biological and cultural diversity and the disappearance of these barriers were the main threat for the survival of diversity.

3. The Internet as a Driver of Globalisation

Globalisation may be understood as an increased mobility of people, goods, money and information which is caused by the decrease of spatial barriers.

People are mobile today as they never were before

The Germans (population: 80 million) are the world champions with respect to travelling. Annually they go on about 120 million holiday trips, 20 million business trips and 2.8 billion day trips (80% of the latter are done by car). Thanks to modern information technology we do not need a permanent location any more in order to be provided with the information and services we need.

Goods travel around the world

On average between 1900 and 2000 the world-wide production of agricultural, mining and merchandise products grew by 2.5% annually. World export, however, increased by 7% on average (WTO 2001). This means that in the last decades of the past century a trend was continuing since the last World War (with only few interruptions). The fact that trade growth continues to exceed production growth means that transportation of goods grows as well. There are more and more trucks on the road being used as mobile store-houses and they bring cargos to their destinations "just in time" thanks to information technologies.

Money has increased mobility, too

The export of agricultural products, mining products and merchandise products has a daily value of US-\$ 14 billion world-wide. The daily trade of foreign currencies is about 100 times larger: Thanks to information technologies, US-\$ 1,200 billion are traded every day.

To this end, Josef Ackermann (management of the Deutsche Bank AG) has observed:

"Während Liberalisierungen und Deregulierungen auf den Kapitalmärkten der westlichen Welt, in den letzten Jahren zunehmend auch in Schwellenländern ("Emerging Markets"), die entsprechenden rechtlichen Grundlagen boten, haben die modernen Instrumente der IuK-

Technologie, vor allem das Internet, erst die notwendigen technischen Voraussetzungen geschaffen. Die Globalisierung der Kapitalmärkte hat erst dadurch nachhaltig an Dynamik gewonnen Internationale Kapitalmärkte und Internet – beide Begriffe sind Ausdruck für Dynamik und Fortschritt, beide werden mitunter aber auch als Chiffre für Macht und apokalyptische Reiter des Kapitalismus gesehen und kritisiert."

(While liberalisation and deregulation of the capital markets of the Western hemisphere has in recent years (also increasingly in emerging markets) provided the corresponding legal basis, the modern instruments of the information and communication technology have created the technical prerequisites. Only this way sustainable dynamics of the globalisation of the capital markets could be gained.....International markets for capital and the internet - both are expressions of dynamics and progress and both are sometimes regarded as a symbol of power and as an apocalyptic cavalier of capitalism)

Information world-wide within seconds

The increased mobility of information can be regarded as the cause for the growing mobility of people, goods and money. This comparison illustrates how the mobility of information has developed: If the performance of cars had been improved as much as the performance of computers, it would be possible today to drive one million kilometers in an hour on a full tank of fuel and it would also be cheaper to throw away the car after a ride than to buy a parking ticket.

The consequences of globalisation for cultural and biological diversity

In the chapters about cultural and biological diversity the negative effects of globalisation have already been mentioned. In the following chapters, two aspects of this relationship will be examined in detail. In the case of cultural diversity it will be shown how the new technologies reduce ethical standards to a "Smallest Common Denominator" and in the case of biological diversity an indirect argument will be presented to show how the information society has a tremendous hunger for resources which increases the pressure on biotopes.

4. The Principle of the Smallest Common Denominator

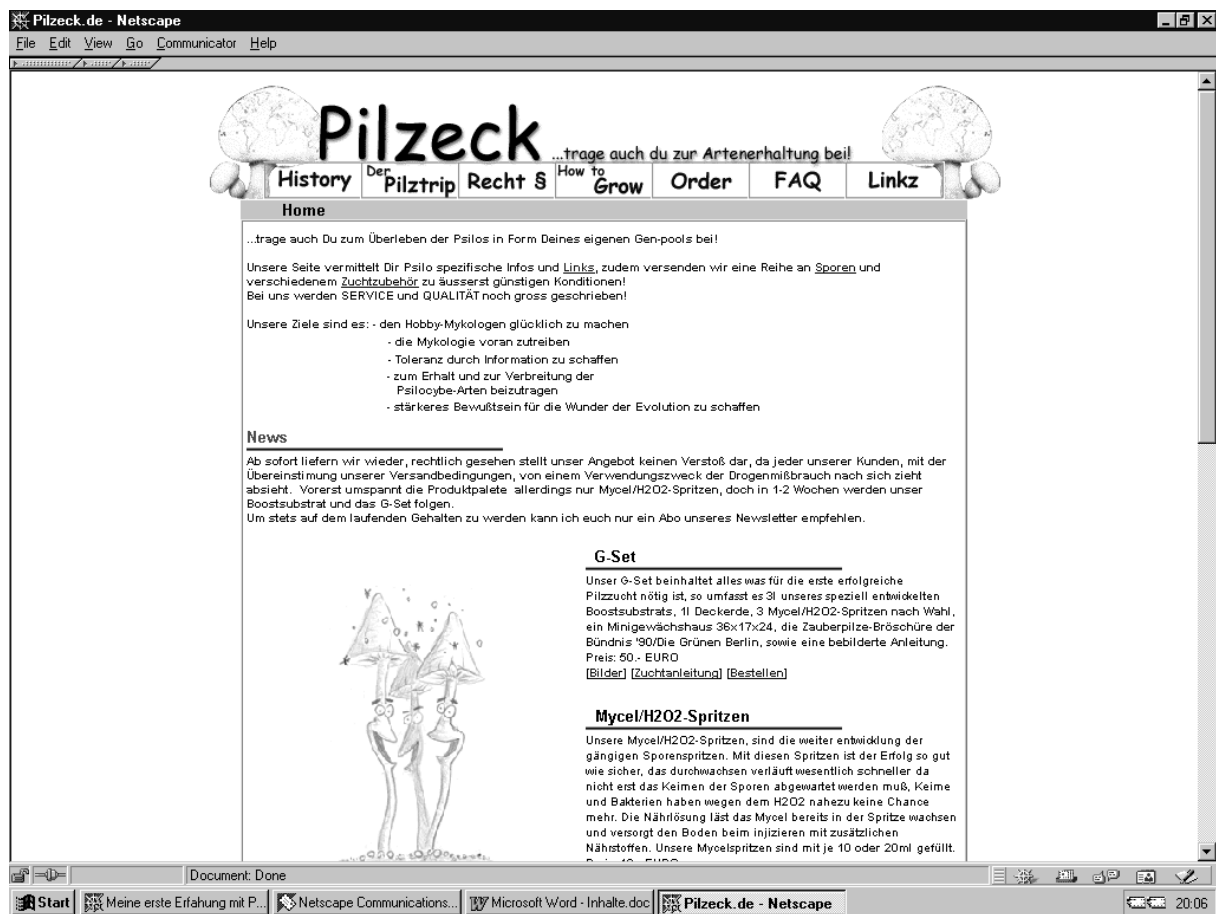
Ethical standards cannot be maintained in the information society

The internet is a tool which enables everybody to make any contents available to a large number of people. Before the introduction of the new media, only television, the film industry and printed media were able to reach a large audience and these traditional media were obliged to keep defined ethical standards. But on the internet such standards practically do not exist - anybody can spread anything world-wide.

Drugs on the internet

If somebody is interested in drugs or in specialized psychoactive compounds, they will find a large amount of information on the internet. This information contains not only public authority warnings but also tips on how to access or to prepare the drugs in question and reports about drug experiences which are likely to make the readers curious. An example of this are websites which promote campaigns for the legalisation of cannabis. <http://www.cannabislegal.de> is one of the most popular sites in Germany. This site is found for example within the first ten hits of a Google search for the Representative of the German Government for the Reduction of Drug Use, Ms. Caspers-Merk. Because Cannabislegal follows up on any activity of Ms. Caspers-Merk and cites any interview, her name appears frequently on the website and therefore the ranking in a respective search is high. Among other links of Cannabislegal there is <http://cannabis-archiv.de/>. On this page the reader can find detailed descriptions on the cultivation of Cannabis plants and on the production of the drug.

People who are interested in hallucinogenic mushrooms may find a lot of information on the internet, also. On the website <http://www.zauberpilz.de> detailed information can be found about the biology and chemistry of the mushrooms as well as hints on how to get around the legal situation. For example if hallucinogenic mushrooms are collected accidentally (because the collector supposed they were edible mushrooms) negative legal consequences in Germany are unlikely. The website also presents photos of the mushrooms and reports by consumers of the drug. On another website, <http://www.pilzeck.de> the spores, which are necessary for breeding the mushrooms, were being sold and links to several dealers who sell the stuff were provided (page closed in Jan 2002).



Website of Pilzeck ("mushroom corner")

If someone has basic knowledge in chemistry, they can start their own laboratory synthesis of drugs using information available on the internet. There are technical descriptions on how to prepare LSD from ergot as well as information on the total synthesis from basic compounds. This information is spread via the online manual ""How to make LSD". This manual was available in September 2001 on the website www.pla-net.net/~alucard/archives/chem/howlsd.html for downloading but the site had disappeared by January 2002. However, at that time "How to make LSD" was also offered on the websites www.pierre.top.free.fr/drg/How%20to%20make%20LSD.txt and at www.geocities.com/bruciato_lasd/lsd.htm. Such location changes are typical of the way of how illegal or dangerous information appears on the internet. The texts have meanwhile been copied by so many surfers that as soon as one site is closed, another one can take over its role. Using the Altavista or the Google search engine it is very easy to find the information again.

Political extremism on the internet

Another problem is the growing number of Nazi sites on the web. Some providers in Germany decided not to host such sites but this measure did not have much of an effect as Nazi organisations started to become active as providers themselves. And they started to profit from the fact that the German laws which prohibit extremist and racist content are without effect if the content is presented via websites which are located in countries where right-wing extremism is tolerated as part of the freedom of expression such as in the United States. Especially in the late nineties, the number of right-wing websites grew rapidly. These sites offer a lot of propaganda publications. Hitler's "Mein Kampf" can be downloaded as well as the old version of the German national anthem "Deutschland, Deutschland über Alles". It is possible to order stickers with the "Hakenkreuz" and people who want to purchase the items are also reminded of "security measures" such as omitting identifying marks on the outer surface of the letter. According to a report by the "Bundesamt für Verfassungsschutz", the number of right-wing extremist websites has grown by a factor of 10 between 1996 and 1999. The authority is sceptical about the chances of stopping the spread of Nazi propaganda via the web: "Die Einstellung solcher Propaganda oder gar von strafbaren Inhalten wird - angesichts der Strukturen des Internets und der unterschiedlichen Rechtsauffassungen insbesondere zum Grundrecht der Meinungsfreiheit in anderen Ländern - nicht zu verhindern sein." (*"Hosting of such propaganda and of content which is subject to punishment by German law cannot be prevented because of the structure of the internet and different opinions about the freedom of expression"*).

Pornography and Brutality

Pornography plays an important role on the internet and contributes significantly to the popularity of the new tool. Sometimes figures relating to annual turnover created by pornographic contents are published but they are very rough estimations and not very reliable. The significance of pornographic contents can be illustrated by the results of a Google search for various terms.

computer:	44.600.000 hits
sex:	31.200.000 hits
porn:	10.200.000 hits
freedom:	7.200.000 hits

Besides the quantitative aspects, the quality of the pornographic contents on the internet is surprising. A wide variety of content may be found ranging from things which are usually indicated as pornography to sadomasochistic websites and websites on which there are photographs presented of human cadavers and mutilated people. Below, there is a list of some of these websites in order to give the reader an impression of the kind of things which are accessible via the web. Persons of a sensitive nature or disposition are recommended not to visit these sites.

<http://hjem.get2net.dk/sexchock/gb-toys001.html> - *between pornography and gynecology*

<http://www.hotclub2000.com/exclusive/pictures/extreme/> - *extreme homosexual webseite*

<http://internetdump.com/users/elmstreet/go.htm> - *smushed, burnt and mutilated people*

http://www.geocities.com/wpb_strangla/HorrorPorn.html - *dead bodies*

<http://exploitedteensasia.com/> - *offers youngsters from Asia*

<http://www.maxsfree.com> - *section about sex with animals*

<http://www.snuffix.com> - *brutality*

Strategies against dangerous content on the internet seem unsuccessful

Limitations at the source

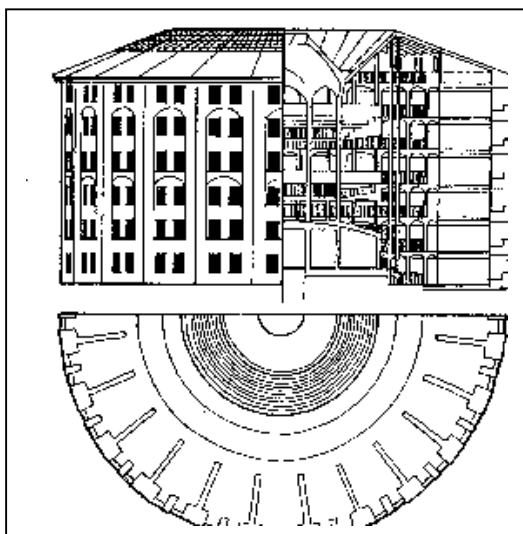
Principally it would be possible to stop the spread of harmful content on the internet by measures relating to the provider. However, this possibility is largely excluded by present legislation. In Germany, for example the law on "Rechtliche Rahmenbedingungen für den elektronischen Geschäftsverkehr (EGG)" passed at Parliament. It was based on the targets of the EU guideline 2000/31/EG and similar laws therefore were prepared in many European countries. The EGG restricts the possibility to stop harmful information at the contents provider by declaring the "validity of the laws of the country of origin". This means that someone who offers information via the web is subject primarily to the legislation of his state and not of the states where the information can be read on the web - even if services or products are offered to people in foreign countries (§4 Abs. 1 EGG and §5 Abs. 2 EGG). Exceptions to this principle are only possible if they are necessary for the protection of public order, especially with respect to the prevention of crime, protection of the youth and racist propaganda. These restrictions however can only be applied if the content is stored in Germany.

Restriction of access at the consumers' side

There is various software available which promises to filter harmful content and to protect children for example from visiting pornographic sites. In May 2001 Consumer Reports published test results about such products (Consumers Union of U.S. Inc, 2001). Tested among others were AOL Parental Control, Cybersitter 2000, Net Nanny, Cyber Patrol and Internet Guard Dog. None of the products which costed between \$39 and \$89 could provide effective protection from harmful content. They allowed up to 20% of the pornographic sites used for the test appear on the screen. Other sites which did not offer harmful content were blocked. Moreover, experience shows that any technical tool which intends to block access to harmful content will sooner or later be hacked. Persons looking for suitable tools can find them also on the web.

The vitreous surfer

While technical blocking of access to websites is not promising, there could be effective control by survey of the surfer's behaviour. If the surfers know that every step they make on the web is observed and recorded (or potentially observed and recorded), they will probably be afraid to visit illegal or banned websites. The principle is known as panopticon and was designed by Jeremy Bentham (1748-1832) as an innovative concept for prisons. The panopticon prison was designed in a way that the prisoner could be observed permanently.



Prison designed according to the panopticon principle

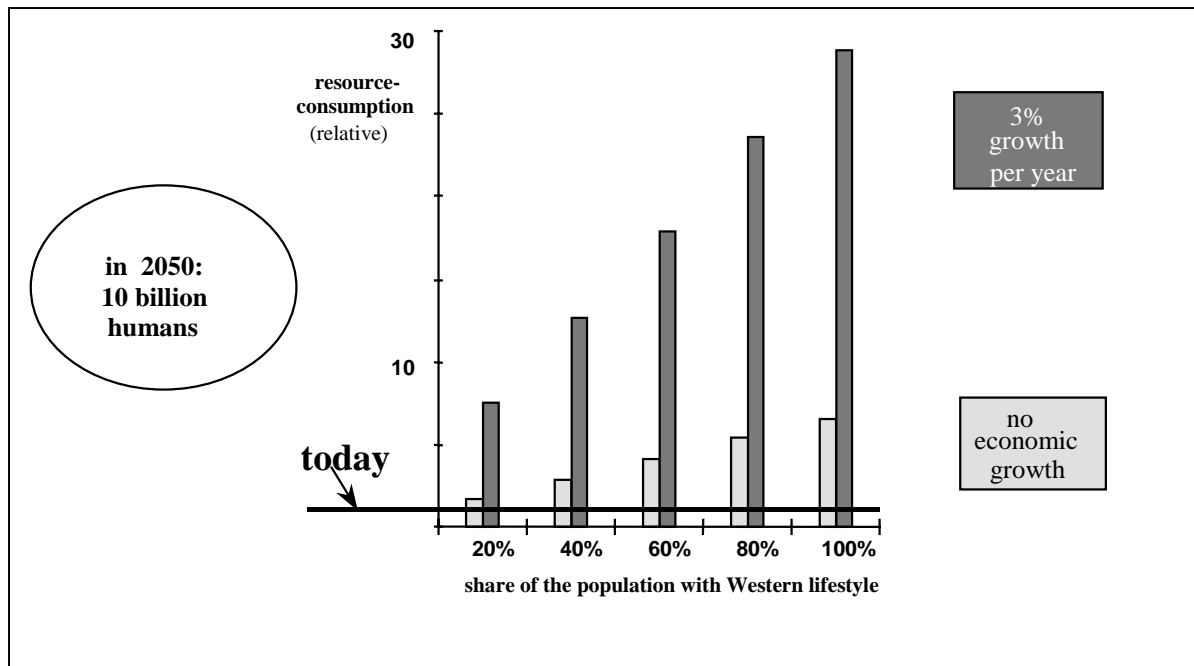
The rooms were arranged in a way which made it possible for a controller sitting in the centre of the building to look into any room. Of course this is possible only theoretically because even a larger number of observers would not be able to look at all rooms at the same time, but even the risk of being observed would lead to a more disciplined behaviour of the prisoners. However the concept of a vitreous surfer according to the panopticon principle is heavily criticized by many internet users who oppose survey as a violation of their privacy.

Result: The smallest common denominator with respect to ethical standards

In addition, attempts to restrict the presentation of illegal or harmful content on the web face some principal problems. How can the term harmful be defined? A video presented on the internet, showing how a cat is skinned and fried will shock Western audiences. Chinese cooks, however, may be delighted by such instructive information. Pictures which in Western Europe are regarded as being far away from pornography may be not acceptable and offending to Islamic surfers. If content is prohibited in some or nearly all countries but is regarded as legal in only one state, it can nevertheless spread world-wide from that location. Thus the internet supports a trend towards the smallest common denominator with respect to moral standards. Only content which is forbidden in all countries (and that's not much) can be banned from the web. The smallest common denominator is presently the banning of websites offering child pornography which at least has disappeared from the easily accessible parts of the web (Pedophiles meet in groups with restricted access on the web, access can be gained only after submission of illegal material - a procedure which assures that all members of the network have violated laws and are thus "in the same boat").

5. Real Resource Consumption of the Virtual Economy

Presently, we are still in a situation in which 20% of the worlds population, living in the rich countries, consume 80% of the resources. This state is represented by the black horizontal line in the figure below.



Possible development of the resource consumption (Schauer 2000)

The first light bar shows the increased resource consumption which would result from the expected increase of the world population from 6 billion to 10 billion if the relationship between the rich and the poor were to remain constant. If the presently detectable formation of a global middle class continues and more and more people copy our lifestyle, resource consumption would increase as shown by the light bars and if everybody would live to 2050 as is possible in the rich countries today, a factor of eight would result. However, the calculation done so far does not consider the consequences of economic growth. If there is an annual economic growth of about 3% and if this growth is not decoupled from resource consumption, a factor of 30 will result. It is obvious that the question whether we will use information technologies for dematerialisation or whether we will use them to increase resource consumption (intentionally or unintentionally via rebound-effects) will decide whether a sustainable development will be possible or not (Radermacher 1997).

Today, the opinion is still widespread that the environmental problems in the IT-sector are less serious than in other parts of the economy and that there is hardly an industrial branch which has an image with respect to the environment, which is as good as that of the IT-industry. There are no smokes from the chimneys, the mobile phones and computers do not contain dioxine and the industry has achieved incredible gains in efficiency (Moore's law).

Information technology and resource consumption

During the 1990's scientists were still rather optimistic in their forecasts about the effects of information technology on resource consumption. "Everything will get smaller and thus more environmentally friendly" was the predominant opinion. But this euphorical attitude has vanished. On the one hand it turned out that the IT-hardware, even though considerably smaller, has a large ecological Rucksack. During production large amounts of resources are needed. On the other hand it became visible that even in those cases in which miniaturisation is actually correlated with a decrease in demand of resources, this efficiency gain is transformed into lower prices, stimulates consumption and thus indirectly causes an increase of resource consumption. This effect is called the rebound-effect (Radermacher 1997, Forum Informationsgesellschaft 2000).

Two groups of rebound-effects can be distinguished (Schauer 2000). There are primary rebound-effects which are related to the direct consumption of materials or energy by the IT hardware. But IT can also increase resource consumption via lifestyle changes and result in secondary rebound-effects.

From the cradle....

The enterprises promising us virtual worlds belong to the large polluters of the real world. In the U.S., those sites which are heavily polluted are classified as Superfund Sites. In California there are 101 Superfund Sites and the highest concentration is in Santa Clara County, the Silicon Valley, with 23 Sites. Even Los Angeles has only 16 Superfund Sites. A closer look at the companies involved shows that many from the IT business are responsible for the problems: Fairchild Semiconductor Corp., Westinghouse Electronic Corp., Spectra-Physics Inc., Advanced Micro Devices Inc., National Semiconductor Corp., Teledyne Semiconductor, Intel Magnetics, Intel Corp., Hewlett Packard, Intersil Inc./Siemens Components.

The problem of contamination of the environment by toxic compounds can be solved relatively easily by a better environmental legislation. The more difficult task will be the control and the reduction of resource consumption for the production of IT devices. As a very pure atmosphere is needed for the production of the chips and purification of the air to such a degree is complicated, there is a significant amount of energy necessary for the production of IT hardware. Estimations of material use with the MIPS method revealed unexpectedly high results, too (Malley 1997).

....during a whole computer life....

Energy consumption by computers is often underestimated by the users of IT-devices. But with a power uptake of 50 to 100 Watt by the computer itself and further 100 Watt by a traditional monitor, even surfing in the virtual world can become a resource consuming pleasure, especially if users have a flat rate internet access and don't switch off the computer after use.

Electrical devices in Germany already in 1995 consumed 20,5 TWh energy per year in their standby-mode, which was 4,4% of the overall current consumption. Devices from the area of telecommunication (computers, phone, fax etc.) were responsible for the largest part (6,3 TWh) followed by TV/video (5,8 TWh), audio (2,3 TWh), devices for the preparation of warm water (2,3 TWh) und copying machines (1,2 TWh, Umwelt 1999). The standby energy consumption of computers has increased since 1995 as in Germany their number has more than doubled.

The products which will be available in the future are likely to further increase our resource consumption. For example Electrolux has developed an intelligent refrigerator. It knows exactly, which products are stored, remembers the preferences of the users and can, in case it is connected to the internet, order products via email. It is informed about expiry dates, gives respective reminders to the users and can also serve as a communication terminal. The device is refrigerator and computer at the same time and according to Electrolux energy consumption of the screenfridge is 12.5 Watt higher than the consumption of the corresponding "stupid" refrigerator. If the Screenfridge were to become a standard device within European households, energy consumption would increase by 1.5 GW and there would be a need to build an additional large power plant.

.....to the grave

The growing number of IT-devices is not only accompanied by environmental stress during production and use. The increasing number of devices is also beginning to cause a growing waste problem. In many European countries and so on the European level there is an intensive debate on how to solve the problem. The need for a solution is getting more and more pressing as the devices are getting smaller and smaller and the probability that they will simply be put into the waste bin instead of being processed and at least partially recycled is also increasing. In June 2000 the European Commission made a proposal for a directive of the European Parliament and of the Council on waste electrical and electronic equipment (EU 2000a). The Commission argued that the problem of electronic waste would increase:

- The **rapid growth** of waste electrical and electronic equipment is of concern. In 1998, 6 million tonnes of waste electrical and electronic equipment were generated (4% of the municipal waste stream). The volume of waste electrical and electronic equipment is expected to increase by at least 3-5% per annum. This means that in five years 16-28% more waste electrical and electronic equipment will be generated and in 12 years the amount will have doubled. The growth of waste electrical and electronic equipment is about three times higher than the growth of the average municipal waste.
- Because of their **hazardous content**, electrical and electronic equipment cause major environmental problems during the waste management phase if not properly pre-treated. As more than 90% of waste electrical and electronic equipment is landfilled, incinerated or recovered without any pre-treatment, a large proportion of various pollutants found in the municipal waste stream comes from waste electrical and electronic equipment .
- The environmental burden due to the production of electrical and electronic products ("**ecological baggage**") exceeds by far the environmental burden due to the production of materials constituting the other sub-streams of the municipal waste stream. As a consequence, enhanced recycling of waste electrical and electronic equipment should be a major factor in preserving resources, in particular energy.

Key elements of the planned directive are:

- separate systems to collect and process electronic waste.
- setting of minimal standards
- absorption of costs by the producers

In parallel the Commission proposed a directive of the European Parliament and of the Council on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EU2000b).

Will the internet make lifestyles more unsustainable ?

The information society will probably change daily life even more than the industrial revolution did. Being still in a relatively early stage of the changes ahead, we are presently unable to forecast the development and its consequences in detail. However it is possible to analyse primary trends and estimate how they might be related to environmental sustainability. Presently there are two different pathways possible which can be described by two different hypotheses.

The Substitution Hypothesis and the Cyberworld-Scenario

With the help of new information technologies, real products and services will be replaced by virtual ones. The transition ahead of us is as fundamental as the transition from the agricultural to the industrial age. The virtual economy is primarily a service economy which makes it possible to decouple economic growth from resource consumption.

A future in which the substitution hypothesis is realised can be described by a cyberworld scenario. The life of people is transferred more and more to cyberworlds and resource consumption in real life decreases. Data highways replace physical highways, virtual meetings replace physical meetings and most meetings will be done as videoconferences. These assumptions are supported by research which shows that people in all industrial countries tend towards post-materialistic attitudes and values.

The Addition Hypothesis and the Pandora-Scenario

The addition hypothesis starts from the fact that the industrial society has replaced the agricultural society mainly with respect to the workforce. People moved from agricultural work to work in industry. In the year 1900 there were only 38% of the workforce active in agriculture in Germany compared to 62% in 1800. On the material level, the industrial society did however add to the agricultural society. Via a positive feedback even more agricultural products could be produced than before. In 1840 Justus von Liebig had published his findings about the application of chemistry in agriculture which resulted in the broad use of fertiliser and an increase of the cereals production in Germany by a factor of three between 1850 and 1900. In some other countries a different development took place. Cereals production in Great

Britain decreased by 18% in the same period. This was not a result of a lower productivity (the yields of wheat and rye per area were similar in Germany and Great Britain) but was caused by a first wave of globalisation. As in Great Britain customs on the import of cereals were abolished, import increased so much that in 1900 only 27% of the wheat consumed in Great Britain was produced in the country. Instead of wheat the economy produced industrial goods.

The information society means again a shift of the workforce - this time from the industrial to the service sector. But on the level of production, the information society has added to the industrial society and via positive feedback, industrial production is increased.

The addition hypothesis can serve for the design of a Pandora-scenario which describes a development which leads to an ecological disaster. When the transformation from the agricultural society to the industrial society took place, the magnitude of the positive feedback was restricted. Even though the number of humans who could be fed multiplied and the share of energy-consuming meat products in the diaries was increased, the food uptake of the population was restricted and as soon as there was overproduction, the quantities of food produced had to be reduced again. In the case of information technology and its positive feedback on industrial production, there might be less limits. The consumers' hunger for products seems never to be saturated and the ability of the industry to provoke this hunger and to supply adequate products is not restricted because the price mechanism which is used for steering the market is not corrected by an ecological component which internalizes the destruction of our ecosystems. In addition a globalisation effect can be observed which can be compared to the development in Great Britain in the 19th century. The production of the products of the "older" economy is transferred to other countries. Toys, textiles and computer parts are imported for example in large quantities from Asia. The increasing productivity there (cheaper workforce and less environmental laws) can stimulate consumption again. In Europe there is an increasing focus on the new technologies and the service sector leading to a "clean economy", but in summary the information technologies will not result in a change of the direction into which humanity has been moving over the last two centuries. We will use IT to accelerate to a dead end. Like the opening of Pandora's box brought evil to Earth, the information technology enables us to practice many new possibilities of consumption (evil from the view of nature) which will have disastrous results and consequences.

Substitution or Addition, which hypothesis is more realistic ?

Both the Cyberworld scenario and the Pandora scenario are extreme and overstated. The prognosis of dematerialized lifestyles is as unrealistic as the assumption of endless growth of industrial production. But the scenarios are useful to demonstrate the two directions in which an information society could move. Videoconferences could actually replace business travel and thanks to IT, offices could operate today without using paper. A development according to the substitution hypothesis would thus be possible. However, if we look at the present global trends, it is more probable that a development would occur which points to the direction of the addition hypothesis. In the following sections, some areas in which secondary rebound-effects occur, are considered: Human mobility, transportation of goods and paper consumption.

Homo virtualis will not stay home with the computer

People are today as mobile as they have never been before and there seems to be a close relationship between communication and travel behaviour. There was already in the pre-internet age a correlation between the number of messages sent by people, beginning with letters and later including phone calls, and the number of kilometers travelled. The development was in parallel.

Have people said that because of telephone calls, which bridge distances easily, they would travel less and that television would replace holiday trips because they could see foreign countries comfortably from their home? Development in reality was completely different but this finding does not prevent some prophets of the new technologies forecasting a reduction of travel due to the introduction of information technologies. Email and videoconferences, they argue, would result in a replacement of highways for cars by information highways. So far, no such trend has been observed. We use the new technologies to increase our communication activity and at the same time travel statistics show that street traffic continues to grow. In the 1990's the length of the motorways network in the EU grew by more than 25%, exceeding a length of 50.000 km. Biodiversity has suffered because there are less and less unspoilt areas and thus the species which need a defined size of territory disappear.

More environmental burden by e-commerce ?

There is the risk that the transportation of goods will continue to increase via e-commerce. More products from remote regions become accessible. But not only could the consumption of new exotic products increase the environmental burden, the distances over which traditional products are transported could increase as well. Shop-Bots are search engines which help the customer find a dealer who offers the best rate for a specific product. As long as transportation is relatively cheap, this will lead to an increase in long-distance transport.

Telework might accelerate urban sprawl

An examination of the ecological consequences of telework gives different results depending on how the "system boundaries" are set. Principally telework is a suitable means to replace commuting on the road by virtual traffic. But it is not very probable that the teleworkers will spend the time they save at home. They will possibly travel even more in order to go shopping, to do sports or to visit friends. It is also possible that they may move to a beautiful spot in the countryside and commute 100 km once a week instead of 10 km five times a week as they did before. Urban sprawl could increase the pressure on biotopes and on biological diversity and houses in the countryside are usually built larger due to lower land prices.

A fairy tale : The paperless office

The story of the paperless office is a further example of the missing realisation of potential benefits of the information technologies. After the introduction of computers did not enable paperless work, there had been the hope that internet and email which make the transportation of files very comfortable would lead to a breakthrough. But today there is no reduction of paper consumption in sight. Forests are destroyed and replaced by monocultures of trees despite every effort in the recycling area. Studies on the paper use in big companies or organisations reveal impressive figures. Each of the 21,500 employees of the European Commission uses on the average 270 sheets of paper per day. Annually, 1.5 billion sheets (4,000 tons) must be transported to the copying and printing machines. The Bank of America uses 9.5 Million sheets of paper per day. Paper consumption is very different world wide: US-Americans use almost 350 kg of paper and cardboard per year, people in Ethiopia only 0.3 kg.

6. Perspectives on the Preservation of Diversity

The present reduction of biodiversity due to over-use of natural resources is difficult to stop and it seems that information technology rather increases than decreases the problems. In order to achieve sustainability in the information society, there are two strategies discussed besides that of using a more environmental friendly hardware: Measures for the increase of environmental awareness of consumers and frameworks such as new laws and taxes, which support environmental friendly behaviour. In political discussions, participants sometimes focus on only one of these components but due to weaknesses they can only be successful if they are applied in a combination.

Eco-schizophrenia and the long way from consciousness to behaviour

Surveys carried out on the topic of environmental consciousness arrive at the conclusion that the population in Europe is very concerned about the state of the environment. 80% of Europeans believe that they will be exposed to dangers which arise from poisoned soils within the next few years, more than 60% are afraid of climate change, 65% are afraid of poisoned drinking water. 80% of the population in Germany claimed to have actively contributed to the protection of the environment. But these are statements in polls, an examination of the actual behaviour gives different results. Obviously the environmental awareness does not result in changes of behaviour. The examination of the third of the German population which is most environmental friendly according to verbal statements revealed that 74% of them travelled by car or by air to their last holiday and 39% did not care about saving hot water.

The discrepancy between ecological awareness and actual behaviour, the eco-schizophrenia (Schauer 2000) can be explained by a lack of attractiveness of environmentally friendly lifestyles. The "prototype of a sustainable citizen" would live in a small flat, he would not travel, not possess a car, would re-use shopping bags and would not buy exotic fruit. This lifestyle is practised only by some pensioners with small incomes whereas the ecological activist after re-using shopping bags can leave his large flat and travels to the Himalayan for meditation. Obviously, the post-materialistic values which the substitution hypothesis refers to, exist only in the minds of people. On a high level of saturation of demand for consumption people re-discover non-material values but they don't decrease consumption.

New frameworks - will voters "cooperate" ?

People who behave in an environmentally friendly way often have to suffer disadvantages. The area of preservation of biodiversity is not an exception to this rule. The UN Food and Agriculture Organisation (FAO) stated:

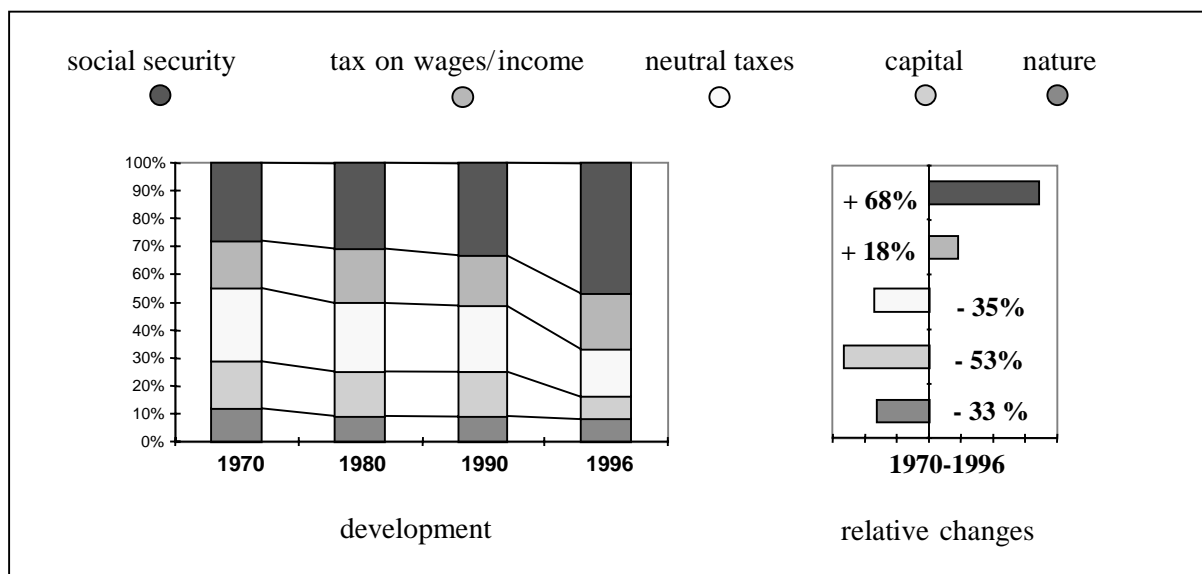
What farmers do see is the cost of maintaining diversity, which is the 'opportunity cost' or potential income lost by not planting modern varieties. When the farmer's cost surpasses the local portfolio value, there is an incentive to convert to modern agriculture. Similar factors work at the national level. While governments may appreciate the local and national portfolio values, they have difficulty appropriating them in any meaningful way and cannot appropriate the global portfolio value at all.

Smaller and poorer states, in particular, see few incentives in conserving a high level of diversity, because they appropriate only a small proportion of the benefit. Their farmers are encouraged to switch to high-yielding varieties, rather than maintain diversity.

Plant breeders and seed companies appropriate the exploration value when they market varieties that have incorporated farmers' material. This value however, does not return to the farmers, from whom the germplasm came. If this value could be appropriated by the farmers and their communities and countries, substantial areas with diverse agro-biodiversity would have a much better chance of being preserved.

Without greater incentives to maintain such biodiversity, greater than the opportunity cost of not converting, there is no real prospect for change in the immediate future, and states with rich genetic resources in traditional agriculture will see little reason for retaining this diversity. The major factor driving genetic erosion is that traditional farmers who develop and conserve agro-biodiversity, are generating a "public good", without adequate incentives. They are producing global values for which they obtain no return. Without appropriate and urgent solutions to this paradox, the loss of agro-biodiversity will accelerate, and the consequences will be serious, irreversible and global. (FAO 1997)

Therefore there is an urgent need for new laws which change the price system and make environmentally friendly behaviour also economically advantageous. The protests in Seattle, in Davos and in the meantime also at the meetings of the EU Ministerial Council show that within parts of the European population indignation grows about the dominance of economy and the neglect of social and environmental aspects. The development in the past has shown that there is in fact the possibility to direct people and business. In Germany taxes and social security contributions changed in the past: Labour was charged increasingly. As a result labour productivity increased much more than resource productivity.



*Long term structural changes in tax and social security contributions in Germany,
Förderverein Ökologische Steuerreform 1997*

Theoretically it should be possible to reverse this trend, but the way back is much more difficult. Measures which intend to reduce material consumption face opposition by the consumers and this opposition can change voting - leading to a high risk to the government which initiates the changes and also to the parties which are not part of a government. Therefore a change in frameworks will be without success if it is not accompanied and supported by a consciousness change within a majority of the population.

The discussions prior to the 1998 elections of the German Parliament provide an instructive example. The party Bündnis 90/ Die Grünen ("the greens") agreed on a draft for a programme which was presented in Oct 1997. In this draft an increase of fuel prices to 2.20 Euro was foreseen. Media attention to this draft was relatively low. But when in the second draft in December 1997 an increase of the price to 2.55 Euro until 2008 was cited, it was discussed intensively and contributed essentially to the loss of support by the voters. According to polls the party had a share of more than 12% before the discussion about the fuel prices but got only around 6% of the votes in the elections in the Western part of Germany. In the Eastern part there was a reduction from 7% to 4%.

Scope is reduced by globalisation effects

Ongoing globalisation does not only mean an increased availability of products from many different countries for the benefit of the consumers, it also has negative consequences which have made many people very critical of it. Their criticism is mainly directed to the undermining of social and ecological standards by multinational companies as a result of global competition and a significant decrease of the power of traditional national states with respect to the capability of setting and enforcing standards. For example it is no longer possible for national governments to set tax rates independently of the world wide situation because both the multinational companies and rich individuals have found ways to escape tax burdens which they consider to be too high. Often they use even legal loopholes and transfer their profits to states with lower tax rates.

The Cayman islands have only 31,000 inhabitants. But meanwhile there are 575 banks registered, which keep US-\$ 500 billion on their accounts. There are 20,000 companies registered on the islands but the majority of the native people have still traditional occupations like fishing. Further tax havens are the British Channel Islands, Liechtenstein and others. According to estimations, such locations altogether host between US\$ 7,000 and 8,000 billion (Attac 2001).

The new media can be a very useful tool for the administration of money located abroad. But it is not only the global players who can escape taxation - via the internet it is possible for ordinary citizens as well - for example with respect to taxes on tobacco products. There are a few companies which sell tax-free cigarettes via the web. The cigarettes are not subject to taxation in the countries of origin and they are stored prior to sale in tax-free bonded warehouses. How many cigarettes people order there, how often, and if the seller and buyer act according to the laws, cannot be supervised. There are so many parcels entering the European Union that the probability that illegal content will be detected is very low. Moreover the recipient has the option to deny the order and to refuse to accept the delivery if problems occur. In that case the supplier gives a money-back guarantee. Thus the risk for the customer is low and the price difference is significant. Whereas for example a Marlboro cigarette costs 15 Eurocents on German territory, it is available for 8 Eurocents via Yesmoke (January 2002).

It is obvious that in the age of globalisation national governments and parliaments have become toothless tigers. Many national regulations cannot be kept up or be enforced.

7. Virtual Ambiguity as Opposed to Real Diversity

A phenomenon which may play a role in future as an obstacle both for the creation of environmental awareness and for initiatives which intend to change frameworks is the possibility that the virtual worlds make us forget the problems in the real world. We spend more and more time with media. A look at the historical development shows that in the past traditional media was not replaced by new media but that the new media was used in addition to the old one. In spite of the introduction of the radio, people continued to read newspapers and in spite of TV, radio is still popular today. Thus, people continue to watch TV and use the internet as well. Germans (14 years and older) increased their daily consumption of media from 309 minutes in 1980 to 502 minutes in 2000 (many of them are used in parallel, i.e. music from the radio or CD-player while reading). Today we spend more and more time not in reality but in the virtuality created by the media. And for these media, exchangeability is characteristic. If we do not like one of the worlds presented there (if there are for example reports about environmental problems), we can make them disappear with a click. We can choose between more than 50 TV-channels and millions of different websites. The daily zapping between different virtual realities might support an attitude which could lead to the illusion that finally the so-called environmental problems in the so-called reality are inconveniences which we can get rid of with a click, too (as we are not confronted with them in our everyday life any more after the visible problems such as dirty water and poisoned air have been solved and there are the "abstract" ones remaining like the global warming and the disappearance of some species which we did not see anyway). Thus, the virtual worlds could prove to be a trap which makes solving the problems ahead more difficult.

The relationship between virtuality and reality is complex. How can we for example know whether information which is presented via the internet is true or false? This problem of verifying information is not new and there have been false informations in printed media as well, the publication of the false Hitler diary by the German Magazine Stern is a famous example. However, there appears to be a new dimension of the problem after the introduction of the internet for two reasons.

- Today, anybody can present any information on the web at low cost and search engines do not distinguish between the sources. The verification problem is thus more frequent.

- In contrast to traditional media the internet is interactive which means that we do not only consume information but react as well and do business. Therefore the verification decisions are more momentuous.

But how can we be sure that the attractive lady in the chatroom is not a 10-year old boy who has scanned a picture from a magazine and how can we know if the company with the impressive website will really deliver the desired product with the attributes indicated?

Even in the scientific area it is necessary to be more sceptical if information is not presented via traditional journals but via the web, because there is usually no quality control, no review process on the web. For example, the German Newsserver Heise reported the development of a new robot, called slugbot. It was to be a mobile device moving autonomously in the fields collecting slugs. It was planned then to use the slugs for a fermentation process which would provide the energy to feed the robot. But is this really possible? Can slugs with their extremely high water content really provide enough energy? Perhaps the people at Heise, who



Website with a description of the Slugbot

are more computer specialists than biologists did not test the scientific plausibility sufficiently? Mails addressing the energy problem sent to the scientists who developed the slugbot, remained without reply.

Apart from the true websites with false information there are false websites with (almost) true information. Frequently websites are forged, for example the website of the World Trade Organization WTO. The authentic website is registered at <http://www.wto.org>. The forged one uses the designation GATT (which was the WTO precursor and never had a website). A group of people who call themselves "The Yes Men" registered the domain name <http://www.gatt.org>. The forged website has at first sight the same layout and content as the true WTO site.

Search engines find both websites, Altavista listed the forged one in position 5 in a search for WTO. By looking at the false website in detail and scrolling down, it is principally visible that something is wrong - but most people do not examine the whole website of a well-known organisation before addressing the organisation via the contact buttons presented. For example the Center for International Legal Studies (CILS) addressed WTO Director General Mike Moore via the false website and asked him for a conference presentation in Salzburg. The request did not reach the WTO but "The Yes Men" who excused Mr. Moore and proposed to send another WTO representative, Mr. Bichlbauer. This proposal was accepted and the false WTO representative travelled to Salzburg and gave a presentation. Mr. Bichlbauer provoked the audience with remarks about the laziness of Italians but there were no protests against his proposal to use market mechanisms in democratic elections by creating agencies with the legitimation to buy votes. Even after the event "The Yes Men" succeeded in fooling the organisers and invented an assault in which Mr. Bichlbauer was hurt. The whole story was documented on the website <http://www.theyesmen.org> - including a video. The report (if it is true) is an impressive example of the challenge of verification of information on the internet. Also, prior to the Doha WTO meeting the WTO website warned of the false website and the false website advised against the WTO website.



false WTO-Website <http://www.gatt.org>

The example shows, that virtual worlds can have effects of their own and interfere with reality. Virtual worlds and the real world can even co-exist and only if significant contradictions appear, reality catches up with virtuality. In the case of the reduction of biological and cultural diversity it is however possible that this catching up happens too late. In our everyday life we do not have much contact with biological diversity anyway and do not meet the cultures which are threatened to be extinct. When the rare organisms and cultures finally have disappeared from reality, there are colour pictures and files remaining on the internet which we may re-animate in the virtual worlds like in Jurassic Park.

Instead of a Summary: The Symptomatic Ambiguity of the Term Sustainability

Sustainable development has become a widely used term today. A Google internet research for the term reveals more than one million hits. And it is amazing that there are no sites which are opposed to sustainable development. Thus, the term seems to have become a universal consensus. But this is true only at first sight - a closer investigation reveals that there are many contradictory definitions and that the dissent about a sustainable path to the future is hidden in these definitions. For classification of sustainability definitions an axis of anthropocentricity is proposed along which the different definitions can be located.

The "Pure Ecologist" definitions

The understanding of pure ecologists demands the maintenance of natural resources and minimisation of human influence. Nature is regarded to have a right of its own to exist. This definition corresponds to the understanding of indians who apologise for cutting a tree or killing an animal before doing it.

The "Moderate Ecologist" definitions

This type of definition still focuses on the preservation of nature but has also emphasis on the role of nature as a "resource providing institution for humans". Human development has to proceed within the crash barriers that nature sets.

The "Concerned" definitions

In this type of definition, close connection to ecology is relaxed and concerns about social and ecological problems are treated equally. Generally, two spheres are distinguished: The Natural Sphere and the Human Sphere. The development of both has to remain within defined limits. The Brundtland Commission for example argued similar by claiming the maintenance of resources in order to give human (!) beings of future generations equal chances of living.

The "Industry" definitions

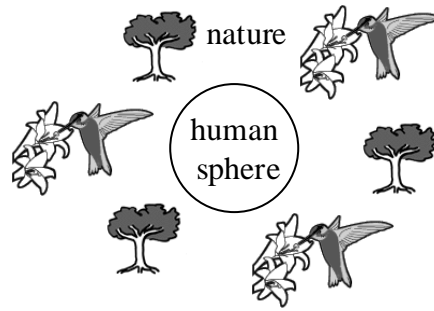
Industry prefers the pillar concept which states that sustainable development is based on ecological, social and economic sustainability and that these pillars have equal importance and have to respect each other. Thus, this concept splits the human sphere of the "Concerned" type definition in two separate areas: Social development and economic development.

The "Virtualist" definitions

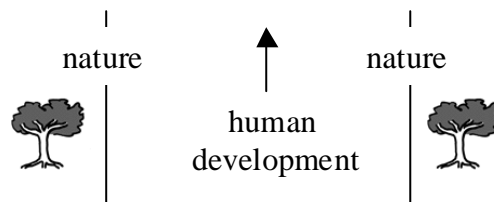
In some recently developed definitions, used mainly in the area of information society initiatives, a further pillar, the cultural pillar, is introduced. This type of definition can be regarded as the most anthropocentric one described so far.

centred on nature

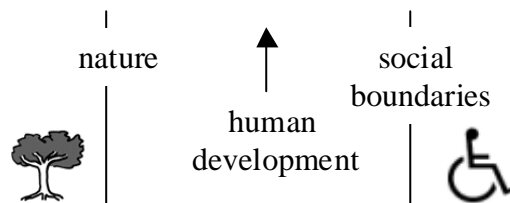
Pure Ecologist



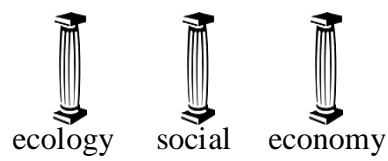
Moderate Ecologist



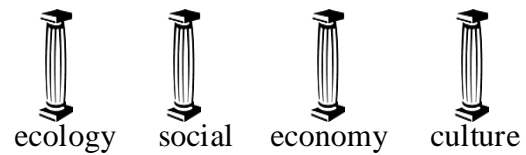
Concerned



Industry



Virtualist



anthropocentric

Scientists as well as politicians and lobbyists choose one of the definitions according to their personal preferences and according to the practical consequences for argumentation: "Pure Ecologist" definitions usually lead to a working concept with few space for compromises. Activists get quickly in conflict with politics and economy - rarely leaving a way out of the dispute. Their definition of integration of humans into nature is perceived by their opponents as encapsulation, inhibiting any progress. "Concerned" definitions mostly lead to a crash-barrier concept of argumentation. They accept the importance of both social and economic aspects. In practical work, the efforts are directed to maintaining economic development within social and ecologic constraints. "Industry" definitions are not acceptable by ecologists. They often lead to concepts which state that measures protecting nature and having negative implications for industry are not acceptable because they violate economic sustainability. Also, using the terms ecology, social system and economy, which are entities from different categories, causes problems. The Enquete Commission "Protection of Humanity and Mankind" of the German Parliament followed an "Industry" definition and often found itself in a blocked situation. The commission established rules for the tree dimensions of sustainability. It was not so difficult for ecological sustainability (some rules about renewable and non-renewable resources) but caused problems with the economic and social rules, which were achieved only after endless discussions. Examples for such rules are: "The social systems can only grow to the extent that such growth is backed by greater economic performance potential", or: "The economic system should be designed in such a way that it "promotes personal initiative and subordinates personal interest to public interest". In these areas, different understandings of how society should look like and conflicts between trade unions and entrepreneurs caused severe problems and showed that the "Industry" type of definition may lead to a dead end. In "Virtualist" type of definitions, integration of the cultural dimension bears an additional problem of finding consensus. How should cultural development look like? Should we approach a culture of common values or should we follow the principle of cultural diversity, which in a wide definition would also allow further suppression of women in some Islamic countries?

The more anthropocentric a definition becomes, the more societal discourse about possible transition paths to sustainable development becomes necessary because more and more normative questions have to be addressed. While the scientific prerequisites for ecological sustainability can be at least roughly defined, this is not the case for social, economic and cultural sustainability. But while societal discourses in the social and cultural area can lead to progress, they can have only disastrous consequences in the ecological area. Our ecosystems are not negotiable and nature does not conduct consensus talks.

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